

Prehistoric Research in Xinjiang, Northwest China

A Dissertation

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I, Xiaozhe Li, hereby affirm that I prepared the submitted dissertation on the topic “Prehistoric Research in Xinjiang, Northwest China”, independently and without the support of third parties, and that I used no other sources and aids than those stated.

Abstract

Located in the northwest of China and southeast of the Eurasian Steppe, Xinjiang has always been considered one vital meeting point that bridges East China, Central Asia, and Europe. The bridging road was then named the “Silk Road.” The earliest historical documents in the Han dynasty recorded the first official expansion carried out by Zhang Qian, a Chinese envoy, in 114 BC. This expedition put the previous communication between east and west into a formal connection. The languages and cultures of the Silk Road have exchanged various cultures from different regions, including the pre-Han time.

There were several independent small states in the Tianshan Mountain ranges before the Han government, like Yuezhi, Wusun, Xiongnu, etc. These states have displayed similar nomadic lifestyles with each other and other cultures from the north. Therefore, communication must have existed long before the Han Dynasty. The prehistoric Xinjiang must have several external/internal communication approaches that developed in many aspects.

This dissertation intends to organize the prehistoric Xinjiang materials, reconstruct the prehistoric Xinjiang framework, and provide new research to study subsistence patterns, economic strategy, social status, and state formation.

The whole dissertation is articulated as follows:

Part I. An introductory chapter provides the background and outlines of the research. Chapter 1 is devoted to the geographical and climate descriptions. The topography characteristic of Xinjiang can be summarized as “two basins sandwiched between three mountains” (Altai Mountain, Tianshan Mountain, Kunlunshan Mountain, Junggar Basin, and Tarim Basin). Its large scale contributes to variable climate differences from north to south: mountain-oasis-desert condition. Xinjiang is generally in the central continent and exhibits a typical continental arid climate. The dry weather has preserved the ancient relic remains in good condition.

Chapter 2 revived the research history concerning the Xinjiang prehistoric study, which can be divided into four phases: 1. 1900-1940s, 2. 1940-1970s, 3. 1970-1990s, 4. 2000-present. Even after more than 100 years of exploration, the comprehensive research on prehistoric Xinjiang is still limited due to the lack of excavation materials and little multidisciplinary cooperation.

Chapter 3 concerns the research problems, methodology, and related concepts during the research. After more than 100 years of research, it is evident that Xinjiang prehistoric cultures have been closely connected with other neighboring cultures, and this chapter mainly describes the possible related cultures in the nearby regions: Yamnaya culture, Afanasievo culture, Andronovo culture, Siba culture, and Kayue culture, etc.

Part II regards the prehistoric materials that have been published yet, which is the central part of this dissertation. In this part, Chapter 4 views the “Paleolithic Age” sites that are dated between 240,000-4,000 BP, while Chapter 5 is about the “Bronze Age”- “Iron Age” sites, according to the geographical order. Each site is described based on the smallest excavation unit, trying to provide the most detailed information for the reconstruction. Each section of this part follows the framework of 1. *Location*, 2. *Research History*, 3. *Findings*, 4. *Age*, 5. *Interpretation*.

Part III is the discussion part, in which it first establishes the prehistoric chronological sequence and then divides the whole prehistoric Xinjiang into 11 cultural zones: (A). *Southern Hami Zone*, (B). *Eastern Hami Zone*, (C). *Balikun region Zone*, (D). *Turfan Basin Zone*, (E). *Altai Mountain Zone*, (F). *Western Junggar Zone*, (G). *Mid-northern Tianshan Mountain Zone*, (H). *Mid-southern Tianshan Mountain Zone*, (I). *Lop Nur Zone Southern*, (J). *Tarim Zone*, (K). *Pamir Plateau Zone*. According to the chronological framework and the separate cultural zones, this chapter proposes the possible cultural communication route in prehistoric Xinjiang.

The conclusive part, Chapter 7, summarizes the prehistoric material and the cultural

zones and provides a general picture of prehistoric Xinjiang before Han Dynasty.

The prehistoric Xinjiang started around 300,000 BP in the Altun Mountains region, when two spots exhibit the earliest lithic percussion assemblage. Several Paleolithic sites were distributed in the Altai Mountain, Hami Basin, and Tarim Basin until 4,000 BP, respectively; however, these lithic traditions did not transform into the Neolithic technologies in the following centuries. The arrival of Bronze Age cultures from central Asia leads the Paleolithic Xinjiang into the Bronze Age around 2,500 BC. The outside Bronze Age culture from the west and east contribute to the unique Xinjiang native cultures, with the coexistence of painted pottery wares and bronze items. The continuous communication helped the development of metallurgy; at the beginning of the first millennium BC, iron came into use in Xinjiang prehistoric sites. The transmission of tool production and continuously external/internal cultural communication contributed to the revolution on subsistence strategy. The rise of horse nomadism with metal harnesses and weapons has led to frequent conflicts and expansion of local territory. The adoption of agricultural practice assured a relatively stable sedentary life.

In general, this thesis intends to first build a fundamental database for prehistoric Xinjiang research, and this database will be enriched with more discoveries and research results. Only by collecting all the published data can we have a basic knowledge for the further study. In addition, this thesis also provides a new general chronological sequence of Xinjiang prehistory, and discussed the possible cultural interaction route according to the cultural comparisons.

Abstrakt

Das im Nordwesten Chinas und im Südosten der eurasischen Steppe gelegene Xinjiang gilt seit jeher als ein wichtiger Treffpunkt, der eine Brücke zwischen Ostchina, Zentralasien und Europa bildet. Die Brückenstraße wurde damals "Seidenstraße" genannt. In den frühesten historischen Dokumenten der Han-Dynastie wird die erste offizielle Expedition von Zhang Qian, einem chinesischen Gesandten, im Jahr 114 v. Chr. erwähnt. Diese Expedition brachte die bisherige Kommunikation zwischen Ost und West in eine formale Verbindung. Die Sprachen und Kulturen der Seidenstraße haben verschiedene Kulturen aus unterschiedlichen Regionen ausgetauscht, auch aus der Vor-Han-Zeit.

Vor der Han-Regierung gab es in den Tianshan-Bergen mehrere unabhängige Kleinstaaten wie Yuezhi, Wusun, Xiongnu usw. Diese Staaten wiesen untereinander und mit anderen Kulturen aus dem Norden ähnliche nomadische Lebensweisen auf. Daher muss die Kommunikation schon lange vor der Han-Dynastie bestanden haben. Im prähistorischen Xinjiang muss es mehrere externe/interne Kommunikationsansätze gegeben haben, die sich in vielerlei Hinsicht entwickelten.

In dieser Dissertation sollen die Materialien aus dem prähistorischen Xinjiang geordnet, die Rahmenbedingungen für das prähistorische Xinjiang rekonstruiert und neue Forschungsergebnisse zur Untersuchung von Subsistenzmustern, wirtschaftlichen Strategien, sozialem Status und Staatsbildung vorgelegt werden.

Die gesamte Dissertation ist wie folgt gegliedert:

Teil I. Ein einleitendes Kapitel liefert den Hintergrund und die Grundzüge der Forschung. Kapitel 1 ist der geographischen und klimatischen Beschreibung gewidmet. Die für Xinjiang charakteristische Topographie lässt sich als "zwei Becken zwischen drei Bergen" (Altai-Gebirge, Tianshan-Gebirge, Kunlunshan-Gebirge, Junggar-Becken und Tarim-Becken) zusammenfassen. Die große Ausdehnung des Gebiets trägt dazu bei, dass das Klima von Norden nach Süden sehr unterschiedlich ist: Berg-Oasen-Wüsten-Zustand. Xinjiang liegt im Allgemeinen auf dem zentralen Kontinent und weist ein typisches kontinentales Trockenklima auf. Das trockene Wetter hat die antiken Überreste in gutem

Zustand erhalten.

In Kapitel 2 wird die Forschungsgeschichte der prähistorischen Xinjiang-Studie wieder aufgegriffen, die sich in vier Phasen unterteilen lässt: 1. 1900-1940er Jahre, 2. 1940-1970er Jahre, 3. 1970-1990er Jahre, 4. 2000-heute. Auch nach mehr als 100 Jahren der Erforschung ist die umfassende Erforschung des prähistorischen Xinjiang aufgrund des Mangels an Ausgrabungsmaterial und der geringen multidisziplinären Zusammenarbeit immer noch begrenzt.

Kapitel 3 befasst sich mit den Forschungsproblemen, der Methodik und den damit verbundenen Konzepten während der Forschung. Nach mehr als 100 Jahren Forschung ist es offensichtlich, dass die prähistorischen Kulturen Xinjians eng mit anderen benachbarten Kulturen verbunden waren, und dieses Kapitel beschreibt hauptsächlich die möglichen verwandten Kulturen in den nahe gelegenen Regionen: Yamnaya-Kultur, Afanasievo-Kultur, Andronovo-Kultur, Siba-Kultur und Kayue-Kultur, usw.

Teil II befasst sich mit den bisher veröffentlichten prähistorischen Materialien, die den zentralen Teil dieser Dissertation ausmachen. In diesem Teil werden in Kapitel 4 die Stätten der "Altsteinzeit" betrachtet, die zwischen 240.000 und 4.000 BP datiert werden, während Kapitel 5 die Stätten der "Bronzezeit" und "Eisenzeit" in geographischer Reihenfolge behandelt. Jede Stätte wird auf der Grundlage der kleinsten Ausgrabungseinheit beschrieben, um möglichst detaillierte Informationen für die Rekonstruktion zu liefern. Jeder Abschnitt dieses Teils folgt dem Rahmen von 1. Lage, 2. Forschungsgeschichte, 3. Funde, 4. Alter, 5.

Teil III ist der Diskussionsteil, in dem zunächst die prähistorische chronologische Abfolge festgelegt wird und dann das gesamte prähistorische Xinjiang in 11 Kulturzonen unterteilt wird: (A). *Südliche Hami-Zone*, (B). *Östliche Hami-Zone*, (C). *Zone der Balikun-Region*, (D). *Zone des Turfan-Beckens*, (E). *Altai-Gebirge Zone*, (F). *Westliche Junggar-Zone*, (G). *Mittleres nördliches Tianshan-Gebirge*, (H). *Mittelsüdliche Zone des Tianshan-Gebirges*, (I). *Südliche Lop Nur Zone*, (J). *Tarim-Zone*, (K).

Pamir-Plateau-Zone. Anhand des chronologischen Rahmens und der einzelnen Kulturzonen werden in diesem Kapitel die möglichen kulturellen Kommunikationswege im prähistorischen Xinjiang aufgezeigt.

Der abschließende Teil, Kapitel 7, fasst das prähistorische Material und die Kulturzonen zusammen und vermittelt ein Gesamtbild des prähistorischen Xinjiang vor der Han-Dynastie. Das prähistorische Xinjiang begann um 300.000 v. Chr. in der Region des Altun-Gebirges, wo an zwei Stellen die frühesten lithischen Perkussionsfunde zu finden sind. Im Altai-Gebirge, im Hami-Becken und im Tarim-Becken gab es bis 4.000 v. Chr. mehrere paläolithische Fundstellen, die jedoch in den folgenden Jahrhunderten nicht in neolithische Technologien übergingen. Die Ankunft bronzezeitlicher Kulturen aus Zentralasien führt das paläolithische Xinjiang um 2.500 v. Chr. in die Bronzezeit. Die fremden bronzezeitlichen Kulturen aus dem Westen und Osten trugen zu den einzigartigen einheimischen Kulturen Xinjiangs bei, wobei bemalte Töpferwaren und Bronzegegenstände nebeneinander existierten. Die kontinuierliche Kommunikation förderte die Entwicklung der Metallurgie; zu Beginn des ersten Jahrtausends v. Chr. kam Eisen in den prähistorischen Stätten von Xinjiang zum Einsatz. Die Übertragung der Werkzeugherstellung und die kontinuierliche externe und interne kulturelle Kommunikation trugen zur Revolution der Subsistenzstrategie bei. Das Aufkommen des Pferdenomadentums mit Metallgeschirr und -waffen führte zu häufigen Konflikten und zur Ausdehnung des lokalen Territoriums. Die Übernahme landwirtschaftlicher Praktiken sicherte ein relativ stabiles sesshaftes Leben.

Generell soll mit dieser Arbeit zunächst eine grundlegende Datenbank für die prähistorische Xinjiang-Forschung aufgebaut werden, die dann mit weiteren Entdeckungen und Forschungsergebnissen angereichert werden soll. Nur wenn wir alle veröffentlichten Daten sammeln, können wir über ein Basiswissen für weitere Studien verfügen. Darüber hinaus wird in dieser Arbeit eine neue allgemeine chronologische Abfolge der Vorgeschichte Xinjiangs erstellt und der mögliche Weg der kulturellen Interaktion anhand von Kulturvergleichen diskutiert.

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Part I. Introduction

Chapter 1. Regional Setting

1. Topography

Xinjiang Uygur Autonomous Region (新疆维吾尔自治区) is located in the northwest of the People's Republic of China and southeast of the Eurasian Steppe, covering over 1.66 million km², on the border with Mongolia, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, and India. The geographical coordinate of Xinjiang ranges between 49°10'49°10' N to 34°15'34°15' N and 96°25'96°25' E to 73°10' E. Running 1,900 km from east to west, and 1,500 km from south to north, it is the largest province in China.

The topographical characteristic of Xinjiang could be summarized as "two basins sandwiched between three mountains (三山夹两盆)." The Altai Mountain, Tianshan Mountain, and Kunlun Mountain frame the Junggar Basin and Tarim Basin north to south. At the same time, the east Turfan and Hami (Kumul) regions also contribute to the lower depression—Tuha Basin (Fig. 1.1).

The geographical distribution decides its water resources are distributed unevenly. The oases, fed by the snowmelt of glaciers, are primarily located in Altun Mountain Valley, Kunlun Mountain Valley, and Tianshan Mountain Valley. Rivers are mostly short and end in the continent or desert; even the Tarim River's longest inland river is ultimately diverted before reaching the Lop Nur.

The Tianshan Mountains ranges divide Xinjiang into a northern and southern parts. From the Pamir Mountains in the West to the Hami oasis in the east, the Tianshan Mountains extend over 2,500 km with altitudes between 6,000m to 1,300m above sea level. Thus, high mountains become a natural geographical block and contribute to several oases on both sides of the mountain ranges, which provide the ideal nomadic

environment in the steppe (Guo, 2012). Therefore, the Tianshan Mountain is one of the most critical communication passages in the Eurasian Steppe and a crucial region in academic research.

North of the Tianshan Mountains are the Junggar Basin and Altai Mountain, and in the south are the Tarim Basin and Tuha Basin. The elevation of North Xinjiang rises from <500m above sea level in the center of the Junggar Basin to >3,000m in the south and northern ranges. It is mostly flat in the center of the north part while rather ragged in the peripheral mountain regions.

As for the southern Xinjiang, Tarim Basin is the largest basin in China, covering more than 330,000 km². The Taklimakan Desert in the center of the Tarim Basin makes this region extremely arid; it receives the lowest precipitation in China, which drops to an annual total between 15 mm to 50 mm (Domrös & Peng, 1988).

2. Climate

In the central continent, Xinjiang is surrounded by mountain ranges, which intercept much of the water carried by the westerlies from the North Atlantic Ocean to this region (Zhang et al., 2016). Therefore, Xinjiang has a typical continental arid climate, with an average temperature of 6.8°C (Kong et al., 2013) and annual average precipitation of around 450 mm (Li et al., 2015).

Meteorological data show that the westerlies control the current precipitation in central Asia, while the monsoon rainfall does not extend to this region (Li, 1991). Xinjiang encompasses both semiarid and arid areas. It is a typical mountain-basin system, including snow and ice, high mountain forest, middle mountain forest grassland, low mountain desert, agricultural oasis, and diluvial fan shrub-grassland. According to the 1988's definition (Domrös & Peng, 1988), the climate of Xinjiang could be divided into two major types: (1) Middle temperate-arid, including Junggar Basin, Altai Mountains, Tacheng Basins, Ertix Valley, and Ili Basin; (2) Warm temperate-arid, including Tarim

Basin and Turfan Basin. In addition, the western Kunlun Mountain belongs to the Alpine Plateau Zone due to its high elevation (i.e., above 4,500m above sea level). In general, the northern Junggar Basin consists of mostly steppe and semi-desert, while the southern Tarim Basin is represented more by desert—the Taklamakan Desert. The climate of Xinjiang is typical of inner-continental landmasses, with a comprehensive daily temperature range, low precipitation, and low humidity. The annual precipitation of northern Xinjiang is 100-500mm, while the southern is 20-100mm. The average temperature in the north ranges from 4 to 8°C, while in the south, it is 10-13°C.

Some environmental scientists try to reconstruct the climate change in Xinjiang during the Holocene (Zhang et al., 2016). After the peat analysis, they propose that in the Altai region in the north, the climate was warm and dry during the early Holocene (10.0-8.0 ka BP.); an increase in the precipitation occurred after 8.0 ka BP.; the temperature was cold and humid in the mid-early Holocene (8.0-6.3 ka BP.). After that, warmer and drier weather developed during the mid-Holocene (6.3-5.5 ka BP.); the temperature declined and became cold and wet in the late mid-Holocene (5.5-4.0 ka BP.), but soon got warmer from 4.0 to 2.5 ka BP. Since the late Holocene (2.5-1.0 ka BP.), the Altai region remained cold and wet, with a gradual shift to warm and dry in the last 1.0 ky.

The Altai Mountains are far from oceans, and the westerlies mainly form the regional climate. The Junggar Basin displays a typical temperate continental climate with an annual air temperature of about 5°C; winter and summer experience severe seasonal contrasts in temperature (Domrös & Peng, 1988), e.g., the minimum is between -10°C to -20°C in January and maximum between 28°C to 33°C in August. The annual mean precipitation is 60-150 mm in the central plain (Zhu et al., 2012).

As for eastern Xinjiang, the high-resolution climate records since 8.6ka BP indicate that the precipitation is generally high between 8.6 to 7.1 ka BP. Then, a regional deterioration occurred at 7.1-4.5, 3.7-2.5, and the latest at 2.0 ka BP. A southward movement of the rain belt dispersed from the north, making this region relatively wetter

than northern Xinjiang. The Siberian high could be one possible factor in controlling the mid-Holocene climate in arid Central Asia (Lu et al., 2013).

In the south, the climatic record from northern India also reveals a generally wet climate during the waning Asian monsoon. According to peat analysis from North India, the winter rainfall increased to maintain a damp environment during 6.0-4.7, 5.8-4.8, and 6.9-4.8 ka BP (Lu et al., 2013) (Fig. 1.2).

Chapter 2. Research History

In 138 BCE, Emperor Wu (汉武帝) sent Zhang Qian (张骞) as the ambassador to the "Western Regions (西域)"¹ in an attempt to make contact with the Yuzhi (月氏) through the so-called "Hexi corridor (河西走廊)," which is located in modern western Gansu Province. Zhang Qian returned to Chang'an (modern Xi'an 西安) in 125 BCE, bringing back invaluable information about the western regions. It was this journey that first connected central China and the western areas. The political and economic situation between Xi'an and Rome kept flourishing. This road was first named "die Seidenstrasse (Silk Road)" by German Scholar Ferdinand von Richthofen in 1877 (Herrmann, 1910; Bergman, 1939)², which also confirmed the critical role of the meeting point—Xinjiang—between central China and the Eurasian Steppe. With the growing of scholars' research interests in Xinjiang, the study of prehistoric Xinjiang has inevitably started. The research history can be divided into four phases.

1. 1900-1940s

In the beginning phase, most of the study was done by western scholars, including explorers, geologists, etc. They arrived in Xinjiang with various aims. Several ancient relics were found remaining on the ground during this expedition. In 1900, the discovery of Loulan (Koran) city kicked off the study of Xinjiang, and a series of ancient cities were uncovered in the following decades. Except for the collected stone tools found by Sven Hedin and Stein, most were thought to belong to historical remains. Chinese scholar Huang Wenbi also did several surveys in Hami during the same period, collecting several colored pottery sherds (Chen & Zhang, 1999).

The finding about ancient cities attracted scholars' attention gradually. International exploration started between China and Europe because of the time background. During the 1930s, Swedish scholar Folke Bergman published his field survey in Xinjiang

¹ The Western Region is a historical name specified in the Chinese chronicles between the third century BC to the eighth century AD that referred to the regions west of Yumenguan Pass (Tikhvinskii et al., 1981).

² Other arguments believe that the name "Seidenstrasse" was brought out by other German scholars earlier than Richthofen (Merterns, 2019), while who is the first to name this road does not affect this research.

(Bergman, 1939). In this report, he recorded all possible prehistoric sites with collected stone artifacts and pottery sherds. During this phase, almost all sites on the ground were found, and some were partly excavated. For instance, the British scholar Stein, French scholar Pelliot, German Scholar Grünwedel and A. von le Coq, Russian scholar Przhevalsky and Japanese scholar Otani did a series of investigations and fieldwork in this region during this phase; their work provided the earliest scientific records of ancient Xinjiang and offering a great chance to study the history, geology, religion, language, architecture, art, and communication in ancient Xinjiang. However, since no professional archaeologists were involved, all fieldwork was carried out with no scientific archaeological methodology, especially chronology and typology. The lack of professional archaeological work has created a big challenge for the subsequent studies.

2. 1940s-1970s

After establishing the People's Republic of China in 1949, the Chinese government arranged several systematical surveys and excavations in Xinjiang (Chen & Zhang, 1999). The fieldwork included the whole Xinjiang field survey carried out by the Northwest Bureau of Culture, Xinjiang Institute of Cultural Relics & Archaeology, Xinjiang National Minority Social-historical Investigation Team. The Buddhist Association of China and Dunhuang Institute of Cultural Relics also investigated the stone cave temple in the Tianshannanlu region (Chen & Zhang, 1999). According to the field survey and trial excavation, scholars have a comprehensive preliminary understanding of the Xinjiang sites, but most are historical. Few sites in Hami, Turfan, Ili, and Kuche were discovered with microlith and painted pottery sherds. In addition, in 1958, Huang Wenbi excavated 14 burials and one 3000 km² city site in Yanbulaq, Hami, which could be seen as the starting point of prehistory research (Huang, 1983).

During this period, research on prehistoric Xinjiang had just started, while all knowledge of the Han documents was limited. At this time, scholars divided the Xinjiang prehistory into three phases: "Microlithic culture," "Colored Pottery Culture," and "Gravel Culture" (Chen, 1985). Even though such division was objected to in the next phase with later evidence, it was a good start for Xinjiang prehistoric research,

which shows that Chinese archaeologists have realized the importance of chronology sequence and tried to establish one overall framework (Chen, 2017).

3. 1970-1990s

With more sites surveyed and excavated, the study has come into the more profound research phase, also the most discussed time phase in Xinjiang prehistoric research.

In 1979, the Institute of Archaeology of Xinjiang Academy excavated one public cemetery in Gumugou, and they cleared 42 prehistoric tombs (Wang, 1983). In 1986, Xinjiang University re-excavated the Yanbulaq site, finding 76 graves (Xinjiang et al. 1989). From 1983 to 1989, the Xinjiang team of the Institute of Archaeology of the Chinese Academy of Social Science excavated Chawuhu Site in Hejing County (Zhongguo et al. 1988; Xinjiang et al. 1988; Xinjiang *et al.* 1989; Zhongguo et al. 1990). From 1988 to 1989, in Linya site (which is now called "Tianshanbeilu Site"), scholars dug more than 250 tombs (Li, 1999). In addition, Chaiwopu site, Qijiaoqing site, Wupaer site, Xintala site, Wupushuiku site, Nanwan site, Shirenzigou site, Halahezhuo site, Haladun site, Sidaogou site, Alagou site, Xiangbaobao site, Keermuqi site, Miaoergou site, and many other sites were also discovered or excavated (Xinjiang et al., 1973; Xinjiang, 1985; Chang, 1985; Wang, 1987; Xinjiang et al., 1981; Xinjiang et al., 1982; Xinjiang et al., 2002; Xinjiang et al., 2003). These newly found prehistoric sites or cemeteries provide abundant resources for more profound research.

At first, scholars discussed how to name an archaeological culture. The Gumugou site was named the representative site of "Gumugou Culture" because it was excavated earliest and exhibited typical regional cultural elements. In 1986, scholars first put forward the "Yanbulaq Culture" out when suggesting that Wupu Shuiku site, Lafuqiao site, Hanqigou site, and Miaoergou site belong to Yanbulaq Culture (Chen, 1991). In 1988, with the publication of the excavation report of Chawuhu Nr. 1 Cemetery, it was named Chawuhu Goukou Culture (Zhongguo et al., 1988). Then, the cultural distribution range, characteristics, age determination, and subsistence strategy were studied in various aspects by Chinese archaeologists (Chen, 1993; Zhou, 1998; Chen,

1999; Lv, 1999; Xinjiang et al., 1999). The study of prehistoric Xinjiang focuses on the following topics:

I. Defining the prehistoric dates

There are two significant opinions on the prehistoric dates: Chen first assumed that prehistoric Xinjiang should start from the Age of Teras and end before Han Dynasty (Chen, 1994; Chen & Zhang, 1999); on the other hand, Zhang argued that it should be finished around 2nd Century BC, which is the beginning phase of the Han Dynasty (Zhang, 1997). Both focused on the time when the prehistory should be ended. Chen pointed out that there are no documented records about Xinjiang before the Han dynasty; no inscription means no historical development before the Han dynasty. Zhang argued that after the 2nd Century BC, the Han government had already defeated Xiongnu and got involved in the Western Region arrangements. Therefore, in Zhang's point of view, the prehistoric Xinjiang should be ended around the 2nd Century BC.

II. Defining the development phases

With more prehistoric sites being discovered, the former sub-phases no longer seem practical. Some scholars assume that it should be divided into "Microlithic Culture," "Polished Stone Culture," and "Painted Pottery Culture" (Chen, 1985). However, these sub-phase theories could not summarize the development of Xinjiang's prehistoric phases.

In 1985, Chen concluded twelve subcultures and summarized them as Neolithic, Bronze Age, and Iron Age. And then, he extended these three stages into "Paleolithic Culture," "Mesolithic Culture," "Neolithic Culture," "Chalcolithic Culture," "Bronze Age Culture," and "Early Iron Age." He also pointed out that according to the coexistence of bronze and iron items, some Neolithic sites should be Bronze Age or even Early Iron Age sites (Chen, 1985; 1987). At the same time, Zhang argued that it could only be concluded as Paleolithic, Microlithic Culture, and Metalage Culture (Zhang, 1997).

Apart from the discussions over the Paleolithic/Mesolithic cultures in Xinjiang, another

topic is the division between the Bronze Age and Early Iron Age. The discussion focused on whether to take the appearance of iron items as the symbol of the Early Iron Age. Chen suggested that the appearance of iron objects in some sites before Han time should be a strict standard for defining the Early Iron Age (Chen, 1990). Wang pointed out that the iron items found in Late Warring States sites in mainland China are usually connected with the Iron Age period. Xinjiang's iron condition may suggest that the area had started its transition into the Iron Age (Wang, 1985). On the contrary, Shui proposed that it began after the Han government promoted iron tools in agriculture activities, which can symbolize the entering of the Iron Age (Shui, 2001). The discussion is focused on whether to put an "Early" phase when defining the Iron Age in the Han Dynasty.

As for the dating standard, even though we cannot simply take a specific item as the symbol of one different society, the appearance of new elements still stands for the transition in the material and production technology. Therefore, iron objects' appearance and early usage at the beginning of the Early Iron Age make sense. The typological analysis combined with the absolute radiocarbon dating results has convinced most scholars accepted Wang's periodization.

Defining the exact time range of the Iron Age matters in the discussion about the exact properties and uses of the new material—iron; therefore, the discussion on the "Early" Iron Age seems unnecessary for the current social complexity study.

III. Cultural classification

There are two views on cultural classification: one is based on the cultural elements, including the local culture and the diffused area, like Chen's twelve subcultural areas (Chen, 1985); the other on the geological situation.

In 1993, Shui concluded eight regional groups according to the geographical distributions, which intensely debated the environmental aspect of the early cultural division. While some scholars agreed on the relevance of geographical features to the

cultural groups (Shui, 1993; Chen & Hiebert, 1994), others believed that the early cultural division should not be limited by the geographical condition (An, 1998; Mei, 2000). At the same time, the ecological method pays more attention to ecology due to the extreme climate and geographical conditions in Xinjiang cases (Festa, 2018).

IV. Social Properties

With more continuous finds accumulating enough material for the research, they started to research social status after discussing the initial age problems.

Take Chawuhu Site as an example. Since the first excavation in 1983, the excavator named this site the representative site of Chawuhu Culture. Despite the research in the excavation report, scholars also discussed the item definition, tomb customs, animal bones, natural environment, domestication of animals, social subsistence strategy, social status, and cultural communication separately. The discussion between Chen and Lv stands out the most (Chen, 1993; Lv, 1999; Chen, 2001), who illustrated their different opinions respectively. For instance, should this culture be called Chawuhu Culture or Chawuhu Goukou Culture? Is this site in the Bronze Age or Iron Age? Can we reconstruct the tomb custom and social status from tomb findings? And so forth. Their discussion promoted the study of prehistoric Xinjiang into a well-developed era.

Despite the Chinese archaeologists' heated discussions, the western scholars also involved Xinjiang in the central Asian content. The idea that Xinjiang is part of the "wider context" was brought out by Kohl in 1981 when noticing the possible cultural connection between Uzbekistan and China in the second millennium BC (Kohl, 1981). Then Debain assumed an even bigger cultural connection that links the western, northern, and eastern communities (Debian, 1988). The intensive study started after the joining of Russian scholars with the development of Soviet Central Asian archaeology (Mei, 2000) and the discovery of Tarim mummies, especially the latter one, which provide direct evidence of the western-eastern communication through Xinjiang (Mair, 2000; Festa, 2018).

4. 2000-present

Entering the new century, the exploration of prehistoric Xinjiang continued. Between 2002 and 2005, the Xinjiang Institute of Cultural Relics & Archaeology excavated Xiaohe Site and yielded 167 tombs (Abdurasul et al., 2004). In 2003, the Yanghai site was excavated (Xinjiang et al., 2011). From 2008 to 2009, the Hongshankou Site, Shirezigou/Dongheigou Site, and Tuobeiliang Site in Hami and Balikun regions were surveyed and excavated (Northwest University et al., 2014; 2016). From 2014 to 2017, the Tongtiandong Cave site, a Paleolithic spot, was found in Jiernai County. More than 400 stone tools, mammal fossils, pottery sherds, and bronze items were found, making this the first Paleolithic site in Xinjiang with complete stratigraphy (Yu & He, 2017). All these sites were long-lasting settlements, which provide a significant research resource on the ancient settlement study in Xinjiang. In general, there are 142 primary publications, including excavation report and survey report, among which the eastern Xinjiang publications accounts for 54, which is the most studied area.

In addition to more surveys and excavations, scholars from a new generation started the comprehensive research. In 2001, Shui published his analects of the Bronze Age in Northwest China. This book described the Bronze Age cultures in Xinjiang and cultural communication between East and West (Shui, 2001). In 2007, Han published his research on the Bronze and Iron Age Xinjiang (Han, 2007); unlike the former analysis, he divided Xinjiang into several sub-areas based on geological and archaeological material. Then he focused on the pottery aspect, establishing the pottery chronology and typology, and interpreted the origins and development of each culture. In 2012, Guo published his study on the social condition in Late Prehistory Xinjiang (Guo, 2012), which divided Xinjiang into three sub-regions and focused on the communication and development between Xinjiang and other cultures, especially the interactions of the state before the Han Dynasty. Then he discussed nomadic mobility and social state formation. It could be seen as the first try at understanding the social status of prehistory Xinjiang. In 2018, Shao published his Ph.D. dissertation, which was completed about ten years ago; in this research, he studied the development of prehistoric cultures in Xinjiang and the interaction mode with neighbor cultures by dividing the whole

prehistoric Xinjiang into four sub-phases (Shao, 2018). There are 51 secondary publications, including research articles and books.

Except for the comprehensive research, professional scholars carried out specific studies on multidisciplinary aspects, especially time dating, social status, and communication patterns (Liu, 2000; Shao, 2009; Shao, 2012; Wang, 2014). Their research also referred to agriculture, animal husbandry, and the manufacturing industry. In the meantime, metal casting, textile production, and pottery making were studied by the different academic institutes in various countries (Mei, 2000; Wang, 2005; Qian, 2006; Ling, 2008; Wang & Xi, 2009; Mo, 2010; Zhang & Liu, 2011; Li *et al.* 2017; He & Wang, 2017).

Chinese scholars and institutions have arranged several international teams to study Xinjiang-related cultures' origins and further development. For instance, the Northwest University and Uzbekistan cooperated in their excavation in 2017, which revealed the evidence of the sources of the Yuezhi ethnic group. Meanwhile, western scholars never stopped discussing prehistoric Xinjiang as part of the Bronze-Iron Age Eurasian Steppe. For example, *The Prehistory of the Silk Road*, published by E.E.Kuz'mina in 2007, talked about the role of Xinjiang and their western contacts during the Bronze Age; while the article collection *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads* (Betts et al. eds, 2019) published not only new excavation findings and radiocarbon dates in Xiaohe, Bortala River region, and Ili River region, but also provided new insights on the wheat cultivation, metallurgy practice, and the possible migration route.

At the same time, after carrying out the first successful exhibition on the sensational prehistoric Xinjiang findings in Germany from 2007 to 2008. The "Silk Road Fashion" project, an international cooperation project built by Deutsches Archäologisches Institut, Freie Universität Berlin, and Xinjiang Archaeology Institute, reconstructed the woolen pants found in Yanghai Site, provided new evidence of the mobile lifestyle of ancient Turfan people, pays more attention to the ancient inhabitants' daily life (Ulrike et al.

2014). In 2021, the newest genomic analysis overturned the past hypothesis on the Tarim origins. They found out the Xiaohe and Gumugou inhabitants were native originals, while they got mixed through the migrations from outside later (Zhang et al., 2021).

After more than 100 years of study, the research of prehistoric Xinjiang has entered a comprehensive exploring phase. With more and more sites being surveyed and excavated, the understanding of Xinjiang prehistory is much more profound. Overall, the study of Xinjiang prehistory has just started, and more research and fieldwork remain to be carried out on a larger scale in the future.

Chapter 3. Research Problems and Methodology

1. Research Problems

In more than 100 years of exploration, the research on prehistoric Xinjiang has been carried out from every aspect. Unlike central China, which already established a complete chronology sequence and time framework, only the basic knowledge of prehistoric Xinjiang has been understood. Therefore, despite the studies above, there are still several problems where attention needs to be paid:

I. Naming and Cultural Classification

In Chinese archaeology, the archaeological cultures are usually named after the first excavation site, like Longshan Culture (龙山文化), Yangshao Culture (仰韶文化), etc. As for Xinjiang cultures, the regional scale is too large, and the sites are scattered in different areas. So, the naming of Xinjiang sites varies a lot: e.g., Chawuhu Culture and Yanbulaq Culture are named after the excavation unit, while the "Ili River Region Culture" or "Eastern Tianshan cultural group" are named after one geographical region. Various naming systems made a significant challenge to understanding Xinjiang culture as a whole system.

II. Time Dating and Chronological sequence

Whether taking Xinjiang as an independent culture or a part of the Eurasian Steppe culture has still been discussed. This refers to different dating and typological systems that might change the whole research pattern in Xinjiang. Also, the difficulty with international cooperation has enlarged the differences in the gap between time chronology and social understanding. In addition, there is still a blank space between Paleolithic and Neolithic cultures. All these need to be explored with more discoveries. Besides, the timeline of Xinjiang prehistory has not been established completely, and the division of different time phases is still under discussion.

III. Understanding the cultural interaction and social status

Cultural interaction has always been discussed when referring to the Silk Road activities,

especially during the historical period after Han Dynasty. In contrast, the prehistoric research is still less developed than the historical study due to relatively few findings from the fieldwork and rare documents. Therefore, the study on prehistoric cultural interaction still needs to be strengthened.

Various cultural groups not only affected the inhabitants' daily lives but their social development is also changed. During the transition from Paleolithic to Bronze Age, the social process and the subsistence strategy system transition from hunter-gatherer to sedentary lifestyle became complicated. For Xinjiang in particular, the development from simple mobility to the admixture of nomadic-sedentary stands as the most important social phenomenon.

2. Methodology and Related Concepts

This dissertation intends to re-organize all Xinjiang prehistoric material published by characterizing each site's feature and then analyzing their cultural relationship within and outside Xinjiang.

The re-organization will be focused on data collection, including all survey and excavation reports (primary material) and the research information (secondary material). Combining all data published in Chinese, English, and German, this dissertation will describe every prehistoric site as detailed as possible, providing a whole new page on the fieldwork feature by feature. In this case, most Chinese excavation reports provide the excavation work by material type, i.e., pottery, copper, iron, gold, silver, bone, or wooden items, which, to some extent, cannot describe the information for each remaining. Therefore, the re-organization work will stand on the smallest unit and re-order all published data. After that, the discussion part will summarize the characteristic of each cultural group by the division into cultural zones, with the comparison with neighboring regions' cultural elements, trying to understand the formation and development form of prehistoric Xinjiang cultures.

Prehistoric Xinjiang sites have displayed various cultural elements, including internal and external archaeological features. Located on the eastern Eurasian steppe, different Bronze Age and Iron Age cultures in the Eurasian steppe have inevitably contacted Xinjiang during the early movements.

Geographically, Central Eurasia usually represents the significant territory covering the steppes north of the Black Sea to the Gansu Corridor in China, Siberia to the Iranian plateau, and the edge of the Pamir and Himalaya Mountains (Frachetti, 2008). The earliest population in the western steppe region can be substantially differentiated as mobile pastoralists have been associated with Yamnaya cultural materials dating to 3000 BC (Shishlina, 2008; Frachetti, 2013). These groups slowly grew from the Ukrainian steppes to the Ural Mountains and started their cattle and sheep herding strategy in the early-to-mid-third millennium BC (Shnirelman, 1992). Four-wheeled bullock carts and horses decide their regional mobility, making sure to move throughout the open valleys and low hills of the western steppe regions and foothills (Shishlina, 2008). While the ecological situation also promotes seasonal migratory orbits (Shishlina, 2004).

The Afanasievo culture is one of the earliest Bronze Age cultures in Southern Siberia, mainly in the Minusinsk Basin and Altai region. It was first dated to the mid-third millennium BC, while the radiocarbon dating results suggest it could have started at the beginning of the third millennium BC (Mallory, 1989). The tombs of Afanasievo culture usually have stone slab circles on the surface ground as tomb indicators. Their pottery is characterized by egg-shaped pots with pointed bases and decorated with stamped impressions; bronze needles, awls, and small knives are also found together, but very few; stone and bone items are the primary grave goods (Mei, 2000). The Afanasievo population used the ecology of high mountains and developed their transhumant sheep/goat and cattle herding strategy. The broadly accepted view is that Yamnaya migrants created the Afanasievo culture from the west, while the radiocarbon dates suggest that it might pre-date the Yamnaya culture (Görsdorf et al., 2004). The chronology of Afanasievo-type sites shows that the eastern population practiced the

herding strategy a few centuries before the Yamnaya group (Frachetti, 2013).

The Andronovo culture is a Bronze Age culture named after the village of Andronovo in the Minusinsk Basin in Siberia; the culture spans from the Urals to the Yenisey and from the northern border of the forest-steppe south to the Pamir of Tadjikistan (Mallory, 1989; Mei, 2000). It has been suggested that the Andronovo culture mainly occupied the area between the Ural and Ertrix rivers at first and then extended to the upper Yenisey to the east and the desert oases of western central Asia and the Tianshan region to the south between 2000 BC and 800 BC (Dergachev, 1989). Horse, cattle, and sheep herding keep being their primary subsistence strategy, while the bronze sickles and stone hoes also indicate the existence of the agricultural practice. The Andronovo pottery is characterized by flat-based wares decorated with swastika patterns (Masson, 1992). Bronze objects account for a large proportion of the grave goods, representing the high development of metal casting technology and the horse-drawn chariot (Kuzmina, 1998; Anthony, 1998; Mei, 2000).

In the thirteenth century BC, the Andronovo culture in southern Siberia was replaced by the Karasuk culture, which first occupied the Minusinsk basin on the middle Yenisey and then extended to Mongolia and Altai region. Karasuk culture is a typical Bronze Age culture consisting of many bronze wares and cemeteries. Surface stone circles characterize the tombs of Karasuk cultures as indicators. The pottery wares are mostly bag-shaped with round bases, decorated mainly on the upper part with zig-zag, triangles, and rhombs patterns. The Karasuk culture lasted until the eighth century BC (Mei, 2000).

Chust culture is mainly distributed in the Fergana valley during the late second and early first millennium BC. This pottery is painted with black color in geometric patterns of triangles and rhombs as a primary feature. Large numbers of bronze objects and a few iron pieces indicate the high development of metal production in the beginning phase of iron usage. The stone tools like sickles and hoes, bone arrowheads, and check pieces reveal the coexistence of agricultural practice and animal herding, representing

the subsistence strategy's admixture (Kohl, 1984; Mei, 2000).

Majiyao Culture (马家窑文化) is one of the primary late Neolithic cultures in the upper Yellow River region; Banshan (半山) and Machang (马厂) types are two significant sub-types. The distribution of this culture covers most parts of modern Gansu and Qinghai provinces. Painted pottery wares are the most typical feature of this culture. The red and black colors are usually found on the upper part of the pottery vessels, including triangles, circles, waves, lines, and calabash patterns; pottery basins, shallow bowls, double-handled jars, and big pots ("Weng") are the major vessels. In addition, rectangular shaft tombs and catacombs are two common tomb types, and the tombs are mostly found with wooden coffins. The time range of the Majiyao culture is around 2500-2300 BC (IACASS, 2010).

There is one assumption on the further development of Majiyao culture that some scholars believe that Qijia (齐家) and Siba (四坝) culture are two different directions inheriting the Majiyao pottery tradition (Yan, 1978). This has not been broadly accepted (Hu, 1980; Zhang, 1987) but indicates the similarity of the cultural elements. Qijia culture is mainly found in the Gansu region; storage pits, sacrificial stone circles, and grey-white house remains are common; single-burial straight supine is the primary burial position. When it comes to pottery, double-handled jars, basins, and pot *Dou* pots are the powerful vessel combinations, with red and purple coating and grid or diamond designs on the vessels. Copper weapons like an awl, knife, axe, Bone tools like spades, needles, daggers, and turquoise and jade ornaments indicate its well-developed handicraft industry, especially for the copper metallurgy. Qijia culture mainly spans over 2180-1630 BC; its late phase has entered the Bronze Age (IACASS, 2003).

Siba (四坝) culture is mainly found in the belt region along Hexi Corridor. Few houses remain in Siba culture sites; some remains are found with mud-bricks and gravel stone walls; some post holes also indicate the sedentary life. The major tomb types are:

- Vertical shaft tomb with a side chamber.
- Vertical shaft pit with a secondary platform.

- Round-rectangular upright shaft tomb.

Few graves are found with cut fingers buried in one pottery jar. Painted pottery accounts for more than half, with purple coating with red and black patterns, while triangle and appending practices are the most popular design. The primary vessel types are single-handled/double-handled jar, jug, cup, pot Zun, plate, and a rectangular box. In addition, bronze objects are common in Siba culture, including handled axes, knives, awls, arrowheads, tubes, and ornaments; gold, silver, and cowry ornaments can also be seen in burial goods. The absolute time of the Siba culture is between 1900-1500 BC (IACASS, 2003).

Kayue Culture (卡约文化) is mainly distributed in Qinghai province. A few houses remain, while tombs are commonly found, with rectangular vertical shafts and shaft passage pits with side chamber burial forms. Pottery jars, double-handled basins, and jugs are the main daily tools and burial goods, with purple coating and black patterns in rid, line, triangle, and zig-zag patterns. Bronze objects include weapons and ornaments, i.e., knives, axes, arrowheads, bells, tubes, mirrors, and plaques. The type of bronze pot Li is more like the Shang pots, while the bronze ornaments display typical northern elements from the grassland. In addition, large amounts of goat/sheep bones found in the tombs, copper, and lithic tools also indicate the excellent development of animal husbandry and agricultural practices in the Kayue culture (IACASS, 2003).

Part II. Prehistoric Materials in Xinjiang

Chapter 4. Paleolithic Age (240,000-4,000 BP)

1. Altun Mountain Sites

1. Location

The Altun Mountain is located in southern Xinjiang, separating the eastern Tarim Basin and Tibetan Plateau. Two surveyed localities³—Yeniuquan Spring and Ka'erdun—are situated in the hinterland of Altun Mountain and belong to the Ruoqiang (Charqilik) County (Fig. 4.1: a).

Yeniuquan Spring Locality: the site is about 4530m above sea level, and the scale is over 12,000 km². This site is next to Yueya River to the south and Ulugh Muztagh Snow Peak, about 19.5 km to its southwest; the northeast is located with Aqike Lake, about 90 km; while to the east is a large terrace that connects the Yueya River⁴. This site lies in the Warm Temperate Zone, while the mountains affect more than the latitude, so the climate here is more in the Temperate Plateau Zone. The winter here is long and dry. The temperature is usually between -3°C and -7°C, and the summer temperature keeps at 10°C-15°C, the annual precipitation is between 600-800 mm (Domrös & Peng, 1988). The location is named 89AY.

Ka'erdun Locality: it is about 200 km to the east of Yeniuquan Spring Site with the same latitude; the climate and scale are almost the same. The site found in this region is named 89RK.

2. Research History

In October 1989, the Taklimakan Desert Scientific Investigation and Study Team conducted their archaeological survey in Ruoqiang County. They collected a series of

³ The term "site" usually represents an area, while "locality" represents different areas within the site (Pei *et al.* 2012).

⁴ Yeniuquan Spring was named after the wild Bog grunniens activities on the nearby river terrace, while the eastern part of the site is located at the Yueya River Terrace.

stone artifacts from Yeniuquan Spring and Ka'erdun localities. These stone artifacts were then evaluated and published in 1990 (Taklimakan Team et al., 1990).

3. Findings

Most of the findings are irregular lithic flakes⁵; some are cores with few shaped tools. Most of them are reduced by direct or indirect percussion technology and unifacial modified. The stone cores could be the material for making stone blades, including chert, crystal, silicalite, and tuff.

3.1 Yeniuquan Spring Locality

There are 46 shaped tools, including three cores and fourteen flakes; the rest are small blades.

Core, with several pressure scars, three pieces.

89AY: 4, chert, grey dark, the original shape is the triangular pyramid, and the cross-section is a triangle. Three sections are also in the acute triangle, and the thinner section has five concaves from the platform to the distal end. There are four ridges, and one of the ridges is stroke. The length is 4.2 cm, the width is 2.1 cm, and the thickness is 1.5 cm (Fig. 4.2: 3).

89AY: 5, chert, grey dark, wedge, the dorsal keeps its natural condition, while the ventral is modified by pressure percussion. The platform is an oval shape, and there are nine concave striking scars. The length is 3 cm, width is 1.6 cm, and thickness is 1 cm (Fig. 4.2: 6).

89AY: 6, crystal, leaden, the transparency is not so good. The original shape is point. There are six striking scars from platform to dorsal end, with one percussion point and one percussion slope. The length is 3.1 cm, width is 1.6 cm, and thickness is 1.35 cm (Fig. 4.2: 11).

⁵ All followed lithic terminology referenced from Debenath & Dibble, 1994.

Flake and Scrapper, ten pieces.

89AY: 11, flake. Chert, grey dark, oval shape. All margins are thin and sharp except for the platform. The separation section is smooth, and the modification landmarks are not clear. The length is 2.05 cm, width is 1.4 cm, and thickness is 0.3 cm (Fig. 4.2: 8).

89AY: 3, Scraper. Silicalite, grey dark, almost round. All margins are sharp from the separation to the dorsal, except for one notch. The modification landmarks are clear. The diameter is about 3.3 cm, the thickness is 0.6 cm. (There are eight more scrapers made in crystal.) (Fig. 4.2: 1)

Stone blade, 29 pieces.

89AY: 1, chert, grey and dark, blade. The separation section is not retouched, while the dorsal has two ridges and three long striking scars. One end is point round, and the other is flat and straight. It is made by pressure scraping, with two sharp and slightly arc knife-margin, which can be used as a scraper. The cross-section is a trapezoid. The length is 3 cm, width is 0.8 cm, and thickness is 0.2 cm (Fig. 4.2: 2).

89AY: 2, blade. Chert, grey dark. The separation section has not been retouched; the dorsal has three long scars from pressure scraping. Two margins are sharp and flat. One end is arc point, and the other is a trapezoid. The length is 2.6 cm, width is 0.7 cm, and thickness is 1.5 cm (Fig. 4.2: 4).

89AY: 7, chert, grey dark, and rectangle. The dorsal has four concaves by pressure scraping and three long concave ridges. One margin is flat and sharp; the other is slightly curved. The cross-section is irregular. This one can be used as scrapper. The length is 2.55 cm, width is 0.9 cm, and thickness is 0.2 cm (Fig. 4.2: 9).

89AY: 9, silicalite, cinereous. The dorsal is not flat, and the margins are not flat. Two ridges are slightly curved, and the cross-section is irregular. The length is 2.1 cm, the width is 0.7 cm, and the thickness is 0.15 cm (Fig. 4.2: 10).

89AY: 10, crystal, transparency. The dorsal has two slightly arc scars by pressure scraping. The margins are flat. One end is pointed and incomplete; the other is flat and straight. The cross-section is the triangle. The length is 1.25 cm, width is 0.15 cm, and thickness is 0.15 cm (Fig. 4.2: 7).

3.2 Ka'erdun Locality

Most of the stone artifacts are hard to tell the artificial landmarks—seventeen shaped tools, including a round end scraper, core, blade, and flake.

Round End Scraper and Scraper, ten pieces.

89RK: 5, Scraper. Crystal, transparency, the margins are modified from the separation to dorsal, and there are two smooth concave scars. One end is almost round, and the platform is a triangle. The length is 2.2cm, the width is 1.5, and the thickness is 0.3 cm (Fig. 4.3: 7).

89RK: 6, Scraper. Chert, yellow. The margins are modified from the separation section to the dorsal, and there are three arcs on the dorsal with two ridges. The section is flat, and the margin is slightly round in a straight trapezoid. The length is 2 cm, width is 1.95 cm, and thickness is 0.2 cm (Fig. 4.3: 9).

89RK: 8, Scraper. Crystal, deep dark, half transparency. The section is a trapezoid, and the ventral is natural, while the dorsal has modified landmarks. The margins are stroke from ventral to dorsal. The length is 2.2 cm, width is 2.1 cm, and thickness is 1.2 cm (Fig. 4.3: 3).

89RK: 9, round end scraper. Chert, grey dark, semicircle. The rounded end is stork from the separation section to the dorsal, and there are several modification scars. The diameter is 3.2 cm, thickness is 1.2 cm (Fig. 4.3: 1).

89RK: 10, Scraper. Silicalite, grey. Two sections are modified from the separation section to the dorsal, making one ridge on the dorsal surface. The broken section is the

triangle, and the whole item is in beak shape. The length is 3.35 cm, the width is 1.1 cm, and the thickness is 0.5 cm (Fig. 4.3: 10).

Cores, three pieces.

89RK: 2, irregular point core. Crystal, grey dark, half transparency. The platform is slightly hexagon, and the surroundings all have modification landmarks. Five smooth concave scars are retouched from the platform to the pointed end. The pointy end is wide flat. The length is 3.1 cm, width is 2 cm, and thickness is 1.8 cm (Fig. 4.3: 6).

89RK: 3, wedge core, tuff. The platform is oval, and there are two long scars on the dorsal surface and two margins; the other end is wide flat, and pointed, looking like a wedge. The length is 3.3 cm, width is 3.3 cm, and section thickness is 2.2 cm (Fig. 4.3: 4).

89RK: 7, irregular pointed core. Crystal, deep grey, half transparency. Two intersected natural platforms are modified into a tetrahedral, and the pointy end is clear. The platform is quadrangle. The length is 3.1 cm, the width is 2.1, and the thickness is 1.1 cm (Fig. 4.3: 2).

Blade, three pieces.

89RK: 1, crystal, transparency. One ridge and two long scars are modified on the dorsal, making two sharp margins. One end is pointed, and the platform is the triangle. The length is 2.1 cm, width is 0.75 cm, and thickness is 0.15 cm (Fig. 4.3: 8).

89RK: 4, crystal, transparency. There are two broad and long concave scars on the dorsal and one smooth ridge. Two sharp margins are slightly curved. One end is broken and might be used as a pointed end, as the broken section is triangular. The remained length is 1.5cm, width is 0.8 cm, and thickness is 0.15 cm (Fig. 4.3: 5).

In conclusion, most of the collected stone artefacts in these two localities are made by simple unifacial direct percussion technique. Their size mostly corresponds with the

microblade standard. The reduction is not that complicated and systematic but shows a great practical function.

4. Age

The Altun lithic assemblages exhibit a remarkable similarity with what is found in the Dali site (大荔), Shann'xi Province (Taklimakan Team et al., 1990), while the Dali artifacts' size is smaller. The core reduction strategies are dominated by simple unifacial unidirectional flaking, including a single asymmetrical discoidal core. As a Middle Pleistocene site (An & Wu, 1957), the suggested date of Dali lithic assemblage is between 300- 247 ka (Li & Lotter, 2018). According to the typology and production technology, no other items found in the same area/layer, a significant similarity with eastern culture, and no agricultural condition, the Altun Mountains Sites may be from the Middle Paleolithic Age. Based on the date of the Dali site, the possible date of the Altun Mountains sites might be around 300,000-247,000 BP.

5. Interpretation

The blades mentioned above are either double-ended or point-ended, so they can be used for scratching and puncturing, and the core might be used as the producing material. These stone tools might be made as composite devices, while the reduction techniques are not as complex as the later stages, i.e., Upper Paleolithic or Neolithic techniques. The lithic assemblages show less Mousterian or Levallois characteristics, and the amount is not abundant enough. Taking the natural conditions here into account, agricultural practices are hardly possible; the small size stone tools are not suitable for rural or settled life. The hunter's livelihood might be the only explanation. Even though these two sites have not been excavated completely, it is hard to reconstruct the past livelihood straightforwardly; it still provides good evidence for the highland culture research.

2. Ancient Yarguhl City West Terrace (Jiaohe gucheng gouxi) Site

1. Location

The surveyed sites are situated on the west terrace of the Ancient City. The Ancient Yarguhl is located in Yarnaz Valley, 10 km west of Turfan City, Eastern Xinjiang (Fig. 4.1: b). The Turfan Basin is a fault-bounded trough located in the eastern part of Tianshan Mountain; it covers 50 km², and its surrounding lies the Junggar Basin in the north and Tarim Basin in the south. Turfan Basin is in a depression extending to 154 m below sea level, creating a desert climate. The Turfan Basin lies in the Warm Temperate Zone and receives the lowest precipitation in all of China; the total annual is between 15-50 mm. The temperature varies from -7.6°C to 32.2°C (Domrös & Peng, 1988).

2. Research History

From July to October 1995, to preserve and protect the World Cultural Heritage—Ancient Yarguhl City, Xinjiang Institute of Cultural Relics & Archaeology made several field surveys in this region. They collected a series of stone artifacts on the west terrace of the ancient city. In November 1995, Zhang Senshui from the Paleontology and Paleoanthropology of the Chinese Academy of Science authenticated these stone artifacts and confirmed their similarity with Shuidonggou Site (水洞沟), an Upper Paleolithic lithic site. In 1996, a brief report published the typology results; unfortunately, no drawings or pictures were published (Zhang, 1996).

3. Findings

The field survey collected more than 600 stone artifacts on the ground, one pick and one flake on the Pleistocene layer. According to the reduction style, these stone artifacts could be divided into Group I and II.

Groups I (also known as the blade and end scrapers group): there are 580 artifacts in this group, including 176 flakes and blades, 141 chunk flakes, 34 chunks (also known as the angular waste), 41 cores, 145 scrapers, five notches, eleven denticulate pieces, nine points, three burrstones, three burins, one pick, one discoidal knife, two backed blades, three core-scrapers, one chopping tool, and four competitive tools.

Group II: there are 32 micro-stone tools in this group, including two flakes (which might be used as a retouching platform of core) and 30 micro-cores.

4. Age

According to the report, Group I shows a remarkable similarity with the late period of Shuidonggou in Ningxia Province to the east, an Upper Paleolithic site dated about 40,000 BP. Shuidonggou is an important “initial Late Paleolithic site” (Gao & Norton, 2002) in the Ningxia Hui Autonomous Region of China; its lithic assemblages can be characterized by small, irregular flakes and casual retouch (also known as the “small tool tradition”) (Zhang, 1990; Gao & Norton, 2002). The dating results suggest that human occupation in the Shuidonggou area occurred between 32,000-24,000 BP and 13,000-11,000 BP (Pei et al., 2012). The 2012 dating results provide two possible times for the lithic industry; the contemporary date of the Ancient Yarguhl City West Terrace site might refer to 32,000-24,000 BP (Zhang, 1996).

5. Interpretation

Most of the findings are attributed to Group I, which mainly consists of the blade and end scraper, according to the characteristic of the primary artifacts. At the same time, Group II could be featured as the micro-tool technology group. Based on the similarity with eastern Shuidonggou Culture, the lithic technology can be characterized by the small tool tradition, which is one of the two dominant lithic tool traditions in North China⁶. The finding of this small tool tradition indicates that during the Upper Paleolithic period, this technique spread throughout Hexi Corridor and arrived in eastern Xinjiang, which was way earlier than the silk trade along that corridor.

This site is situated on the terrace of the Ancient Yarghul City, which is not far away from the Jin & Tang Dynasty cemetery. The Paleolithic and Jin & Tang gap still needs to be filled, like human occupation development.

⁶ One is the Kehe-Dingcun Series, characterized by extensive chopper-chopping tools and triangular points; the other is the Zhoukoudian Locality 1-Shiyu Series, characterized by small flake tools such as scrapers and burins (Gao, 2013).

3. Chaiwopu Site

1. Location

Chaiwopu Site is situated in the Tianshan valley about 50 km to the northeast of Urumchi. In the middle of the inter-mountain plain bordered on the north by the Bogda snow peak, along the road Turfan to Urumchi (Fig. 4.1: c). This valley is a natural passage throughout Tianshan Mountain and has been the only route since human occupation (Aburasul, 1993). Turfan Basin lies in the Warm Temperate Zone and receives the lowest precipitation in all of China; the total annual is between 15-50 mm. The temperature varies from -7.6°C to 32.2°C (Domrös & Peng, 1988).

Two localities are found on two sides of Chaiwopu Lake, whose diameter is about 6 km. Locality 1 is on the east of the Gobi lakeshore of the lake, about 1 km, and locality 2 is situated on the southwest side of the lake.

2. Research History

The first survey was done by Sweden scholar Folke Bergman, who published his field report in 1939, in which he mentioned this site with several cores, flakes, and scrapers (Bergman, 1939). In October 1984, the Xinjiang Institute of Archaeology arranged a systematical field survey, and they collected 659 stone artefacts from two localities in this area (Abdurasul, 1993).

3. Findings

The collected stone artefacts include flakes, cores, and large chunks, and the materials include chert, jade, siliceous, etc.

Large Chunk: there are nine chunks found in this area, most of them are chopping tools (Fig. 4.4), and the modification landmarks are not so clear.

Core

Boat-core: the boat cores are made of gravel, using the interior separation as the platform, and the whole core is oval-shaped, with a sharp distal end. Some cores keep

their natural cortex, and some are made by indirect percussion (Fig. 4.5:1-2).

Wedge-core: like the boat core, the platform of wedge-cores is made by the interior separation of the gravel, and there are several long scars left on the core. Usually, one sharp margin is from the platform to the distal end (Fig. 4.5: 3-5).

Conical core: this type of core is made by indirect percussion, splitting from the platform to the distal end after retouching the platform. The core is dull with long scars (Fig. 4.5: 6-8).

Cylindrical-core: the reduction process is similar to the conical core, except during the splitting, the platform is modified continuously. Once the platform is not suitable for splitting, the distal end is cut for a new platform (Fig. 4.5: 9-10).

Microflake: the microflakes are made by indirect percussion, and the profile is triangular or trapezoid. Some are modified from the separation section to the dorsal, while few are on the contrary. All microflakes in this site are broken (Fig.4.5: 11-17).

Flake: most of the flakes are rectangular or irregular, and all of them are made by direct percussion technique. Some kept their natural cortex on the dorsal and most kept their platform. Few flakes showed using landmarks on the margin (Fig. 4.5: 18-29).

Scraper:

Long & round-end scraper: This scraper is made of rectangular flake. Direct percussion or pressure percussion from the separation section makes their distal end into a sharp convex margin (Fig. 4.5: 30-34).

Short & round-end scraper: like the long & round-end scraper, except this type is much shorter than the former, which is also known as the thumb-nail scraper (Abdurasul, 1998) (Fig. 4.5: 35-38).

Round scraper: This scraper is made from semicircular flakes, modified from the separation to dorsal, and the sharp margin is also semicircular (Fig. 4.5: 36-42; 43-45).

Leaf scraper: the whole scrape looks like a leaf, and there is one ridge on the dorsal. Two margins are modified from the separation to the dorsal, and one margin is much sharper (Fig. 4.5: 46-47).

Convex scraper: made from a triangular flake or one side of a rectangular flake, and the dorsal is made convex. Only a few are facially modified (Fig. 4.5: 48-50).

Concave scraper: made by triangular flake or one side of rectangular flake, and dorsal is made concave.

Long scraper: modified one side of rectangular flake into sharp margin. Few are facially modified, and most are modified towards the separation section (Fig. 4.6: 1).

Double-margin scraper: modifying two sides of triangular flake or adjacent side of rectangular side into two or three sharp margins (Fig. 4.6: 2-5).

Point

Single point: modifying from the point of triangular flake to distal end, also known as arrowhead (Fig. 4.6: 21-25).

Double point: usually made from the distal end of rectangular flake, striking the dorsal corner and making two points. The points are modified (Fig. 4.6: 26-27).

Double-end point: modifying from both sides from the dorsal of prismatic flake (Fig. 4.6: 32).

Rectangular point: modifying from the corner of adjacent sides of the rectangular flake (Fig. 4.6: 28-30).

Slope point: the point is modified on the dorsal end and looks like a bird beak. (Fig. 4.6: 33, 36)

Burin

Ridge burin: splitting from both sides of an irregular flake, making a sharp ridge margin. (Fig. 4.6: 31)

Chisel burin: modifying from the triangular flake, splitting one point and making it a chisel margin, while the other side is a denticulate margin. (Fig. 4.6: 38)

Drill: modifying two adjacent sides of a flake into a sharp point. (Fig. 4.6:34-35)

Facial retouched tools: only three artifacts are confirmed with the facial percussion technique, two are facial scrapers (Fig. 4.6: 39-40), and on end is a knife flake, the margin is sharp (Fig. 4.6: 42).

In addition, several pieces of pottery were found in this area, including painted pottery sherds.

In summary, the lithic assemblage in Chaiwopu is typical; the microlithic is the most abundant type, especially flake; and the reduction technology includes direct, indirect, and pressure percussion.

4. Age

Judging from the number of stone artifacts and the lack of polished stone implements, the possible date of this site is between Upper Paleolithic to Neolithic. Unfortunately, there is no actual radiocarbon dating evidence, so we could only approximate the age of 6,000-5,000 BP as the Chaiwopu's date from the lithic form (Chen, 2017). However, the coexistence of stone tools and pottery sherds is still a problem. Considering the Han cemetery, these pottery sherds might belong to the later feature, but this must be

re-examined in detail.

5. Interpretation

Chaiwopu site displays a solid local characteristic, and it is unique from other microlithic sites: the microflake is the most abundant, while the site lacks microblade; the reduction techniques include direct percussion and involve indirect and pressure percussion as well; there is even a delicate arrowhead found here (Chen, 2017). Some scholars suggest that this site is not in the microlithic time, as the flake and scraper are not as defined as microlithic devices (Zhang, 1996). The variable techniques may indicate the long-lasting settlement in Chaiwopu; when the inhabitants experienced the transition from hunter-gatherer to sedentary strategy, the development of the reduction technique is the indicator.

4. Ertrix Lake Site

1. Location

The surveyed Paleolithic spots in the Ertrix Lake area are situated in Tacheng (Tarbaghatay) District, Haba County (Fig.4.1: d). There are six localities found in this region (naming 93AHE1-6), Nr. 1 locality is 23 kilometers southwest of Haba County; while Nr. 2 and 3 are 20 kilometers southwest of Haba County; Nr. 4 is located on the northeast side of Ertix River, 41 kilometers to the southwest of Haba County; Nr. 5 is on the half-sand terrace on Biliezi River, and Nr. 6 is located near Nr. 5.

The Altai Mountain range is situated on the northern border of Xinjiang, the northwest end of the range is at 52° N and between 84° and 90° E, and it extends southeast to about 45° N and 99° E. The elevation is 1,500 to 1,750 m. This region is studded with large lakes, with several plateaus of lower elevations. The Altai Mountains lie in the Middle Temperate zone, and the regional climate is severely continental. Winter is long and cold and varies a lot from the foothills (-14°C) to sheltered hollows in the east (-23°C) in January; while during the summer, it can range from 20°C to 24°C; the annual total of precipitation is between 50 to 250 mm (Domrös & Peng, 1988).

2. Research History

From May to June 1991, the Xinjiang Institute of Cultural Relics & Archaeology surveyed Tacheng District; however, they only collected a few stone artifacts with artificial signs and no confirmed localities (Zhang, 1996). From August to September 1993, they made a second field survey. And this time, they confirmed 6 locations with stone tools. In 1998, the typological analysis of these stone tools was published (Abdurasul et al., 1998).

3. Findings (Fig. 4.7 & 4.8)

93AHE1: there are thirteen stone artifacts collected here, including four flakes, three chunk flakes, two scrapers, and one one-side tanged and barbed point.

93AHE2: there are six hundred and sixty artifacts collected, including one hundred and twenty-three flakes, eight blades, two hundred and twenty-five bladelets, one hundred and thirty-seven chunk flakes, forty-two chunks, one flake core, seventeen micro-cores, fifty-one scrapers, five notches, seven micro tanged and barbed point, three wedged pieces, one burin-scraper composite tool, thirty-one modified bladelet, one stone burin.

93AHE3: twenty-three artifacts were collected, including eight flakes, four chunk flakes, seven chunks, three scrapers, one miso-tanged, and a barbed point.

93AHE4: there are one hundred and thirty-three artifacts collected, including forty-one flakes, four blades, thirty-three bladelets, twenty-nine chunk flakes, one chunk, one flake-core, six micro-cores, seven scrapers, two tanged and barbed points, one discoid, eight modified bladelets. One of the points is called Font-Yves Point, which is made by one thin bladelet, and it is pointed on one end.

93AHE5: fourteen artifacts were collected, including five flakes, three bladelets, five scrapers, and one modified pebble. In addition, two pieces of pottery were collected here.

93AHE6: five artifacts were collected, including two flakes, three bladelets, and one chunk.

4. Age

Among these finds, only two pottery sherds are collected, and the stone tools are much more complicated than the Altun tools (with more composite tools), so the time could be later than Altun lithic tools, no earlier than 247,000 BP. The tool kits show a remarkable similarity with the Ancient Yarghul City West Terrace site and stratified localities in the Ertrix Basin of Eastern Kazakhstan. The blade-based composite tools are dated to the Early Upper Paleolithic (Derevianko et al., 2012). Therefore, the possible date of Ertix Lake Spot might be around 24,000 BP.

5. Interpretation

Locality Nr. 2 and 4 are the prominent producing/remaining spots. In contrast, the rest spots lack either bladelets or scrapers, which cannot be good evidence in deciding the composite tools and stone tool styles. The stone tools found in 93AHE: 2 include abundant bladelets and end scrapers so that the lithic assemblage could be summarized as the bladelet-one-end-scraper assemblage; this is also obvious in the 93AEH4 spot. In addition, there is one trapezoid bladelet and a stone burin found in the 93AEH1 location, which is relatively few in other lithic spots.

The bifaces and end-scrapers discovered in this area represent Levallois-like technology (Jia, Betts & Wu, 2009). Based on the typology of the lithic assemblages, Zhang suggests a specific “point and end-scraper industry” for this site (Zhang, 1997).

Like the Ancient Yarghul City West Terrace site, the Ertix Lake Site lithic assemblage also belongs to the small tool tradition. The Levallois technique displayed on this site is a good indicator of studying the development of lithic techniques development among Xinjiang and even North China.

5. Jirigale Site

1. Location

Jirigale Site is situated in the Tashqurghan in Southern Xinjiang, 34 kilometers to the southeast of Tashqurghan Tajik Autonomous County, belonging to Tizinafu Commune (Fig. 4.1: e). This spot is situated on the east side of the Tashqurghan River, 110 m to the modern riverbed. There are five construction terraces, and this site is found on the slope of the third terrace, 10 m higher than the contemporary riverbed.

Tashqurghan lies in the Warm Temperate and Alpine Plateau (Domrös & Peng, 1988). Influenced by the high elevation, it has long, freezing winters and warm summers. The temperature varies from -11.9°C to 16.4°C . The Tashkurghan River begins from the north of Khunjerab Pass and flows north along the Karakoram Highway to Tashkurghan; it turns east at the north of Tashkurghan and joins the Yarkan River in the Tarim Basin.

2. Research History

In August 1983, the Xinjiang Uyghur Autonomous Region Museum, Beijing Natural Museum, and Xinjiang Uyghur Autonomous Bureau of Geology made a joint field survey. They found this spot in the suburb of Tashkurghan County. After the discovery, they made a trial excavation and found one shaped stone tool and several chunk flakes pieces (Xinjiang et al., 1985). In 1988, Chen defined this spot as a Late Paleolithic site (Chen, 1988).

3. Findings

During the investigation in 1983, three piles of ash remained were found in the third Late Pleistocene terrace cave. The ash remains are arranged in stratigraphic order, with about 50 cm of the ash remains' distance (Fig. 4.9). The ash profile remains in lens shape, and some solid burnt soil is left on the bottom and two sides. The thickest remain is between 4cm to 8cm, among which are several charcoals left. The charcoals are distributed unevenly; most of the length is between 5 to 10 mm, while some are as long as 15 mm. Some burnt animal bones are found in the ash and the nearby sand.

One modified stone tool was found in the piles in front of the cave; it is a chopping tool, the most extended length is 14 cm, the width is 9 cm, and the thickest is 8.5 cm. This chopping tool is made of rough quartz gravel, with only one end modified, and the cross-section is an irregular pentagon. One knife-edge has four scars, with two striking points on the margin; the other sharp margin has two more minor scars. There are striking and splitting landmarks. Except for the scars and striking part, the rest keeps its original gravel cortex.

4. Age

Dating by the river terrace, the third layer is in the Late Pleistocene, and there is no pottery found in the same layer; due to the lack of radiocarbon data, the time of this spot can only be conducted from the terrace date; no earlier than 10, 000 BP. (Xinjiang *et al.* 1985).

5. Interpretation

The chopping tool is made by mutual striking technology; the striking signs are still easy to find. In addition, the rest part of this tool is not modified, which might indicate the unskilled in the stone tool industry.

The distance between different ash remains indicates that this place was once inhabited for a period. According to the burnt remains, this place could be used as a cooking spot after hunting. This also explains the animal bones in and around the ash remains (Xinjiang *et al.* 1985).

However, there is only one stone tool found in Jirigale, not in the ash remains but outside the cave; and there are no identical animal bones. So, it is hard to define this site as an exact “Paleolithic Site” (Chen, 2017). We can only assure that about 10,000 years ago, the inhabitants used to stay in this cave. The site and cultural definition still need more evidence to prove.

6. Luotuoshi Site

1. Location

Luotuoshi site is in the Tacheng prefecture (Ooqek wilayat), northwest of Urumchi, Xinjiang Uyghur Autonomous Region, Northern Xinjiang (Fig. 4.1: f). The elevation is about 1,000 m above sea level. This site is situated on both sides of National Highway G217, linking Qaramay and Altai, on a slightly dipping Piedmont plain, adding the Junggar range of the Saur-Tarbagatai massif to the east. The scale of this site occupies an area of about 30 km².

This region is situated in the Middle Temperate Zone, with a continental semi-arid climate, with hot summers and freezing winters. The temperature varies from -12.6°C to 23.7°C; the annual precipitation is between 50 and 250 mm (Domrös & Peng, 1988).

2. Research History

In 2004, the joint Chinese-Russian-American archaeological expeditions' reconnaissance route traversed northern Xinjiang's Tacheng and Altai Prefectures, following the natural borders of Junggar Basin. A total of thirty-two Stone Age sites were surveyed. Luotuoshi is the most crucial site (other locations, see Table 1: Gao et al., 2012). In 2005, Gao and Pei reported their findings and the absolute age of the stone tools (Gao & Pei 2005). In 2008, in the Xinjiang Prehistory Archaeology Symposium, Shui Tao summarized the general information of Luotuoshi and pointed out its importance in prehistoric migration research, cultural interaction research, and subsistence research (Shui, 2008).

3. Findings

During the field investigation, the site is divided into three study sections named sections A, B, and C. Artifacts are all surfaces collected from established three units, each producing various numbers of artifacts ranging up to several hundred.

The total Luotuoshi collection comprises five hundred and ninety-four artifacts, made mainly by dark gray and black fine-grained siliceous rocks sourced as nodules and on

sub-rectangular, tabular blocks. Alluvial pebbles are also used as raw materials.

The artifacts are classified by qualitative relative degrees of surface abrasion into several categories, including twelve specimens with a new unabridged surface; three hundred and four specimens with light surface abrasion; one hundred and ninety-five specimens with moderate surface abrasion; and twenty-three specimens with heavy surface abrasion.

There are seven hundred and forty-nine stone artifacts in total, including 84 cores, 281 flakes, ten Levallois-like flakes, six Levallois points, 116 blades, two platform rejuvenation spalls, 19 *Eclats debordants*, five semi-primary blades, four semi-crested blades, 60 small flakes not exceeding 30 mm, three pebbles, four indeterminate, 17 sidescrapers, eight end scrapers, 25 retouched blades, 36 retouched flakes, 36 notch-reticulate tools, five points, five bifaces, 13 spur-like tools, six combination tools, one knife, and three choppers (Fig.12).

4. Age

The typological composition of the Luotuoshi site is similar to those of well-dated stratified sites in Mongolian (i.e., Baelagin-Gol-2 collection and Orkhon-1 collection) and China (i.e., Shuidonggou site). The Levallois-like flakes and points made it possible to attribute the collections to the transition stages from Middle Paleolithic to the Upper Paleolithic (Gao et al., 2012). Due to the lack of exact radiocarbon dating or geomagnetic analysis, we could only approximate the date of Luotuoshi to between 50,000 and 24,000 BP.

5. Interpretation

The core-like artifact constitutes 14% of the total number of artifacts, while most represent the initial reduction stage. Five cores are made with preform, which is considered the consequence of locally abundant outcrops of rocks suitable for artifact manufacturing. The chunk spalls, including flake and blade and other chunk pieces, contribute 68%; as for the tools, it only constitutes 20%.

The Luotuoshi lithic industry includes various degrees of surface weathering; it is homogenous and shows its independent technique and tradition. The typological range of nuclei, together with specific morphological features of the cores themselves and the large proportion of chunk pieces, performs preparations, indicating that the Luotuoshi site could be a workshop where primary stone reduction and firstly preparation of core-like forms are undertaken.

The geographical location of the Luotuoshi site is suggested to be situated on a route of dispersal of a blade-flaking technological tradition from the Altai Mountains through eastern Junngar and western and Central Mongolia to the Ordos Region within the Yellow River. Additionally, the Luotuoshi lithic industry supports the hypothesis of a “southern route” for distributing Upper Paleolithic technologies through Central Asia (Gao et al., 2012).

7. Tarim Basin Sites

1. Location

Six localities are situated in the southern borders of Tarim Basin, named XYF-87, XNF-87, XLF-87, XNM-87, XKM-87, and XDM-87, and the geographical coordinates are between 79°20'—83°50' E, 36°10'—37°40' N (Fig. 4.1: g). Six localities are located near Yurungkash River, Niya River, and Keriya River. Tarim Basin is a depression region surrounded by mountains, and the eastern border is connected with Hexi Corridor. The elevation is 1000 m above sea level. Tarim Basin is in the Warm Temperate Zone; the great Taklimakan Desert makes this region more desert climate and contributes to the world's driest region. The annual precipitation is between 15 to 50 mm, and the temperature varies from 25°C to 28°C in July and -1°C to -5°C in January (Domrös & Peng, 1988).

2. Research History

In June 1987, Huang and Ouyang surveyed the southern Tarim Basin for a natural

resource investigation. Here, they confirmed three lithic localities. In 1990, the investigation project did a second survey, and they found another three localities. Unfortunately, most stone tools are not published until now (Zhang, 1996).

3. Findings (Fig. 4.11 & 4.12)

XYF-87: there are eight pieces found at this locality, six from the third step of Yurungkash River Terrace and two from the first and second steps. One is a facial chopping tool that might be used as a hand axe. The length is 12.4 cm, the width is 9.5 cm, and the thickness is 5.4 cm.

XNF-87: five flakes are found from the third step of the Niya River alluvial fan, made of dark grey gravel.

XNM-87: more than one hundred and forty pieces are found from the delta of eastern Niya River, including microlithic, microblade, flake, spalls, and fragments. Most of them are made of grey silicalite. There is one wedge core made by facial percussion. Four-leaf scars remain on the separation platform; the length is 42 mm, width is 8 mm. there are also five microblade, modified from both ends, with two or three leaf scars on the dorsal. The width ranges from 5.2 mm to 13.4 mm.

XKM-87: one micro-cylindrical core, two microblade, and seven flakes are found valley between dunes, and several red pottery sherds are found simultaneously.

XDM-87: only one microflake is found between the shifting dunes. The length is 22.4 mm, and the width is 10 mm.

4. Age

The lithic tools found in Tarim Basin have similarities with Layihai Site in Qinghai and Karuo Site in Tibet. Unfortunately, there is no radiocarbon dating or geomagnetic evidence. Based on the typological similarities, the date of these localities might be between 7,000 and 4,000 BP. (Huang et al. 1988).

5. Interpretation

According to the published stone tools, the microlithic accounts for most of the Tarim Basin Sites. The numbers confirmed another spot that belongs to the small tool tradition in North China and existed in Mongolia, Russia, and even North America (Teihard, 1939; Huang, 1988). Considering the time and different technique phases, the diffusion of the prehistoric lithic industry might have more conclusions.

8. Tongtiandong Cave Site

1. Location

Tongtiandong Cave is a granite cave in Jimunai County, Altai Prefecture, Northern Xinjiang (Fig. 4.1: h). The elevation is 1,810 meters. This spot is southwest of Altai Prefecture, south side of Ertix River north side of Sawu'er Mountain.

This region is in the Middle Warm Temperate Zone with a continental climate, and the temperature varies from -10°C to -12°C in January, and a July means between 20°C to 24°C (Domrös & Peng, 1988). The westerlies lead the Atlantic moisture through Ertix River Valley, making this region one of the highest rainfall regions in Xinjiang; the annual rainfall could be 300 mm (Yu, 2018).

2. Research History

In 2014, during the First National Portable Cultural Relics Archaeological Survey, the Northern Xinjiang Team found this spot and confirmed it as a Bronze Age site. In 2015, the Xinjiang Institute of Cultural Relics & Archaeology did a second survey in this region, aiming to determine the date of this site. The follow-up excavation started in 2016 and lasted a year. The Xinjiang Institute of Cultural Relics and Archaeology and the School of Archaeology and Museology of Peking University cooperated in this project.

At the beginning of 2016, to clarify the scale and nature of the cave and understand the

archaeological remains, the archaeological team carried out one trial excavation inside and outside the cave. The 2016 excavation opened 65 m², and many pottery fragments, millstones, and fire-used remains are found outside the cave. Two stone piles remain, named T0505 and T1515; while T0505 is outside the cave, T1515 is in the cave. The 2017 excavation continued the exploration of the caves. The samples' information concerning the type, three-dimensional coordinates, strata deposition, horizontal section and attitude, and weathering erosion are recorded elaborately. The extraction of dating samples, floating soil samples, soil micromorphology samples, and DNA soil samples are also recorded. The brief excavation reports were published in 2017 and 2018, respectively (Yu & He, 2017; Yu, 2018).

3. Findings

The deposition in Tongtiandong Cave is thick, and the most in-depth spot is 3 m deep. The excavated area contained fourteen stratum, which are classified into four groups.

Pottery, Bronze ware, Iron wares, and millstones are found in the Bronze Age and Early Iron Age stratum. The stonewall remains that surround the cave are found in T0505, and there is an ash pit with a diameter of 1.2 meters outside the stonewall. The carbonized wheat (*Triticum aestivum* L. (Yu, 2018)) was gained by the flotation method in the Bronze Age and Early Iron Age deposition in T0505.

Around two thousand pieces of samples are unearthed from the Paleolithic stratum, among which two-thirds are stone tools, and the rest, one-third are animal skeleton fossils and tiny animal fossils. The animal skeletons are highly fragmented, with clear-cutting, burning, and knocking traces. The stone tools include typical Levallois lithic cores, discoid cores, Levallois points, scrapers, and Mousterian points (Fig. 4.13).

Three ash pits are unearthed *in situ* in the Paleolithic layer. They are irregular circles with a clear boundary, and the diameters are 50-70 centimeters.

4. Age

The stone tools displayed Middle Paleolithic cultural characteristics. The identified species include carnivores, rabbits, sheep, donkeys, rhinos, bears, birds, and other small animals. The radiocarbon dating of the fossils shows in 45,000 BP., and the carbonized wheat found in the Bronze Age layer is in 5,000 to 3,000 BP. (Yu, 2018).

5. Interpretation

According to the excavation report, the Tongtiandong Cave Site is the first Paleolithic cave site found in Xinjiang. It provides the continuous stratigraphic cultural layer sections of Paleolithic-Chalcolithic-Bronze Age-Early Iron Age. The coexistence of Levallois and Mousterian lithic tools may suggest the transition of the lithic industry and Middle Paleolithic to Upper Paleolithic. The deep stratigraphy and highly fraged animal bones might indicate frequent human activity.

9. Qijiaojing Site

1. Location

Qijiaojing Site is located in the suburb of Qijiaojing Town, one locality is 10 kilometers to the west, and the other is 500 meters to the northeast (Fig. 4.1: i). This area is in the middle Turfan Basin, Eastern Xinjiang.

This region is in the Warm Temperate Zone, with a continental climate. Influenced by low elevation, the annual precipitation is between 15 and 50 mm, while the temperature reaches 39.9°C in July and -1°C in January (Domrös & Peng, 1988).

2. Research History

From 1930 to 1931, P. Teilhard De Chardin and Young Zhongjian conducted their survey in Mongolia and Xinjiang, and they collected several stone pieces from Hami-Chikuchintze (Qijiaojing) Santaolingtze. They confirmed these two locations as the Paleolithic sites (Chardin & Yang, 1932). Qijiaojing was surveyed several times in 1960 (Shi, 1960) and 1984 (Wang, 1993). The collected stone tools are more than 700. In the 1990s, Wang Binghua from the Xinjiang Institute of Cultural Relics &

Archaeology surveyed Santaolingtze again; unfortunately, this site was broken and replaced by a large coal mine (Wang, 1984), making it impossible to research.

In 1994, Chen Ge defined this spot as a Microlithic site and summarized Qijiaojing, Santaolingtze, and Yarghul Lake Site as Qijiaojing Culture (Chen, 2017). He believed these three sites display a remarkable similarity in the lithic industry since the distance is not far away. However, it is hard to define the cultural elements with no detailed stratigraphy evidence or radiocarbon dating results.

3. Findings

From the 1930s survey, P.T. De Chardin and Young Zhongjian found one pickaxe cut by one end and pierced by another. The trenchant edge is skillfully chipped, and a piece for the attachment of the tool to a handle is clearly indicated. The length is 31 cm (Fig. 4.14: 1).

They also found two pieces named burin; the working part is the small beak (Fig. 4.14: 4, 6).

The later collected stone artefacts can be classified into three types: microlithic, flake and core:

Microlithic: including boat core, cone core, bladelet, small arrow, drill, and burin. The longest bladelet could be 7 cm, and the width is 0.3-0.4 cm. The cross-section is in a triangle or trapezoid; the margin is sharp, but no second modification landmarks (Fig. 4.14: 3, 5).

Flake: constitute the most, making by direct percussion. The chunk flakes are used for long or short scrapers and points. There are also nail-scrapers and thick flakes found, which are modified on one side, and used for chopping. There are also regular rectangle flakes, with no modifications but used evidence.

Core: there is only one sharp axe with girdling, it is modified on both sides, and the middle part is girdled concavely. The length is 31cm (Fig. 4.14: 2).

4. Age

According to the stone characteristic and production technology, this spot might be dated to 9,000 BP (Chen, 2017); there is no exact radiocarbon dating or geomagnetic evidence.

5. Interpretation

The lithic tools found here represent a skillful producing technology: the flake is made by direct percussion, while the bladelets are caused by indirect and facial pressure percussion. We may preliminary take Qijingjing into the "small tool tradition"; however, the lack of polished lithic, pottery sherds or exact radiocarbon dating will determine the lithic tradition.

Chapter 5. Bronze-Iron Age (4,000-1,500 BP)

1. Eastern Xinjiang

1.1 Hami Region

1.1.1 Yanbulaq site

1. Location

Yanbulaq site is situated in Yanbulaq village, Hami County. There are two long narrow oases bands in the northwestern village; among these two bands flows a stream, and the site is situated in the south of the west band (Fig. 5: 1). Some of the city walls remained decades ago while all walls were destructed currently. Many pottery sherds can still be found on the ground.

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C , while in July, it can be between 20° to 24°C (Domrös & Peng, 1988).

2. Research History

In the 1950s, some pottery wares were found in this area (Li, 1959). From 1957 to 1958, Chinese archaeologist Huang Wenbi excavated this site (Huang, 1983); he cleared fourteen tombs and a walled compound. In 1986, this site was excavated again; 76 graves were exposed (Xinjiang, 1989). The excavation area is divided into twelve trenches (86XHYT1-T3; T10-T12; T20-T22; T30-T32), and one tomb was yielded in the northwest of the T1-T3 area (M76) (Fig. 5.1.1.1-1).

“Yanbulaq Culture” was named in the excavation report in 1989, and then scholars studied the chronological sequence (Wang & Tan, 1990; Shao, 2006), social content (Chen, 1991), burial tradition (Li, 1997), population affinity (Han, 1990; Wei, 2009), etc.

3. Findings

3.1 Stratigraphic sequence

The Topsoil is about 0.05-0.15m. The content is pure; under the Topsoil is the disturbance layer. The thickness is between 0.4 to 0.6m, involving pottery sherds, wooden pieces, mud-bricks, human bones, and several complete pottery wares. The stratigraphy varies between different excavation areas. In T2, the raw soil is under the Disturbance layer, and all tombs are constructed in the raw ground (Fig. 5.1.1.1-2). In contrast, for the T30-T32 area, the third layer is the sand gravel layer, the thickness is between 0.25 to 0.7m, and the content is soft; all mud-brick tombs are found in this layer, while under this layer is the raw soil, all pit graves are constructed in this layer (Fig. 5.1.1.1-3).

Combing the two sections' stratums, this site has four layers: Topsoil, Disturbance layer, Sand gravel layer, and Raw soil (Fig. 5.1.1.1-4).

Human skeletons are found in random order; only a few bones remain in some tombs, and the grave goods are also in disorder. However, the Topsoil is in good preservation, suggesting this site was disturbed long ago.

3.2 Tombs

M6: Rectangular, the orientation is 168°. *M6* is constructed from a 37cm deep pit. Two rows of two-layer mud-bricks are on the northwest side, while on the northeast side is one layer of mud-brick. The west side is constructed by one row of two-layer mud-brick, with one layer of mud-brick on top. The south is one layer of mud-brick. There are two rows of three mud-bricks and one layer of mud-brick above it for the east side. The outer length is 162cm, and the exterior width is 142cm; the inner size is 114cm, the internal width is 90cm, and the depth is 74cm.

Two human skeletons are buried in *M6*; the upper skeleton is an over 50-year-old male, the direction of the head is southeast, and his legs are right flexed. The lower skeleton belongs to an adult female whose head is missing, but the direction is northwest, and

her legs are left flexed.

There are 22 grave goods found in M6, including one pottery vessel, two bronze arrowheads, one bronze button, three cowry ornaments, four stone beads, and one goat talus on the east side; while one bronze earring, one bronze tube, five stone bead, two bone beads and one goat talus on the lower skeleton (Fig. 5.1.1.1-5).

M8: Rectangular, the orientation is 341°. There is one row of single-mud-brick along the pit wall from the bottom. The outer length is 69cm, the width is 53cm, and the depth is 13cm; the inner size is 49cm, and the internal width is 33cm.

There is one 4/6-year-old child found in M8; the direction of the head is north, flexed upwards. There are two stone ornaments on the northwest side (Fig. 5.1.1.1-6).

M11: Irregular oval, the orientation is 6°. M11 is constructed in the natural soil pit; the length is 120cm, the width is 87cm, and the depth is 20cm.

There is one 30-35-year-old female skeleton found in M11; the direction of the head is the north, upward left flexed. There are two pottery vessels on both sides of the arm (Fig. 5.1.1.1-7).

M19: Irregular rectangle, the Orientation is 349°. It is constructed of four mud-bricks; the north, west, and east sides are all above the brick wall of M22. The outer length is 64cm, the exterior width is 52cm, the internal size is 47cm, the inner width is 32cm, and the depth is 20cm.

One child is buried in M19; however, the bones are in disorder. There are no grave goods found in M19 (Fig. 5.1.1.1-8).

M22: Rectangular, the orientation is 354°. Mud-bricks above the ground construct its tomb pit. One row of three-layer mud-brick on the north, east and west sides; while each

north layer has two mud-bricks, the east and west layers have three mud-bricks; the south side has one layer of two mud-bricks. There are two wooden beams on the east and west inner sides, respectively, the length is 70cm, and the diameter is 6cm. The size of the outer chamber is 165cm, the width is 120cm, the inner length is 140cm, the width is 73cm, and the depth is 33cm.

One adult male is buried in M22, but the skeletons are disorderly placed, indicating the secondary burial. One stone bead found in M22 (Fig. 5.1.1.1-8).

M30: Oval, the orientation is 222°. M30 is constructed in the raw soil pit. The length is 240cm, the width is 150cm, the upper part of the grave is destroyed, and the remained depth is 14cm. There is only one mud-brick under the head of the human skeleton.

There is one 35/45-year-old male skeleton found in M30. The direction of the head is northeast, upward straight. There are five grave goods found in this tomb, including four pottery vessels and one wooden plate around the head area, the wooden plate has rooted, but there are two strings of cow vertebra (Fig. 5.1.1.1-9).

M31: Rectangular, the orientation is 344°, the length is 150cm, the width is 111cm, and the depth is 86-96cm. There is one raw soil platform along with the bottom pit, the height is 25cm, and the width is 26-28cm. There is one row of three-layer mud-bricks on each side of the platform, the north and south side is composed of two mud-bricks, while the east side has three mud pieces, and the west side has two and a half mud-bricks. The space between the mud piece and pit wall is filled with raw soil, making a raw soil & mud-brick platform, whose height is 63cm. The length of the inner chamber is 97cm, the width is 55cm, and the depth is 63cm. There are seven cover beams on the platform, the direction is north-south, the remaining length is 17-62cm, and the diameter is 5-10cm.

M31 has been robbed, the skeleton of one 35-45-year-old female remained, the direction of the head is northwest, and the legs are left flexed. According to the analysis

of the rest skeletons, there were three people buried in this tomb initially, except for the above female; the rests are one 35/45-year-old female and one 18/22-year-old male.

Nine grave goods are found in M31, including five pottery objects, two bronze earrings, one stone ornament, one stone bead, and one iron knife. Four pottery vessels, one pottery spinning wheel, and one iron knife are found on the east side of the pit; two bronze earrings, one stone bead, and one stone ornament around the head area (Fig. 5.1.1.1-10).

M43: Oval, the orientation is 346°. One row of mud-bricks along the bottom of the shaft pit comprises 18 mud-bricks, and another nine mud-bricks make a mud-brick wall. The space between the pit wall and brick wall is filled with raw soil, and the surface of the bricks is coated with a 2cm mud piece. The outer length is 155cm, the exterior width is 112cm, the internal size is 127cm, the width is 85cm, and the depth is 62cm.

One 35/40-year-old male is found in M43; the skeletons are out of order and incomplete, which might indicate the secondary burial tradition. Only one goat talus is found in M43 (Fig. 5.1.1.1-11).

M52: Rectangular, the orientation is 0°. There is one row of two-layer mud-brick on the north side; on the west side, there is one layer of mud-brick on the bottom, three mud-bricks in the middle, and one mud piece on the top. There is one layer of mud-brick; while the east side is constructed of two layers of mud-bricks, with four mud-bricks on top. The outer length is 132cm, the exterior width is 122cm, and the depth is 35cm; the inner size is 102cm, and the internal width is 73cm.

There is one adult female skeleton found in M52, the direction of the head is north, and the body is left flexed. Only one pottery vessel is located on the southeast corner (Fig. 5.1.1.1-12).

M60: Rectangular, the orientation is 344°. There is one row of two-layer mud-brick

along the bottom of the shaft-pit wall. At the same time, each layer has two mud-bricks, which form a mud-brick barrier. Its east wall is constructed on the west wall of the next tomb—M61. The outer length is 112cm, the exterior width is 84cm, and the depth is 52cm; the inner size is 96cm, and the internal width is 68cm.

There is one 15-18-year-old female found in M60, the direction of the head is northwest, and the whole body is right flexed. Only one pottery vessel is found from the southeast corner (Fig. 5.1.1.1-13).

M61: Rectangular, the orientation is 344°. One raw soil platform on the north, east and west sides, whose height is 49cm and the width is 20cm; one row of two-layer mud-brick above the raw soil platform forms a raw soil & mud-brick platform, whose height is 70cm. There is one raw soil platform at the south side, and it is constructed by one row of nine-layer mud-brick, while each layer has two mud-bricks, which form a mud-brick wall. As for the surface of the tomb pit, there are one row of two-layer mud-brick on the north, east and south sides; each layer has three mud-bricks. There is one row of single-mud-brick on the southwest side; the rest is the east wall of M60. The outer length is 145cm, the exterior width is 103cm, and the depth is 140cm; the size of the inner chamber is 102cm, the width is 77cm, and the depth is 70cm.

M61 has been poorly robbed; according to the analysis of the rest bones, there is one adult buried in this tomb initially; the gender is unknown. One pottery vessel and one bronze tube are found from the robbed fillings (Fig. 5.1.1.1-13).

M68: Rectangular, the orientation is 153°. The five-row-mud-bricks are constructed from the bottom of the shaft pit, the north and south wall is built with three mud-bricks, while the east and west walls have four mud-bricks; and the space between the grave wall and brick wall is filled by raw soil, which makes a mud-brick platform, the height is 58cm, and the width is 30-55cm. There is another platform on the west side, composed of four mud-bricks and one mud-brick on the southwest and southeast corner, respectively, with another two mud-bricks on the northeast corner. The outer length is

260cm, the exterior width is 192cm, and the depth is 183-200cm; the inner size is 148cm, the internal width is 106cm, and the inner depth is 58cm.

M68 has been robbed, with one human skeleton remaining, which belongs to a 25-year-old male, the direction of the head is southeast, and the legs are right flexed. According to the analysis of the rest skeletons, this tomb is initially buried by three people, one is a female adult, and the other is a teenager.

There are sixteen grave goods found in this tomb, including two pottery objects, nine bronze objects, four stone objects, and one golden object. One bronze knife, one grinding stone, one bronze awl, and one bronze ornament are found at the waist area, two bronze ornaments and one stone bead are located in the foot area; one bronze bead and one stone bead are found under the east platform (Fig. 5.1.1.1-14).

M75: Rectangular, the orientation is 153°. There are six rows of mud-bricks along the north, east, and west bottom of the shaft pit, with two bricks on each northern row and three on the east and west sides. There are four rows of two-layer mud-brick platforms in the south, and each row has two or three mud-bricks. The space between the pit wall and the brick wall is filled with raw soil, making a mud-brick platform, whose height is 65cm and the width is 60-100cm. There is another tomb chamber on the southeast corner. This chamber is constructed out of mud-bricks. The north side is composed of two rows of mud-bricks, and the west side is constructed out of one row of six-layer mud-bricks; the south is constructed with one row of three-mud-bricks. The east side is the initial pit wall. The outer length is 278cm, the outer width is 227cm, and the exterior depth is 172cm; the inner size is 125cm, the internal width is 77cm, and the inner depth is 70cm.

M75 has been robbed, left with two human skeletons in the central and southeast chambers. An eight or ten-year-old child is found in the main chamber room, the direction of the head is southeast, and the legs are right flexed. An adult male is found in the southeast chamber, the direction of his head is southeast, and the legs are right

flexed. According to the analysis of the rest skeletons, there were nine people buried in this tomb initially, except the above two, which are one 35/45-year-old male, over 40-year-old female, 25/35-year-old female, 25-year-old female, 45/55-year-old adult, 35/40-year-old adult, and 8/10-year-old child.

There are 82 grave goods found from M75, including 11 pottery objects, 19 bronze objects, three iron objects, 38 stone objects, three bone objects, five wooden objects, one golden object, and two woolen textiles. In the central chamber, there are one bronze knife, one bronze awl, one bronze tube, one stone pestle, two bronze earrings, four bronze buttons, two bronze arrowheads, and thirty-four stone beads near the child's body. In the southeast chamber, there are three pottery vessels along the east wall, and two bronze ornaments, one bronze engraving knife, one bronze arrowhead, one iron ring, one iron sword point, one grinding stone, one stone bead, one bone bead, one golden earring, and one goat talus near the male body (Fig. 5.1.1.1-15).

The exact tomb information can be seen in Table 2; other tomb goods can be seen in Fig. 5.1.1.1-16 & 17.

4. Age

4.1 Relative Age

According to the tomb descriptions, there are three major types of tomb: I: shaft-pit grave with platform (M1, 4, 18, 31, 33, 35, 37, 41, 44, 55, 57, 58, 61, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76), II: shaft-pit grave without platform (M5, 6, 10, 11, 13, 16, 20, 21, 23, 27, 29, 30, 38, 42, 43, 45, 46, 49, 50, 53, 54, 56, 59, 60, 62), and III: mud grave (M2, 3, 7, 8, 9, 12, 14, 15, 17, 22, 24, 25, 26, 28, 32, 34, 36, 39, 40, 47, 48, 51, 52, 65).

Among these seventy-six graves, there are twenty disturbance relationships: M2→M1, M3→M4, M5→M4, M14→M11, M14→M13, M19→M22, M24→M23→M18, M22→M16, M31→M32, M37→M36, M47→M41, M47→M42, M47→M55, M48→M41, M48→M42, M48→M55, M59→M58, M60→M61, M62→M57,

M65→M66. Based on the types of the grave, type I is the most disturbed, while type III has never been disturbed. The most represented sequence is M24 (III)→M23 (II)→M18 (I), so the relative sequence of this site is type III breaks II, and then breaks I. Combining with the stratigraphy sequence, type III, the mud grave, is found firstly under the second layer; while type I and II, the shaft-pit grave is constructed in the raw soil. Therefore, type III is the latest tomb type, while II and I are earlier.

The grave goods also indicate the different phases in this site. The most common pottery grave goods in tomb type I are bowls, pot *Dou*, double-handled jugs, and single-handled cups. While in type III, the bowls and *Dou* are absent, the amount of single-handled small cups, single-handled jars, and double-handled jars is increasing; as for type II, most of the pottery types can be found. (Fig. 5.1.1.1-18). In all, this site can be divided into three phases:

Phase	Tomb Type	Grave Goods
I	I (shaft-pit with secondary platform, multi-burial, right-flexed, heads towards southeast)	45% of painted pottery, pottery: shallow bowls and pot <i>Dou</i> , double-handled jugs, single-handled cups, bronze knives, bronze arrowheads, wooden plates, and wooden buckets.
II	II (shaft-pit without secondary platform, single-burial, left-flexed)	37% of painted pottery, pottery: single-handled cups, single-handled jars, double-handled jars, bronze knives, wooden plates, and wooden buckets.
III	III (mud-brick pit, single-burial. Left-flexed, no fixed head direction)	15% of painted pottery, pottery single-handled cups, single-handled jars, double-handled jars, pottery bowls, bronze knives, bronze arrowheads, wooden plates, and wooden buckets.

Table 3. Phases of Yanbulaq site.

4.2 Absolute Age

Twelve radiocarbon data samples have been tested; the age of type I is closer to 1550-1150 BC (3500-3100 BP). M31 is found with an iron knife in type I, and M64 is found with painted pottery. Compared to other sites with iron and painted pottery found simultaneously, like the Wupu site nearby, its ¹⁴C dating is between 1350-1010 BC. (Zhang, 1987), and the tomb type is quite similar. Therefore, the report takes 1300 BC as the absolute age of Phase I. Combined with the radiocarbon dating result, the date range could be 1350-1150 BC.

After taking 1350-1100 BC as the earliest time phase of Yanbulaq site, 2750 BC (4700 BP) seems unacceptable. Therefore, the date range of phase II could be in the range of 1150-700 BC (3100-2650 BP.). For the same reason, as for Phase III, the only acceptable date range is 700-500 BC (2650-2500 BP.). The details can be seen in Table 4 and Fig. 5.1.1.1-19.

5. Interpretation

5.1 Stratigraphic Sequence and tomb classification

Since the excavation report was published in 1989, many scholars have argued about the burial traditions. In 1990, Wang suggested that all tombs are built under the second layer (the Disturbance layer), while some are in shaft pits, others with mud-bricks (Wang & Tan, 1990). Scholars believed the stratigraphic sequence should be “Topsoil → mud-brick grave → Disturbance layer → mud-brick grave → shaft-pit grave” (from top to bottom), different from the report’s conclusion. They divided the tombs into five types: I shaft-pit grave, II raw-soil platform grave, III raw-soil & mud-brick platform grave, IV mud-platform grave, and V mud-brick shaft-pit grave. According to this sequence, the tomb sequence should be “shaft-pit grave → raw-soil platform grave → raw-soil & the platform grave → raw-soil mud-brick platform grave → mud-brick platform grave → mud-brick shaft-pit grave” (from early to late).

In 1995, Lv argued about the tomb building principle, “no need to use mud-brick after digging a pit in the raw soil.” He adopted the tomb division from Wang & Tan and

rearranged the tomb sequence as “shaft-pit grave → raw-soil platform grave → raw-soil & mud-brick platform grave → mud-brick platform grave → mud-brick grave.”

The excavator Chen Ge insisted on the initial report’s view (Chen, 1991) and pointed out that Yanbulaq site had been robbed heavily. Compared with other similar contemporary sites, the tomb sequence should not be as they argued.

5.2 Burial traditions

In 1997, Li pointed out that according to the tomb distribution, the southern site is used firstly and then extended into the north; in the south part, most of the tombs are single-buried, while in the north, the single-buried tombs are absent, all the graves are multi-buried. This conclusion also challenged the report’s view, which assumed that the multi-burial is the earliest tradition. In this case, the whole tomb sequence should be in the contrary order. In 1999, Chen replied to this view; he explained that Yanbulaq site is a large-scale cemetery. The 1986 excavation only revealed part of this site; therefore, the overturn of tomb sequence only by tomb distribution is unconvincing.

5.3 Summary

The features of Yanbulaq site could be concluded as follows: mud-brick graves, flexed buried, handmade pottery vessels, mainly without decorations, taking single-handled bowls, single-handled pot *Dou*, double-handled jugs, and single-handled cups as the typical type; most of the single-handled bowls and cups are drilled with one hole on the bottom, while the lips are cut and polished; more painted pottery, with the curve, cross, triangle and “S” pattern; flat point arrowhead and pickaxe engraving knife; Wooden status and bucket.

This site can be divided into three-time phases, lasting from 3300 to 2500 BP; it is a long-lasting site with several inhabitant groups. The grave goods represent that Yanbulaq people lived a sedentary life at that time; the goat talus and woolen fabrics indicate their animal husbandry had been developed. However, no agricultural seeds or other practical tools have been found; only the amounts of pottery vessels represent

their possible agricultural industry. The nearby Wupu site is found with millet cake, and Highland barley chaffs (Xinjiang, 1979), which could be a combined proof of agriculture.

The painted pottery exhibits a remarkable similarity with Xindian culture and Siba culture to the west Gansu and Tibet region (Xinjiang, 1989), while the single-handled jars, double-handled jars, and single-handled pot *Dou* are similar to the site in the west (Zhongguo, 1988). In addition, the skeletons from Phase II share similar features with Gumugou skulls to the west (Han, 1990). The features of burial tradition are more typical in the Oxus civilization from Bactria and Margiana (Chen & Hiebert, 1995). The varied similarities between east and west Xinjiang may indicate Yanbulaq's role in communicating with Gansu, Tibet, Western Xinjiang, and Central Asia.

1.1.2 Aisikexiaer Site

1. Location

Aisikexiaer site lies about 30 km southwest of Wupu Township in Hami City. This site is located on the northern part of the sand ridge, with several dunes around it. The scale of this site is about 1,400 km². There is one ancient castle to the west of the site; the length is 50m, the width is 4m, and the remaining height is 6-7m. The Southern Site site is next to the Baiyanghe River, starting from the southern Tianshan Mountain and ending at the Nanhu Gobi Desert. There are a terrace 200m to the north of the Southern Site and six mud-brick houses on the terrace (Fig. 5: 2).

The two cemeteries are in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50-250mm, while the temperature shows a significant variation between winter and summer: in January, it can be -10°C to -12°C, while in July, it can be between 20°C to 25°C (Domrös & Peng, 1988).

2. Research History

In 1999, the Xinjiang Institute of Cultural Relics & Archaeology implemented a salvage

excavation of this site. Thirty-two tombs were excavated, while twenty-seven have been robbed. The excavation report was published in 2002 (Zhou & Yu, 2002). In 2009, some of the tombs in the southeast of this site were robbed; therefore, Xinjiang Institute of Cultural Relics & Archaeology and Hami Institute of Cultural Relics made another salvage excavation in 2010 and named the new site the Southern Aisikexiaer Site; the report was published in 2011 (Wang & Dang, 2011).

3. Findings

In 1999's excavation, thirty-two tombs were cleared in total (Fig. 5.1.1.2-1), while there was no stratigraphic sequence at this year's excavation. The 2010's excavation had yielded one hundred and fifty-one tombs in total.

3.1 1999 season

The excavation report only provided the information from three tombs; the collected objects can be seen in Fig. 5.1.1.2-2.

M1: the orientation is 288°, oval-shaped, straight pit wall, the length is 129cm, width is 86cm, and the depth is 76cm. There is one male skeleton buried in M1; the direction of the head is northwest, side flexed. A leather coat covers the skeleton; his left sleeve is folded under his head as a pillow. A leather mask covers his face, and he wears a colored-stripe woolen towel, stitched with one colored woolen yarn, a woolen belt, and a string of decoration beads. The body had one bronze gown, one woven waistband, and a pair of yellow-green woolen pants, and he also had one pair of felt socks and leather boots.

There are twenty-nine objects found in M1, including one branch tool, one wooden cup, one leather sheath, one single-handled jar, one double-handled jug, one agate bead, one bronze knife, one goat bone, two leather bags, and three beads (Fig. 5.1.1.2-3).

M2: the orientation is 83°, oval, the length is 220cm, the width is 130cm, and the depth is 140cm. There is a raw soil platform in this tomb, the height is 66-88cm, with two

layers of the wooden stick, the upper layer has five sticks, and the lower layer has six, in between is a reed mat; the length of the stick is 42-170cm, and the diameter is 6cm. Above the wooden sticks are set with gravel stone, mud-bricks, and animal dung.

There are two human bodies found in this M2, up and down setting; in between is the soil filling, whose thickness is 10cm. The upper body is a male (A); the direction of the head is northeast, side-flexed, with one hole drilled into the skull. Body A is covered by a leather coat, under the head is a colored woven pillow; a leather mask covers his face, and he wears a pair of leather boots; his brown woven coat has rotten, with a leather cuff on the left hand, and one turquoise bead located at the right elbow. Two pairs of leather boots are found on the body side and bosom, respectively; one pair is decorated with seven bronze pieces. The lower body is an old female (B), the direction of the head is northeast, whose left side had a braid; she wears one brown woven gown, with one colored woven belt at the waist, and one pair of leather boots; a couple of bronze earrings, and one bone tube is found at her head area. One single-handled jar, one bread, one wooden cup, one goat/sheep bone on the right side, one leather bag, one wooden comb, one bone needle, and two wooden sticks are found on the left side. (Fig. 5.1.1.2-4)

M3: the orientation is 283°, oval, straight pit wall, the length is 66cm, width is 30cm, and the depth is 34cm. There are thirty-four wooden sticks on the surface of this tomb, whose diameter is 1-1.5cm, with a triangle pattern on it. There are many goat dungs found in this tomb, and one infant body, the direction of the head is northwest, side flexed. One single-handled jar is found in M3 (Fig. 5.1.1.2-5).

3.2 2010 season (Southern Aisikexiaer Site)

The report of 2010's excavation did not provide detailed information about each tomb; the only information is the tomb type and burial format.

3.2.1. Tomb Type

The tombs can be divided into two types: with surface structure tombs and without

surface structure tombs.

The *Surface Structure tomb* is one of the most critical findings in this excavation. They are made from mud-bricks, in round shape; the lower part could be seen as a broad base; the upper part is made on the inner side of the base. The space between the mud-bricks is filled with grass mud, and then the surface is soil plastered. There is a sacrificial altar on the south of the structure; the altar is embedded with wooden sticks, single-handled jars, and single-handled cups. There are several burnt marks located surrounding the altar.

The tomb chamber is in the center of the surface structure; the tomb surface is covered by grass, under which is the poplar beam. The tomb chamber is oval, filled with brown sand, with many pottery sherds, wooden sherds, goat dung, and grass in the sand. Most of the tombs have been disturbed. The grave objects include pottery wares, wooden wares, lithic tools, bone and horn objects, bronze, and iron objects. Some appending pits near the tomb chamber, some are found with sacrificed dogs, and some with infants. The infant pits are found with goat/sheep heads, wooden plates, cups, pottery jars, goat/sheep bones, and food remains. One dog pit is found with a surface structure with a rope on the neck.

The *Tomb without Surface Structure* had a similar size and grave goods to the last type; the only difference is whether a surface structure was built above the tomb chamber.

3.2.2 Burial couches and traditions

The burial couches are made of poplar cylinders in an oval or square shape. The adults' couches are more than one meter, while the infants' are less than 1 meter. Some infants are buried in pottery jars or wooden buckets.

Most of the tombs are multi-burials, and the bodies are side-flexed; the upward-straight body is only found in infants' graves. Most of the multi-burials are in layered settings and have been disturbed. One tomb pit is found in the double burials with two bodies in

opposite directions. There are few single burials found in this site, among which the only one is the adult tomb. The teenager and infant tomb ratio are the most, while most teenagers are buried with the adult, and the infants are buried in the independent pit near the adult chamber.

3.3.3 Grave Goods

There are thousands of grave goods found on this site; most are pottery wares and wooden objects. There are also woven products, bronze objects, iron objects, bone and horn objects, lithic tools, golden objects, and leather products found on this site.

The pottery wares are made of brown sandy clay, handmade; the types include single-handled jars, double-handled jars, single-handled pots *Dou*, shallow bowls, and single-handled cups. The pottery decorations include weave, triangle, and "S" patterns.

The material of wooden objects is poplar, and the types include grave couches, instruments, figurines, plates, shovels, buckets, cups, spinning wheels, and comb.

As for the bronze wares, there are knives, boards, arrowheads, and decorations; most of the woven products are woolen clothes.

4. Age

Unfortunately, there are no ^{14}C data from this site, so the age can only be conducted by analyzing grave goods and tomb traditions.

Most of the tombs in Aisikexiaer site are shaft-pit tombs, and only a few are shaft-pit tombs with a platform. The tomb tradition exhibits significant similarity with the nearby Yanbulaq site; the pottery wares found in this site, like the single-handled jars, double-handled jugs (with triangle or S pattern), and the single-handled cups, also indicate the contemporary period with Yanbulaq site. Due to the lack of iron objects from the 1999's excavation, the time of that site could be equal to the early phase of Yanbulaq site. According to the radiocarbon dating results, the time of Phase I and II is

1350-700 BC (Xinjiang, 1989; IACASS, 1988-1991). In addition, the wooden objects found in the Aisikexiaer site also indicate their similarity with the Wupu site, and the absolute time of Wupu is 1050-450 BC (Xinjiang, 1992). Combined with the comparison between Aisikexiaer and the other two nearby sites, the possible date of Aisikexiaer site is 1250-1050 BC.

The Southern Aisikexiaer site had found iron objects, so its time could be later than the 1999's site. According to the excavation report, the pottery and iron objects are similar to the later phase of the Yanbulaq site to be an Early Iron Age site. The ¹⁴C data of the later stage of Yanbulaq site is 700-600 BC, which might also be the time of Southern Aisikexiaer site.

5. Interpretation

Most of the tombs are single buried, and the bodies are side-flexed, while the direction of the head is either northeast or northwest; most of the bodies are covered with a leather coat, and the faces are covered by the leather mask and have a woolen pillow. Most of the bodies have a similar look: two braids, one hole drilled into the skull. The grave goods include woolen products, leather, bronze objects, pottery wares, wooden and lithic tools. All woolen products and leather products are handmade. There are many bronze objects, but few types, only knives, engraving knives, awls, and decorations. All pottery wares are handmade, with triangles and "S" patterns, and the main pottery wares found are jugs, jars, cups, and shallow bowls. In addition, there are some carbonized grains, bread, and a lot of animal dung and animal bones found from the burials.

In the Southern site, teenagers and infants are buried in most tombs. According to the report, this site is well planned, and the amount of grave goods is so significant that it might be the public site from the nearby settlement. However, the usage time is relatively short, and the layer disturbance is apparent; due to the lack of more details, it is hard to explain the disturbance phenomenon. This site and the northern one could be used as the same public site of the Aisikexiaer settlement.

At the same time, the similarities in tomb traditions and grave goods also suggest that this site may have a close relationship with the nearby Yanbulaq site, while the braids and leather products show their feature. Therefore, this site is defined as the sub-type of Yanbulaq culture that received the Yanbulaq influence and developed its art form (Zhou & Yu, 2002). The woolen and leather products, bone and lithic tools, bronze knives, and animal dung suggested that the inhabitants here have developed the domestic industry to some certain level.

1.1.3 Tianshanbeilu Site

1. Location

Tianshanbeilu site is situated south of the Hami railway station in the modern Hami city, eastern Xinjiang, near the east edge of the Tianshan Mountains (Fig. 5: 3). Tianshanbeilu was initially called the Linya site or Yanmansu Kuanglinchang Banshichu site due to its location between the forestry center ("Lin chang") and the Yamansu minefield. At the same time, it is also located on Tianshanbeilu Road. Therefore, it was renamed as "Tianshanbeilu" site. The site scale is about 15,000 km².

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C, while in July, it can be between 20° to 24°C (Domrös & Peng, 1988).

2. Research History

The excavation of the Tianshanbeilu site started in 1988 when Hami city began to develop its urban regions. The Xinjiang Institute of Cultural Relics & Archaeology and the Cultural Relics Bureau of Hami City carried out five excavations.

More than seven hundred tombs were excavated in the followed ten years. All of these materials have been recorded and characterized by the Northwest University of China

since 2016. Unfortunately, the materials have not been completely published. The first brief report on the excavation appeared in the Chinese Archaeology Almanac in 1989, when it was only referred to as a straightforward sentence. In the comprehensive article about the general Xinjiang Bronze Age Culture, Lv, Chang, and Wang took the grave goods from Tianshanbeilu as one representative example in the eastern Tianshan Mountains and studied the chronology of Tianshanbeilu (Chang et al., 2001). In the Festschrift of Yu Weichao, published in 2009, Li conducted his chronological research on Tianshanbeilu grave goods and cultural features by examining Lv's pottery types while comparing them with other cultures in the nearby region (Li, 2009).

Except for the Chinese scholars' general cultural division, the Tianshanbeilu site also attracted increased interest from other fields. Mei studied the cultural interaction between China and Central Asia during the Bronze Age, especially taking the copper objects from Tianshanbeilu as one key example (Mei, 2003; 2004). Jia put Tianshanbeilu in the Junggar Basin prehistory cultural circle (Jia et al., 2009). Han chose the painted pottery from Tianshanbeilu as one aspect to check the cultural exchange (Han, 2012). Betts discussed the cultural connection between Qiemu'erqieke, Tianshanbeilu, and Xiaohe (Betts, 2018). Tianshanbeilu site is an essential point on the ancient Xinjiang international crossroads (Vicziány, 2019; Betts, 2019; Abuduresule et al., 2019).

In 1996, the Center of Science and Techniques in Archaeology tested six human bone samples, which provided the time range for Tianshanbeilu. Tong and other scholars made another AMS dating on thirty-six samples, combined with four new dates by Wang's results in 2017, and reconstructed the chronology of Tianshanbeilu site (Tong et al., 2020). In addition, the measurement of the human bones and DNA (Zhang et al., 2010; Wei et al., 2012; Gao et al., 2014; Berger et al., 2014), scientific studies on the metal objects (Yang, 2018; Liu et al., 2020), the art meaning from the pottery patterns (Luo, 2012), the botanical research (Wang et al., 2019; Zhang et al., 2019).

3. Findings

Due to the absence of a detailed report, the only material for Tianshanbeilu's findings is very limited.

Most of the tombs are rectangular shaft pits and vertical shaft pits with side chambers; some are constructed by mud-brick. Most of the graves are single-burial, side-flexed (Fig. 5.1.1.3-1). The bronze objects are mostly found in the tombs, including the knife, awl, axe, mirror, earrings, buttons, tube, and bead; more than three thousand bronze objects are discovered among four hundred and nine tombs (Fig. 5.1.1.3-2). The pottery wares are mainly flat-based, including jars, jugs, cups, and basins. The painted pottery accounts for about 30% of the total, primarily black coats, with few red and purple colors. The pottery wares are over six hundred. There are also forty lithic tools, including gravel stone and stone pestle; more than five thousand stone beads made of turquoise, agate, and talc. More than one thousand bone objects, including bone plate, awl, needle, and ornament. One hundred twenty-five cowry ornaments, eight golden earrings, and thirty-four lead ornaments. No iron objects are found in Tianshanbeilu (Yang, 2018).

4. Age

4.1 Relative Age

According to the grave goods, the phase of Tianshanbeilu can be divided into four sub-phases (Lv et al., 2001); see Fig. 5.1.1.3-3. Other scholars agree with the four sub-phases division, while a different standard reordered some tombs, see Fig. 5.1.1.3-4 (Tong et al., 2020).

Phase I: Most pottery wares are relatively thin, with small handles. The typical pottery wares include single-handled bucket cups, curved-belly cups, and double-handled bucket jars; the patterns are mainly diamond patterns, triangle lines, or singles line patterns. Most pottery has a colored coating. Some tombs are found with the side-secondary platform. The bronze objects are mainly knives, plates, and button ornaments. In this phase, a mud-brick chamber is used in the tomb.

Phase II: Most pottery wares are fatter than in the last phase; the mouth of the pottery becomes more open. The patterns are triangles and wave lines. The bronze objects are mainly knives, spears, buttons, and beads. The mud-brick chamber tombs are widely found.

Phase III: the pottery wares are fatter than in the last phase, the mouth lip is more open and flatter, the belly is more curved, some single-handled ware disappeared, with some four-handled jars increased. The patterns are still mainly triangle line, leaf, and line patterns. There are also some appending decorations on the pottery neck and handle. The bronze objects are mostly buttons, awl, knife, axe, and mirror. The Mud-brick tomb chamber is still prevalent.

Phase IV: the number of pottery goods and graves decreased sharply. The pottery wares are thinner than the last three phases, mouth more open, belly more curved. The patterns are still mainly triangles, with few horizontal line patterns, no diamond patterns, and interior paintings. The bronze objects are mostly knives, axe, plates, buttons, and mirrors, but the size is smaller than before.

No iron objects are found in the Tianshanbeilu site, indicating it is a Bronze Age site. The similarity of the bronze object types and patterns may suggest that the Tianshanbeilu site is between the 19th and 13th century BC.

4.2 Absolute Age

There are forty-six radiocarbon dating results on Tianshanbeilu samples; six were done in 1996, four in 2017, and thirty-six were published in 2020. The details can be seen in Table 4.

According to the radiocarbon data, the absolute age of Tianshanbeilu can be conducted between 2011-1029 BC. Concerning the four sub-phases, Phase I is between 2011-1672 BC, Phase II is between 1660-1408 BC, Phase III is between 1385-1256 BC, and Phase IV is 1214-1029 BC (Tong et al., 2020).

5. Interpretation

5.1 Tomb tradition and grave Goods

The tomb structure of Tianshanbeilu is quite simple, basically a vertical shaft pit, some with a secondary platform, some with a side chamber. The tombs are mainly single buried, with one or two pottery wares found together.

Bronze objects and painted pottery wares are the most typical finds in Tianshanbeilu, which also showed a strong cultural connection with the cultures in the east through Hexi Corridor, especially from Siba and Qijia in Gansu Province (Li & Dang, 1999; Shui, 2001; Mei, 2003; Han, 2005; Li, 2009). Especially on the pottery patterns and bronze forms. A similar jar in Tianshanbeilu can also be seen in Qiemu'erqieke in the Altai Mountain region, which is thought to have a cultural connection with Karasuk culture and Afanasievo the north (Li, 2002; Jia et al., 2009).

The study on the bronze objects also reveals that the source of the bronze casting of Tianshanbeilu is not mainly from the local supply. The alloying technology at Tianshanbeilu involves pure copper, arsenical copper, arsenic bronze, tin-bronze, leaded bronze, leaded copper, and leaded arsenic bronze. Tin-bronze is the most ubiquitous local alloying type, and its source may be from the nearby mine (Yang, 2018), while the wide range of alloy types is typical of Steppe metal assemblages. In addition, the isotopic data also suggest that the metal in Tianshanbeilu does not represent recycled metal from central China (Liu et al., 2020); the primary manufacturing process and materials for the bronze may come from Hexi Corridor (Chen, 2017).

5.2 Anthropological features and Subsistence Strategy

The physical anthropology and ancient DNA analysis reveal that the Tianshanbeilu people are a genetic admixture of Di-Qiang (狄-羌) people, Mongolians, and Europeans (Wang et al., 2003; Wei et al., 2012; Gao et al., 2015). The mitochondrial DNA and Y-STR analysis suggest that one of their origins is from East Eurasia, while West Eurasian lineages are also shown in their research (Gao et al., 2015).

From the isotopic analysis, millet is suggested as the typical food in Tianshanbeilu (Wang et al., 2019). Scholars also assume that wheat also played a role in the agriculture practice, according to the grain found in the nearby site, like Yanbulaq and Xiaohe site (Zhang et al., 2010); and sedentary agriculture is the major subsistence economy of the Tianshanbeilu people (Tong et al., 2020). Many sheep/goat and cow remains also indicate meat could be one crucial protein source for their diet (Zhang et al., 2010). The caries study also supports that the Tianshanbeilu population consumed high amounts of animal protein (Berger et al., 2014). And the combination at Tianhanbeilu of low caries rate and high dental attrition may suggest a mixed agropastoral diet.

5.3 Summary

Many bronze objects and painted pottery wares from Tianshanbeilu indicate the high development of metal casting and pottery production in the Eastern Tianshan. At the same time, the similarity in the material and physical features connect the Hexi Corridor and East Eurasian through Tianshanbeilu due to the convenient geographical location. Combining with the Yanbulaq site, Hami Oasis had become a crucial crossroad for frequent technical and cultural interactions among the people of Hexi Corridor, western Tianshan Mountain, and the Altai Mountains even further reached southern Siberia in the Bronze Age.

1.1.4 Miaoergou Site

1. Location

Miaoergou site is located in the Shang Miaoergou village northeast of Hami city, and Nr. I section is situated on the eastern shore of Goushui River on the east of Shang Miaoergou village, belonging to Huangtian Farm (Fig. 5: 4).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to

-12°C, while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). The primary water provider is the Goushui river from the eastern Tianshan Mountain.

2. Research History

Between April and May 1978, the Archaeological team of Xinjiang Museum surveyed and excavated this site (Wang, 1979; Hami, 1993). In 1988, this site was surveyed again through the Xinjiang Archaeological Survey program, and this site was announced as the "Hami culture relic protection site" in 1992 (Hami, 1993). In June 1996, the Hami Institute of Cultural Relics made a field survey along the river and named two cemeteries I & II at this site. The survey and excavation reports were published in 1998 and 2004, respectively (Hami, 1998; Xinjiang & Hami, 2004). After the excavation, scholars believed that the culture of the Miaoergou site should belong to the Yanbulaq culture in the Hami region, which also completed the Hami regional cultural research on the pottery types and chronological sequence (Han, 2007; Guo, 2012).

3. Findings

3.1 Nr. I Section

1996 season yielded fifteen tombs; mostly, tombs are found with the surface stone mound and several standing rocks. The mound can be divided into two sub-types: Type A: stone piles in round shape, the height is 20cm, diameter is 4.5-7m; Type B: stone circles in round or square shape, the diameter is between 3-6m, with one standing rock in the circle center or two sides of the circle.

Most of the tombs are in vertical shaft pits, either rectangular or oval; the pit's depth is between 1.2-2.2m. Except for M13, all graves are found in the stone chamber; the chamber is rectangular, covered by big rocks on top.

In the excavated fifteen tombs, M10 and M15 have no human bones and grave goods remaining, which might be due to the robbery. The human bones in the rest of the tombs are not preserved in good condition because of the burial condition and soil material. This section has single-burials, double-burials, and multi-burials; some are secondary

burials, and the bones are placed randomly.

Pottery accounts for the significant grave goods; most small wares are complete, while the large wares are scattered into sherds. Bronze, iron, golden, glass, and stone beads are also found in the tomb graves.

The detailed description of each tomb can be seen in Table 5 and Fig. 5.1.1.4-1~3.

3.2 Nr. II Section

Nr. II Section is situated west of Shang Miaoergou village, about 2km. There are several stone piles on the surface ground. The stone diameter is 1-2m; height is 1m. Several pottery sherds have been collected, but no excavation has been done (Zhou, 1998).

4. Age

There are no radiocarbon dating results or stratum disturbance on the stratigraphic layer; therefore, the relative age can only be conducted from the grave goods. Firstly, the large percentage of iron and bronze objects can narrow down this site into Iron Age. The bronze bell is unique in Xinjiang; the style is more familiar with central china's bell between Spring & Autumn Period and the Early Warring States Period. The bronze mirror is also similar to the mirror during Spring & Autumn period in central China. In addition, the glass beads and lacquer wares also correspond with a similar time range.

The pottery wares are similar to the Yanbulaq pottery style in the Hami region, especially the colored patterns, while the pottery type is more similar to the Heigouliang site. Therefore, the excavator believed that the Miaoergou site was between Spring & Autumn and Warring States periods (700-200 BC).

5. Interpretation

5.1 Burial Tradition and grave goods

Most tombs are found with a stone mound, and the tomb chambers are under the mound. Some mounds are also found with standing rocks; therefore, the surface mound's point

may be used as an indicator. All tombs are in shaft pits, single-burial is more common, and multi-burial is rare. Pottery wares are mainly with no patterns; the proportion of colored pottery is small jars, jugs, and pot *Dou* are pretty popular, and the size is primarily tiny, and remained with daily usage marks. So, the pottery grave goods are possible everyday wares that are buried with the dead. The horse and sheep/goat bones may also indicate the possible livestock husbandry, while no grains remained in the tombs.

The bronze wares showed a significant connection between the Hami region and central China. At the same time, the pottery jug type leads to a multi-direction, appeared in the Hami region and Turfan Basin in Eastern Xinjiang to the Ili region in the west, and even appeared in the Altai region. Thus, combined with the bronze and lacquer wares, a multi-regional cultural communication from central China to the northeastern Xinjiang through the Hami region might have existed.

5.2 Summary

The grave goods and tomb structure indicate that the Miaoergou site is also part of Yanbulaq culture in the Hami region, which enriches the Yanbulaq culture and makes it more lasting. Hami people may have developed their subsistence system while also exchanging ideas and wares with the east, west, and north for a long term.

1.1.5 Hanqigou Site

1. Location

Hanqigou site is situated in Baishitou County in Hami city. Hanqigou Gully is one east-west gully on the northern slope of Tianshan Mountain; the site is found on the north pitch of the Hanqigou Gully (Fig. 5: 5).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to

-12°C, while in July, it can be between 20° to 24°C (Domrös & Peng, 1988).

2. Research History

In August 1993, before the construction of the Hami-Balikun Roadway, the Xinjiang Institute of Cultural Relics & Archaeology carried out a field survey along this road (Xinjiang & Hami, 1991) found Hanqigou site during this survey. Then, between May and Jun 1994, a salvage excavation was done by the Xinjiang Institute of Cultural Relics & Archaeology; the reports were published in 1996 and 1997 (Xinjiang & Hami, 1996; 1997). After the excavation, the excavator and other scholars believed that Hanqigou site should be part of the Yanbulaq culture in the Hami region, concerning the grave goods and anthropological features (Wang et al., 1998; Han, 2007; Shao, 2007; Guo, 2012; Wei, 2017).

3. Findings

There are twenty-five tombs in Hanqigou site; two have been robbed; the 1994 season yielded four tombs, named 94HTBHM1-4. Some graves are found with wooden or stone chambers.

94HTBHM2: vertical shaft pit, there might have been a chamber cover beam on the tomb opening, only ash remains. The tomb chamber's length is 140cm, width is 130cm, and depth is 134cm. Two individuals were found inside the chamber, one 50-year-old male and one 30-year-old female. Eight pottery wares, two deer-bone combs, and sheep/goat bones remained inside the tomb chamber. (Fig. 5.1.1.5-1)

94HTBHM3: vertical shaft pit. The tomb chamber's length is 190cm, width is 160cm, and depth is 164cm. There are boulders, broken human bones, animal bones, and pottery sherds in the filling soil. Three individuals remained inside the chamber, one female (A) about 25-30 years old, one male (B) about 30 years old, and the rest one (C) is unable to identify. There are three pottery wares, horse heads, and sheep/goat bones that remain inside. (Fig. 5.1.1.5-2)

The rest of the grave goods can be seen in Fig. 5.1.1.5-3.

4. Age

4.1 Relative Age

Only four tombs have been excavated, and due to the location on the mountain slope, some tombs are exposed. The stratum sequence is unclear, so the dating on relative age can be conducted by comparing the tomb structure and grave goods.

The single-handled pottery jars and pots *Dou* are similar to the nearby Yanbulaq site in the Hami region, while the vertical shaft pit with a wooden or stone chamber is not common in Yanbulaq. Therefore, Hanqigou might be the further development of Yanbulaq culture during the late Yanbulaq culture. In addition, the bronze plaque with a sheep/goat pattern is quite similar to the Ordos plaque from the grassland, which is popular during the Spring & Autumn period. Thus, the relative age of the Hanqigou site should be between the late Spring & Autumn Period and the Warring States Period.

4.2 Absolute Age

One sample has been tested, and the radiocarbon data result can be seen in Table 4. According to the calibrated data, we may suggest that the absolute date of Hanqigou is between 450 BC-30 AD.

5. Interpretation

5.1 Burial Tradition and Grave goods

The scale of the Hanqigou site is not large, but the tombs are distributed in good order, which indicates that it might have been used as a public cemetery. The tombs have rock indicators on the surface ground, the tomb pit in vertical shaft form. Multi-burial and flex positions are common at this site, while the human bones are placed randomly, which might be a secondary burial.

In the unearthed pottery wares, single-handled jars, pot *Dou*, and double-handled jars are the most typical pottery in the Hanqigou site, corresponding with the Yanbulaq

culture in the Hami region. The double-handled jars from Hanqigou and Yanbulaq sites are popular in the Gansu region (An, 1957; CASS, 1980; 1988), while the small single-handled jars and cups are similar to the Chawuhu and Subeixi pottery wares. In addition, the bronze plaque with a sheep/goat pattern is quite the same as the bronze plaque from the Erdos culture (Tian & Guo, 1986).

Buried horse and sheep/goat bones are popular in this site, while no grain remains were found. Therefore, it is hard to identify whether the Hanqigou people had an agricultural practice.

5.2 Summary

The anthropological physical study shows that the Hanqigou people are the same group as the Yanbulaq people, and some Mongolian features in the meantime (Wang et al., 1998; Wei, 2017). The date and similarity on the grave goods indicate that the Hanqigou site is one of the late Yanbulaq cultures in the Hami region during the Spring & Autumn and the Warring States Periods. The ancient Hami people lived in this oasis region for a long time while still interacting with the Gansu area, the northern part of grassland, and western Xinjiang. The interaction contributes to the cultural exchange and the development of further nomadic groups, like Yuzhi, Wusun, etc.

1.1.6 Wupu Site

1. Location

Wupu site is located in the Wupu Town in Hami city; the site is in the Gobi Desert on the western edge of the Hami Basin, 1km to the living village and 70km to the west of Hami city. The site is found in the sand near the Baiyang River, flowing from north to south into the Wupu Reservoir (Fig. 5: 6).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to

-12°C, while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). The sea level of the Wupu site is 525m, which is the lowest location in Hami Basin. The scorching and dry environment named this area "Turfan in Hami."

2. Research History

Wupu site was found during the Hami regional archaeological survey by the Xinjiang Institute of Cultural Relics & Archaeology in 1978; the followed excavations were carried out in 1978 and 1986 seasons. However, the report has not been published yet. In September 1991, to understand the mummies, the Xinjiang Institute of Cultural Relics & Archaeology made another excavation at Wupu site. The brief report to tomb Nr. 151 and Nr. 152 was published in 1992.

More than 100 tombs are excavated in Wupu site, one of the most representative large ancient Xinjiang sites. Different scholars have discussed the physical anthropological study (He & Xu, 2002; He et al., 2003; Schröder et al., 2016; Wei, 2017), botanical and livelihood research (Wang, 1983; Wang et al., 1989; Yu, 1992; Zhou, 2016; Wang et al., 2021) in the past decade. Wupu site is considered one typical example of Yanbulaq culture in the Hami region (Han, 2007; Chen, 1991; 2017; Guo, 2012).

3. Findings

The 1978 and 1986 seasons have yielded one hundred twelve tombs in Wupu site. However, the data has not been completely published yet. Only one brief report on two graves excavated in 1991 and some other tested samples data have been published. The two tombs in 1991 were named 91HWM151 and 91HWM152. Both are in an oval vertical shaft pit with the secondary platform; cover beams are placed above the platform. The bodies are supine flex form, some with wooden couches found inside the tomb chamber.

91HWM151: The tomb opening length is 172cm, width is 140cm, depth is 130cm, the orientation is 52°. The secondary platform width is 20cm; the southern side has five layers, while the rest have four. The platform is made of mudbricks and covered by

poplar beams, above which is a layer of cannabis mat.

Eight individuals (A-G) are found inside the chamber; the human bones are placed randomly, with wooden object pieces, pottery sherds, leather pieces, and millet pieces that remain next to the human bones. Body H is one complete human skeleton; even the hair braid is still identifiable. His woolen gown, woolen belt, leather boots, woolen & fur coat remain on the body; one piece of fur leather and woolen felt under the body. There are five adults and three kids among these individuals (Fig. 5.1.1.6-1).

91HWM152: The tomb opening length is 200cm, width is 150cm, depth is 144cm, the orientation is 45°. The secondary platform width is 19-24cm, and five layers make each side of the mudbrick. Poplar beams cover the platform, and some grass remains above it.

Three individuals are found inside the chamber; two body bones are placed randomly, while the female body found on the chamber bottom is complete. All three individuals are adults. Some pottery sherds, goat/sheep bones, woolen textile pieces, wooden objects, and grain ears remained next to the human bones. The complete body is wearing one woolen coat and leather boot (only left boot remained); under the body is one piece of fur leather and woolen felt. In addition, there is one pottery single-handled jar and a string of woolen rope found alongside the body (Fig. 5.1.1.6-2).

Some other grave objects were published in other research articles, and the details can be seen in Fig. 5.1.1.6-3.

4. Age

4.1 Relative Age

The stratum sequence is not clear from the published two tombs; therefore, the time dating can only be done by the grave goods and tomb structures. Firstly, there are no iron objects found from the grave goods, only pottery, wooden, and bronze items, so the time can be narrowed down to Bronze Age.

Secondly, the significant similarity between Wupu and Yanbulaq site pottery, especially the painted patterns, shows the cultural connection between each other. Yanbulaq site is found with amounts of iron objects, which might be later than the Wupu site. The time of the Yanbulaq site is thought to be during the first millennium BC, which leads to the relative date of Wupu no later than the first millennium BC.

4.2 Absolute Age

Twenty samples were tested by different institutes from 1991 to 2021; the details can be seen in Table 4 and Fig. 5.1.1.6-4. Combined with all the radiocarbon dating results, the absolute date range of Wupu site might be between 1050-450 BC.

5. Interpretation

5.1 Burial tradition and grave goods

In Wupu site, a vertical shaft is the most common burial pit. A secondary platform is inside the tomb chamber; some are found with wooden couches in the tomb chamber, while covered by fur, leather, and woolen felt pieces. The grave goods are mostly daily wares, clothes, and food.

Painted pottery wares, fine woolen clothes, and bronze objects, especially ornaments, indicate that the Wupu people have their decoration aesthetic and manufacturing technology. At the same time, the coexistence of bronze objects and painted pottery is a common tradition in the Hami region, even in the Xinjiang Bronze Age sites. The patterns on the pottery wares are mainly triangle patterns, similar to the Gansu & Qinghai region, which might indicate the influence of the east. At the same time, similar designs can be found in the relatively late Yanbulaq site, with more variations and types, representing further development of this painted pottery style.

5.2 Anthropological feature and Subsistence

The physical anthropological observation and mtDNA study showed that Wupu people are an admixture of Mongoloid and Caucasian groups (He & Xu, 2002; He et al., 2003),

which might be the result of ethnic interactions between east and west.

There is plenty of grain and cake remains found at the Wupu site. Intact florets, leaves, ears, stems, and roots of foxtail millet provide evidence of crop farming in the Wupu site (Wang et al., 2021). The agricultural implements of varying functions (wooden digger "Jue (耨)" and plough "Si (耜)") also underline this assumption (Wang, 1983).

Woolen textile is preserved in good condition due to the arid environment; the studies on the remaining coat reveal that Wupu clothes' material is sheep/bovid skin and woolen thread. Combined with the amounts of buried animal bones, domestic sheep, goats, and cattle may have appeared in Wupu (Schröder et al., 2016). Wupu people did not only consume the meat but the leather- and wool-producing industry has also been developed to a large extent. Therefore, livestock husbandry might have been common in Wupu between the 8th to 5th centuries BC.

5.3 Summary

The Wupu tombs are intensively distributed with no disturbance, indicating this might be a public site for people who inhabited the Hami oasis. Wupu people adopted hybrid agro-pastoral systems comprising multi-season cropping, mobile livestock herding, and local resource exploitation in this region. They received the painted pottery style from the east Gansu & Qinghai region. They kept developing this tradition into the next phase—the Yanbulaq site, making the complete Yanbulaq culture one of Xinjiang's most critical Bronze Age cultures.

1.2 Balikun Region

1.2.1 Shirenzigou/Dongheigou Site

1. Location

Shirenzigou/Dongheigou site is located in the Shirenzigou village, Balikun County, on the eastern Tianshan mountain (Fig. 5: 7). Both "Dongheigou" and "Shirenzigou" refer to the same site.

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C , while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). Today, the climate of Balikun features a short cool summer (17.1°C in July on average) and a long-frozen winter (-18.1°C in January on average). The frost-free period is only 108 days, and the annual precipitation is around 210 mm (Zhang 1993).

2. Research History

This site was first found during the Hami cultural relics survey in 1957 and was named the "Shirenzi site" in 1981 (Hami, 1993). The Research Center of Cultural Heritage and Archaeology of Northwest University surveyed this site in July and September 2005 and renamed it "Dongheigou Site" (Northwest University et al., 2006). Then a series of excavations were carried out from June to September 2006 and from June to September 2007; the reports were published in 2007 and 2009 (Xinjiang et al., 2007; Xinjiang et al., 2009). In 2009, another medium-sized settlement enclosed by stone walls and a medium-sized tomb were discovered. The Research Center of Cultural Heritage and Archaeology of Northwest University, Hami Cultural Relics Bureau, and Bilikun Cultural Relics Bureau carried out another excavation between July and September 2009. The reports were published in 2014 (Northwest University et al., 2014a; 2014b). In 2011 and 2013, the excavation team unearthed one large stone-enclosed structure, and then they excavated ten units, 25m^2 each, to analyze the function and interior layer (Ren, 2012; Tian et al., 2017).

After the excavation, the research on Shirezigou/Dongheigou site is focused on the settlement pattern due to the stone structures and grave goods. The excavator believed that this site represents a nomadic settlement in the Late Bronze Age and Iron Age Xinjiang. At the same time, based on the study of animal bones like sheep, horses, and camels (You et al., 2014; Zhao et al., 2014; Li et al., 2016; You et al., 2018; Li et al., 2020), plant remains (Tian, 2018; Tian et al., 2018; Zhao et al., 2020;), metal objects (Chen et al., 2013), structures (Li et al., 2016), artifacts (Jing, 2012; Zhao, 2016; Li et al., 2020), and human physical features (Ling et al., 2013), this hypothesis been more proved, its origin and further development also been discussed (Ning et al., 2019).

3. Findings

The excavator divided this site into four areas: the I-IV area and the main finds are in the III and IV excavation areas.

3.1 2006-2007 Season

The findings in area IV include one high stone platform (GT1), four stone-enclosed dwellings (F01-04), four stone circles (X01-04), and twelve tombs. The platform remains are mainly two floors with fireplaces, cooking stoves, ash pits, and post holes. Each tomb consists of a circular stone heap and a pit below its center. The eight small tombs are furnished with stone coffins, while the four medium-sized tombs with wooden coffins contain human and animal bones.

3.1.1 Building Remains

GT1

GT1 is a round-rectangular surface mound covered by Topsoil. The top is 16.6m long, 10.4m wide, and the bottom is 30.3m long, 25.9m wide; the height is 2-4m. There are twelve stratum from top to bottom on the profile (Fig. 5.1.2.1-1):

- ①: Topsoil, the thickness is 0.05-0.07m.
- ②: Ash layer, the thickness is 0.2-0.33m.

- ③: Light red bedding soil, the thickness is 0.08-0.3m.
- ④: Red bedding soil, the thickness is 0.2-0.45m, only found in the south.
- ⑤: The thickness is 0.2-0.3m, which can be divided into five sub-layers.
 - ⑤a: Charcoal and Ash layer.
 - ⑤b-e: northern bedding soil.
- ⑥: Light yellow bedding soil, the thickness is 0.02-0.06m, only found in the southeast; under this layer is an activity surface.
- ⑦: Grey-red bedding soil, the thickness is 0.2-0.3m.
- ⑧: Grey-brown bedding soil, the thickness is 0.25m, only found in the west.
- ⑨: Stone-soil mixture layer, the thickness is 0.6-1m.
- ⑩: Light red burnt-soil layer, the thickness is 0.25-1m.
- ⑪: Ash and charcoal layer, the thickness is 0.25-0.55m, some wooden structure pieces are found inside; under this layer is one activity surface.
- ⑫: Bottom bedding soil, the thickness is 0.1-0.3m.

There are two activity surfaces found in GT1, under the ⑥ and ⑪ layers, respectively, called "Upper Surface" and "Lower Surface."

Lower Surface

The length is 18m, width is 9.4m, disturbed by one rob pit and one ash pit, the overall scale is about 166m². There are twenty wooden poles, and broken stones remain on the surface as the surrounding wall. There are some fire pits (GT1Z5), ash pits (GT1H24-32), post holes (GT1D4-33), used pottery wares, grinding stones, stone balls, bronze objects, and several piles of the burnt plant remaining in the structure (Fig. 5.1.2.1-2).

GT1Z5: round-rectangular shape, flat base. The length is 1.54m, and the width is 1.32m, constructed by stone slides. The inside remains can be divided into three sub-layers: ①: dark-grey ash layer; ②: flat stone slides layer, filled with white soil; ③: red raw soil, which might be the bedding soil Z5 (Fig. 5.1.2.1-3).

GT1H24: oval shape, straight side, flat base. The length is 2.34m, width is 1.4m, and depth is 0.52m. Many sheep bones are remaining in the pit, including seven sheep heads. The cover soil is connected with the activity surface, which might be used as a sacrificial pit when building the house (Fig. 5.1.2.1-4).

Upper Surface

The length is 18m, width is 10m, found under the ⑤⑥ layer. There are three stoves (GT1Z1, 3, and 4), one fire pit (GT1Z2), eleven ash pits (GT1H2-10, 12, and 13), eight grinding stones, and some lithic tools, pottery sherds, ash, and charcoal remain found on this surface (Fig. 5.1.2.1-5).

GT1Z2: round-rectangular shape, flat base. The length is 1.67m, width is 1.5m, and depth is 0.32m. constructed by stone slides. The inside remains can be divided into three sub-layers: ①: ash layers, with some pottery sherds and charcoal pieces found inside; ②: red burnt-soil layer; ③: light red raw soil (Fig. 5.1.2.1-6).

GT1H2: oval shape, straight side, flat base. The length is 3.7m, width is 1.45m, and depth is 0.36m. One small pit on the bottom, with some charcoal pieces, burnt-soil pieces, and pottery sherds found inside (Fig. 5.1.2.1-7).

There are some other remains between different layers, including twelve ash pits (GT1H1, 11, 14-23), eight ash piles (GT1HD1-8), and three post holes (GT1D1-3).

GT1H19: found under the ⑧ layer, round, flat base. The diameter is 4.26-4.27m; the depth is 2.34m. The remains can be divided into two sub-layers: ①: dark-grey fine sand soil, with one complete sheep skeleton, grinding stone, millstone, bronze tube, clay bead, turquoise bead, carbonized grain remains found inside; ②: grey-red fine sand soil, with plenty carbonized grain remains, and several sheep bones. This pit might be used for grain storage (Fig. 5.1.2.1-8).

GT1HD3: one ash pile is found east of GT1 under the ⑩ layer. The length is 1.97m,

width is 0.9m, and height is 0.31m. Some charcoal pieces, carbonized grain remains, goat/sheep manure remains are found inside the ash, and one complete double-handled pottery jar is found on the northwest of the ash pile (Fig. 5.1.2.1-9).

F003

F003 is located on the north of GT1 in a rectangular shape. The length is 10m, width is 7m. The broken stone walls remained; the wall is 0.8m high and 0.5-2m wide. The remains of F03 can be divided into three sub-layers:

- ①: Topsoil, the thickness is 0.1-0.2m.
- ②: yellow-brown fine sand soil, the thickness is 0.15-0.3m.
- ③: grey-brown fine sand soil, the thickness is 0.1-0.3m.

There are sixteen ash pits (F03H1-16) and sixteen fire pits and stove pits (F03Z1-16) found under the ②③ layer (Fig. 5.1.2.1-10).

F003H11: round shape, straight side, flat base. The diameter is 2.37-2.5m, and the depth is 0.56m. Two layers remain inside the pit; the first layer is dark grey; the second layer is yellow-grey. Some charcoal pieces, burnt soil pieces, animal bones, and pottery sherds are found in the remains (Fig. 5.1.2.1-11).

F003Z4: oval shape, straight side, constructed by stone slides. The diameter is 0.5-0.95m; the depth is 0.38m. Some charcoal ashes, animal bones, and pottery sherds are found inside the pit remains (Fig. 5.1.2.1-12).

X04

X04 is found on the east of F01, oval shape. The length is 4.2m, width is 2.5m. The human bones are located in the circle center, accompanied by sheep bones, agate beads, and pottery wares. This type of stone circle is thought to be used as sacrificial action (Fig. 5.1.2.1-13).

3.1.2 Tombs

M010: M10 is located on the west of GT1, about 156m. the surface mound is round, the diameter is 7.5m, height is 0.45m. The tomb opening is oval; its diameter is 1.2-2.2m, and the depth is 0.65m. The filling soil is yellow fine sand soil. The tomb chamber is in the bottom center, with one stone coffin; the coffin length is 1.7m, width is 0.72m, and height is 0.35m. The coffin is also found with a wooden beam cover.

One human body is found inside the coffin; the orientation is 280°. One iron knife and fifteen clay beads are found in the chamber (Fig. 5.1.2.1-14).

M012: M012 is located north of GT1, about 367m. The surface mound is round; the diameter is 9.75-9.7m, and the height is 0.1-0.8m. Three sacrificial pits are found in the west, buried with one camel and two horses.

The tomb opening is oval; the diameter is 4.55-4.85m, the depth is 4.45-4.55m, straight side. The inside remains can be divided into four sub-layers:

- ①: dark-grey sandstone soil, with few human and animal bones found inside.
- ②: yellow-grey sandstone soil, found with one complete horse skeleton and few human bones.
- ③: yellow-grey sandstone soil, found with few human bones.
- ④: yellow-grey sandstone soil, under which is the tomb chamber.

On the west, the tomb chamber is found with one rectangular wooden couch. The couch length is 2.6m, width is 1.2-1.5m. One human body is found inside the couch; the orientation is 322°. Some colored lacquer pieces remained, which might be the old red coating on the wooden couch. There are plenty of golden and silver objects, pottery wares, iron objects, and bone items inside the chamber. (Fig. 5.1.2.1-15)

M015: M015 is located north of GT1, about 517m. The surface mound is oval; the diameter is 15-16m, and the height is 0.25-0.5m. Five sacrificial human bodies are

found in the mound, with five pottery wares, five bronze items, and two bone and lithic items, respectively.

The tomb opening is round; the diameter is 6-6.25m, the depth is 4.85m. straight side. The filling soil is yellow sand soil, accompanied by large stones. On the east bottom, the chamber is found with one rectangular wooden couch. The couch length is 2.5m, width is 0.97-1.3m. There are no human bones or grave goods found in the chamber.

One oval pit on the north of the couch, whose diameter is 1.05-1.8m, depth is 0.2m, breaks the wooden couch, with few human bones remaining, naming M015RS6. The body of M015 might have been moved from this chamber, while the small pit could be the sacrificial pit when moving (Fig. 5.1.2.1-16).

3.2 2009 Season

2009 season mainly excavated the southern section of Shirenzigou site: III area, including one medium-sized tomb, and two enclosed stone settlements, named F002.

F002

F002 is located on the northern slope of Balikun Mountain; it is one half-underground stone enclosed settlement; the wall around the structure is built by small boulders and filled with yellow fine sand soil and small rocks. There are four sub-layers in the F002 remains (Fig. 5.1.2.1-17):

- ①: yellow-brown fine sand soil, the thickness is 28-50cm; there are plenty of pottery sherds and animal bones in this layer.
- ②: grey-white fine sand soil, the thickness is 2-6cm; there are plenty of pottery sherds and animal bones in this layer; this layer is flat and pure, which might be the activity surface.
- ③: brown-grey fine sand soil, the thickness is 20-23cm; there are plenty of pottery sherds and animal bones in this layer; under this layer are the house remains and 14 post holes.

•④: yellow-brown fine sand soil, the thickness is 13-28cm; there are plenty of pottery sherds and animal bones in this layer; there are four burnt surfaces and one ash pile; under this layer is the ash pit H20 and raw soil, which might be the bedding layer of the house.

There are two activity surfaces (DM21-22), fourteen post holes (ZD1-14), eight burnt surfaces (SM1-SM8), three ash piles (HD1-3), and one ash pit (H1). The post holes are found in rows: ZD6, 7, and 12 on the southern row, ZD8 and 11 made the western row, ZD1, 2, and 14 completed the northern row, ZD2, 4, and 13 made the eastern row, ZD1, 5,6/ZD7,9, 10, 14/ZD3, 10 made the middle row. All rows might be used for the house bearing. All burnt surfaces are round, and the diameter is between 0.4-0.5m.

DM21: under layer ②, this surface has a clear sequence of human activity. There are two burnt surfaces (SM1, SM2) in the center and two ash piles (HD1, HD2) on the northwest wall. Fifty-nine bone pieces in three rows are located in the east center, seven bone pieces in the northeast. One complete pottery single-handled pot *Dou* has four stands and one pottery jug on the northeast corner.

DM22: there are two burnt surfaces on this layer (SM4, SM4). One pottery spinning wheel, one bronze handle from Ding, one iron awl, and one horn check piece are found inside.

ZD1: located on the northern F002, round shape, the diameter is 0.26m, depth is 0.63m. One wooden pole remained inside.

ZD2: located on the northeastern F002, round shape, the diameter is 0.14m, depth is 0.44m. One wooden pole remained inside.

ZD3: located on the eastern F002, round shape, the diameter is 0.26m, depth is 0.65m. One wooden pole remained inside.

ZD4: located on the southeastern F002, round shape, the diameter is 0.23m, depth is 0.23m. One wooden pole remained inside.

ZD5: located on the southern F002, round shape, the diameter is 0.28m, depth is 0.63m. One wooden pole remained inside.

ZD6: located on the southern F002, round shape, the diameter is 0.28m, depth is 1.02m. The hole is surrounded by stones, with one wooden pole remaining inside; the pole is 0.72m high, the diameter is 0.19m. (Fig. 5.1.2.1-18)

ZD7: located on the southern F002, round shape, the diameter is 0.3m, depth is 0.6m. The hole is surrounded by stones, with one wooden pole remaining inside.

ZD8: located on the southwestern F002, triangle shape, the diameter is 0.26m, depth is 0.42m. One wooden pole remained inside.

ZD9: located on the southwestern F002, round shape, the diameter is 0.26m, depth is 0.9m. The hole is surrounded by stones, with one wooden pole and several pottery sherds remaining inside.

ZD10: located on the northwestern F002, round shape, the diameter is 0.18m, depth is 0.52m. One wooden pole remained inside.

ZD11: located on the northwestern F002, round shape, the diameter is 0.28m, depth is 0.5m. One wooden pole remained inside.

ZD12: located on the southern F002, round shape, the diameter is 0.24m, depth is 0.17m. One wooden pole remained inside.

ZD13: located on the eastern F002, round shape, the diameter is 0.3m, depth is 0.3m. One wooden pole remained inside.

ZD14: located on the northwestern corner of F002, round shape, the diameter is 0.2m, depth is 0.65m. One wooden pole remained inside.

HD1: located on the northwest corner of F002. The length is 1.98m, width is 1.39m, and thickness is 0.7m. Some pottery sherds, animal bones, bone pieces with signs, grinding stones, bronze pieces, and agate beads are found inside the ash remain.

HD2: located on the southwestern corner of F002, oval shape, the diameter is 0.48-1m, depth is 0.25m. Several broken pottery sherds, charcoal pieces, and ash remain inside the pit, with no burnt marks on the pit bottom. This could be used for a trash pile.

HD3: located on the southwestern corner. The length and width are about 1m, and the thickness is 0.3m. Some animal bones and one wooden piece remained in the ash pile.

H20: located on the southwestern F002, round shape, the diameter is 0.8-1m, depth is 0.16m, round base. The pit is filled with grey-brown fine sand soil, with some ox bones and charcoal pieces inside (Fig. 5.1.2.1-19).

The grave goods from F002 include pottery wares, lithic tools, metal objects, and animal bones; the detail can be seen in Fig. 5.1.2.1-20.

F002 Wall

The southern wall is 9.6m long, 1.5-1.8m wide. There is one row of standing stones on the south of the south wall; the with is 0.6-0.9m, the length is 10m, and the height is 0.3-0.5m. F002 is high in the south and low in the north; this southern wall might be used for water fender. The western wall is 9m long, 1-1.5m wide. The northern wall is 8.5m long, 1.3-1.6m wide. There is one door in the middle of the north wall, and the width is 1-1.1m; the door passage is built by boulders and sand soil, constructed in one step, and connects the outside earth and F002 earth. The step is 2.67m long, 1.46m wide, and 0.27m high. The eastern wall is 7.7m long, 1.3-1.6m wide.

F004

Located on the southeast of F002, F004 is one half-underground stone enclosed dwelling. The length is 9.6m, width is 9.2m. The wall is built by layers of stones; the door is opened on the western part of the southern wall. There are 20 post holes along the wall and rows of poles on the ground, indicating a roof's possible existence. In addition, there are eight ash pits, one ash pile, several pottery sherds, animal bones, lithic tools, bone items, and iron objects.

3.3 2011-2012 Season

The large stone structure in the III area is named F001; it is 85.5m long, 50m wide, and the walls are 8-12m thick and 1-3m high. In addition, several ash pits, house structures, burnt surfaces, wooden poles, post holes, walls, grinding stones, agate beads, bone tools, bronze arrowheads, bronze plates, and iron objects remained.

4. Age

4.1 Relative Age

The site can be divided into two sub-phases based on the grave goods and tomb structure. In general, the grave goods of the IV excavation area are earlier than the III area. The pottery type from the GT1 in the IV area is similar to the Yanbulaq, Aisikexiaer, and Nawan sites, which might extend Hami local culture's advancing development. While on the other hand, the patterns of the bronze mirror are also similar to the bronze objects found in central China during the Western Zhou period.

The bronze ware handle, bone pieces (armor), and bronze ornament in animal shape from the IV area are also like that in central China during the Western Han dynasty. According to the stratum of the different structures in the III and IV regions, the excavator assumed that the establishment of III was in the early Han Dynasty. It was abandoned in Late Western Han Dynasty.

4.2 Absolute Age

Fifty samples were tested in 2012 on Shirenzigou/Dongheigou, and seven radiocarbon dating resulted in 2018. The details can be seen in Table 4. According to the radiocarbon data, we may suggest the absolute date of Shirenzigou/Dongheigou is between 1300-100 BC. The IV area is between 1300-800 BC; the III is between 500-100 BC. To be more accurate, the lower surface of GT1 in the IV area is between 1300-1200 BC, and the upper surface of GT1 is between 1100-900 BC.

5. Interpretation

5.1 Structure & Burial Tradition and Goods

The stone platform GT1 is the most significant finding in the Shirenzigou site; two independent activity surfaces in the structure represent the active using time. Both surfaces have found fire pits, stoves, ash pits with sheep bones, and plenty of grinding stones, which indicate the connection between the two activity surfaces. Both activity surfaces are centered by the millstone, which shows the primary function of the stone structure could be food processing and meeting. The post holes, ash pits, and ash piles found in the house site have found several disturbance marks, indicating the prolonged use of the house remains (Li & Zhong, 2016).

The objects found on the platform GT1 include pottery wares, lithic tools, bone wares, and bronze objects, while the sizes are mainly more significant than the house, and the typology is quite similar. On the one hand, this means that both platform and house remain to belong simultaneously; on the other hand, the platform's function can be distinguished from the house. The radiocarbon data of GT1 is between 1300-900 BC, while the houses are between 1300-300 BC. This indicates the surrounding houses are used longer than the platform (Ren, 2012).

Human sacrificial pits and stone circles in/out of the large stone structures also represent the unique tradition. Some sacrificial pits are found closer to the post holes in which some poles remain inside. Therefore, we may assume that the sacrificial actions are carried out not only for burial tradition but also for moving activities (Xinjiang et al., 2009). In addition, the stones enclosure in the III area may also be used for protection.

The use of bone armor may indicate the existence of warfare; the complete pottery wares might represent the sudden abandonment of this structure due to the breakout of the war (Li & Zhong, 2016).

In addition to the Hami native cultural pottery types found in the sacrificial pit and stones circles, the pottery wares found inside the tomb chamber showed a different type, combining with the metal wares like the golden plaques in animal shape. This might represent an outcoming cultural element (Xinjiang et al., 2009).

5.2 Anthropological Physical Features and Livelihood

The mtDNA analysis shows that the dominant mtDNA lineages of Shirenzigou/Dongheigou people are commonly found in the modern and ancient West Eurasian populations. The Shirenzigou/Dongheigou individuals are located on a genetic cline from East Asian to Western Eurasians, showing different East-West admixture proportions in three ways: Yamnaya-Samara, Ulchi (or Hezhen), and Han, while the majority of their East Eurasian ancestry is from Ulchi or Hezhen-related population (Ning et al., 2019).

In the Shirenzigou/Dongheigou assemblage, many cereal grains are unearthed. Naked barley is the most abundant crop in the flotation assemblage samples. Broomcorn millet and foxtail millet are rare. Apart from domesticated cereal crops, grains from wild plants are present in large quantities. The majority of the seeds are from herbaceous and shrubby plants, representing a steppe-like ecology. In addition, the grain processing tools like grinding stones and millstones are primarily found in this site; it is probably safe to infer the existence of cultivation practices centered on barley at Shirenzigou/Dongheigou despite the pastoralist nature of the site. Furthermore, the high ubiquity of summer weeds with barley grains suggests a similar growing season for barley consistent with a pastoralist lifestyle (summer occupation at Shirenzigou/Dongheigou) (Tian et al., 2018).

The goat/sheep bones found from Shirenzigou/Dongheigou site are suggested to be

fully domesticated. In contrast, some bones are identified with butchery marks, which indicate the possible meat and milk taking actions that provide the main meat and protein source. The change of mortality of different sub-phases means the shifting from raising sheep primarily for meat. The goat/sheep age study and the found of the polished bone tool also reveal other related artifacts industry, like wool and leather products making. In addition, the placement of sheep bones in the tomb may suggest a different aspect of the ancient funerary practice (You et al., 2018).

5.3 Summary

Shirezigou/Dongheigou is thought to be a large-scale settlement used seasonally by pastoralist groups in the Iron Age Eastern Xinjiang. Agricultural practice might be widespread on this site when they stayed here during summer occupation, while after they left, the wild plants are growing in between the naked barley. Domesticated sheep and horse are their main meat and transportation provider. This also supports their seasonal pastoralist lifestyle. Many foods processing lithic tools and activity surfaces indicate the large stone structure GT1 is the place for food processing and meeting. And they lived in a house close to the stone structure.

The Shirezigou/Dongheigou site on the northern slope of Tianshan mountain contributes to both seasonal moving and exchanging with other regions, which made the cultural exchange represented on the grave objects and burial tradition. The native Hami people settled down here, making their own "state" while also receiving the outcoming cultures, like Xiongnu cultural elements from the north.

1.2.2 Xigou Site

1. Location

Xigou site is located in the south of Shirezigou village in Balikun Kazakh Autonomous County, Hami city. This site is also on the northern slope of the eastern Tianshan range: Balikun Mountain (Fig. 5: 8).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C, while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). Today, the climate of Balikun features a short cool summer (17.1°C in July on average) and a long-frozen winter (-18.1°C in January on average). The frost-free period is only 108 days, and the annual precipitation is around 210 mm (Zhang, 1993).

2. Research History

Between August and September 2012, the School of Cultural Heritage and Archaeology of Northwest University, Hami Institute of Cultural Relics, and Balikun Cultural Relics Bureau carried out the salvage excavation in the Xigou site due to the tomb robbery. The robbed tomb is 600m to the Shirenzigou/Dongheigou site. The excavation yielded one grave, and the brief report was published in 2016 (Northwest University et al., 2016).

Xigou and Shirenzigou/Dongheigou site's close location made the scholars believe they belong to the same culture. With the finds and study of a large number of metal objects, especially the golden ornament (Cheng, 2014), and the research on the animal bones (Li et al., 2016), this site is more proven to be part of the Shirenzigou culture in Balikun region.

3. Findings

One tomb has been excavated, named M1, while another animal pit on its northwest, named K1. The disturbance pits that broke the mound are named JX1-3.

M1

The tomb is a large structure, including a surface mound and underground chamber. The surface mound is round, the diameter is 15m, and the thickness is 0.6-1m. There are two robbed pits on the mound (Fig. 5.1.2.1-1).

The tomb chamber is under the surface mound, and the tomb opening length is 4.2m, width is 3.8m, in a rectangular shape. The tomb bottom is 4.21m long, 3.95m wide, and the depth is 6.59m. The coffin chamber is on the southern bottom, and the width is 2.35m. The northern bottom is a secondary platform, and the width is 1.6m, height is 0.68m, with one complete horse skeleton found on the platform.

The filling soil of the tomb can be divided into five sub-layers (Fig. 5.1.2.2-2):

- ①: Topsoil, dark-grey soil, the thickness is 0.06-0.12m.
- ②: in round shape, the diameter is 13.4-15.3m, boulder layer filled with yellow-brown sand soil and small stones, the thickness is 0.1-0.6m.
- ③: in round shape, the diameter is 13.6-14.3m; boulders make one circle, the width is 1.2-2.4m, thickness is 0.15-0.3m; there is one layer of grey sand soil in the stone circles, the thickness is 0.28-0.43m.
- ④: dark soil, filled with boulders and fine sand soil, the thickness is 6.4m.
- ⑤: grey fine sand soil, the thickness is 0.2m.

There is one disturbance pit under the mound, in a round shape; the diameter is 2.4m, depth is 6.4m. This pit breaks the chamber, filling the soil and coffin chamber with fine sand soil and boulder. There are several human bones and pottery sherds in the filling soil of this pit (Fig. 5.1.2.2-3).

One outer stone coffin and one wooden inner coffin are found inside the chamber. The stone coffin is rectangular; the length is 4.21m, the width is 2.35m, and the height is 0.6-1.1m. Stone slides cover the top of the coffin; the four sides of the casket are built by boulders, with no bottom. The wooden coffin is inside the stone coffin, rectangular; the length is 2.98m, the width is 1.82m, and the height is 0.6m. The cover of the wooden coffin is made of eight poles, whose diameter is 0.15m and the length is 2.93m. The disturbance pit breaks the middle and western of the wooden coffin cover. The sides of the wooden coffin are made of four poles respectively, fixed by two grooves at

the pole end. The bottom of the wooden coffin is made of ten poles, whose length is 2.77m, width is 0.16m, and thickness is 0.05m. The human bones inside the coffin have rotted, and only four teeth remain. There are two hundred and seventy-nine pieces of grave goods in total, including fragments of golden ornament, agate and turquoise beads, pottery sherds, iron objects, glass objects, and animal horns that remained inside (Fig. 5.1.2.2-4).

K1

The animal pit K1 is located northwest of the mound, about 2.3m. There is one surface mound on the ground; the mound is round; the diameter is 7.9m. The inside filling soil can be divided into two sub-layers (Fig. 5.1.2.2-5):

- ①: Topsoil, dark-brown fine sand soil, the thickness is 0.05-0.1m.
- ②: in round shape, the diameter is 7.9m, boulder layer, filled with yellow-brown sand soil, the thickness is 0.56m.

The pit is under the surface mound, round, the diameter of the pit opening is 2.6m, the bottom diameter is 1.8m, and the depth is 1.85m. The layers of the pit can be divided into two sub-layers:

- ③: grey-brown sand soil, filled with boulders, the thickness is 1.2m.
- ④: yellow-brown sand soil, filled with few boulders, the thickness is 0.6m. There is one complete horse skeleton on the bottom.

4. Age

Unfortunately, there is no radiocarbon data from the Xigou site, and because only one tomb has been excavated, dating on stratum sequence has no reference. Therefore, the age can only be conducted from the tomb structure and grave goods.

The iron, golden, and glass objects indicate the general time of the Xigou site in the Iron Age. The tomb structure is similar to Shirenzigou tombs, e.g., M015 in the IV area. The

sacrificial pit with animal bones can also be found in the Shirenzigou IV area. The pottery type shows a prominent Hami native characteristic, similar to Shirenzigou and Yanbulaq sites. Therefore, the absolute age of the Xigou site could be the same as the IV area in Shirenzigou, which is in the early Western Han period.

5. Interpretation

5.1 Tomb Tradition and Subsistence

The tomb structure is the most apparent feature in the Xigou site, with a surface stone mound and underground tomb chamber, and two coffins inside the chamber. The stone mounds and the usage of stone and wooden coffins are similar to the popular Xiongnu tomb mound in the Inner Mongolian, which might be influenced by the Altai's early Iron Age Pazyryk culture (Ma, 2005; Ma, 2011; Cheng, 2014). In addition, the disturbance pit tradition is popular in the Xiongnu burials; it is another form of secondary burial. The sacrificial horse pit also proved the Pazyryk influence (Ma, 2008).

Most Xigou M1 grave goods are golden and silver objects, especially in tiger, sheep/goat, and Griffin patterns. The animal designs can be seen in the northern Chinese cultures during the Warring states times, generally thought to be influenced by the Pazyryk culture in the Altai region (Dai & Sun, 1983; Wu, 2002).

The study on the horse skeletons from M1 and K1 indicates that horses have been used in the long term in the Xigou site; the long-time riding even made the vertebra bending, which also proves the possible nomadic lifestyle. Combining with the agropastoral lifestyle in Shirenzigou, these two sites might belong to the same group of people who ride for seasonal moving or fight against the enemies (Li et al., 2016).

5.2 Summary

With plenty of metal objects, the Xigou site exhibits a prominent nomadic characteristic that could be connected with the Xiongnu culture from the north. In the records of Hanshu, it is the Xiongnu people who lived in the eastern Tianshan region and fought

against the Han government. Therefore, it is reasonable to assume that both Xigou and Shirenzigou people are the Xiongnu group in the western Han period, contributing to the cultural exchange during the fight with central China and other regions.

1.2.3 Hongshankou Site

1. Location

Hongshankou site is situated in the Hongshan Farm in Balikun Kazakh Autonomous County, Hami city. The site is also located on the northern slope of Balikun Mountain (Fig. 5: 9).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C , while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). Today, the climate of Balikun features a short cool summer (17.1°C in July on average) and a long-frozen winter (-18.1°C in January on average). The frost-free period is only 108 days, and the annual precipitation is around 210 mm (Zhang 1993).

2. Research History

Hongshankou site was first found in 2006. During the construction work of the provincial road S303, the Balikun Institute of Cultural relics and the archaeological team of Northwest University did an instant field survey. They found the enclosed stone structure, tombs, and cliff paintings. In 2008, the Cultural Heritage and Archaeological Research Center of Northwest University, Hami Institute of Cultural Relics, and Balikun Cultural Relics Bureau carried out a comprehensive field survey. It confirmed that the Hongshankou site is a sizeable nomadic settlement in Eastern Tianshan. The survey reports were published in 2014 (Northwest University et al., 2014a; 2014b). In 2012, the archaeological team of Northwest University carried out a trial digging in Hongshankou and revealed one stone structure, F002 (Tian, 2018).

After the excavation, the Hongshankou site is thought to be connected to the Shirenzigou/Dongheigou site, belonging to the same cultural elements (Ren, 2012); its botanical research (Tian, 2018) and settlement studies (Ren, 2012) also proved this hypothesis.

3. Findings

The site scale is about 12.8km², and there are three stone structure complex (I-III), sixty-six enclosed stone houses (F1-66), two hundred and twenty-five tombs, and four hundred and ninety-six pieces of cliff paintings found in total.

3.1 Structure I

Structure I is located on the southern edge of the mountain, triangle, and the designs are placed in rows. The length is 170m, width is 35-120m. There are three sub-sections composed of this structure (Fig. 5.1.2.3-1):

The southern section (mound): seven layers of stones construct the mound, with three stone walls on the side. On top of the mound is a stone platform, above which is a round stone mound, the diameter is 6.7m

Middle section (house): there are twelve houses in this section, and the size (length×width) is 6×5m-12×10m. There are four stone mounds northwest of the houses, and the diameter is 2.5-6.6m.

The northern section (house): there are three lines in one row, and the size (length×width) is 7×9m-11×11.5m. boulders construct the houses. There are eight stone mounds on the northwest of the houses, and the diameter is 3-6m.

3.2 Structure II

Structure II is located on the western edge of the mountain, in a triangular shape, the length is 1600m, the width is 620m. there are three sub-sections composed of this structure (Fig. 5.1.2.3-2):

The southern section (house): the length is 45m, width is 51m. The northwest house is round-rectangular, the length is 16.5m, the width is 14.5m, and the width of the wall is 1-2.5m, constructed by boulders. There are eight rooms in the house. There is one row of standing stones on the south of the house, the length is 55m, the width is 1m, and one round stone mound on the west of the standing stones, the mound diameter is 8m.

Middle-section: there is one road in the southwest; the length is 65m, the width is 2.5-3m, and the height is 0.3m. There are two round stone tombs on the platform; the road point to the stone platform, the tomb mound diameter is 6-6.5m. There are five houses on the north of the road, the sizes (length × width) of the houses are 14.5×15m, 13×15m, 14×17m, 26×28m, respectively. There are two rows of standing stones on the north of the houses; the length is 55m, width is 11m. There are three stone mounds on the northern peak; the diameter is 5.2m, 7m, and 15m. The mound profile reveals that no living or burial marks are found, which might be used for sacrificial actions.

The northern section (house): composed of five independent houses, the foundation height is 0.5m. The house's length is 20m, width is 12m, and one-three rows of stone construct the wall. There is one rectangular stone circle on the south of the house, and the length is 4.5m, width is 6m. There is another round stone circle on the south of the rectangular circle, and the diameter is 5.2m. There are four rectangular houses on the southwest of the houses; the length × width is 4×8m-12.5×7m. Some burnt traces are remaining on the ground. There are 18 tombs on the east of the northern section, and the surface mound diameter is 1.5-3m.

3.3 Structure III

Structure III is located on the northeast of the mountain edge; the length is 320m, width is 260m. There are three sub-sections (Fig. 5.1.2.3-3):

Eastern section (house): there are thirteen rectangular houses; the length × width is 5×6m-15×19m. Two rows of stones constructed the walls.

Northwestern section (house): the length is 72m, the width is 55m, and there are five independent houses in five rows. The house length × width is 5×6m-8.5×13m.

Southeastern section (house): the length is 166m, width is 160m. Boulders construct 26 rooms, and the scale is between 4.4×5.3m-26×20m.

3.4 Stone houses

F13-19: seven rooms, in a rectangular shape, the length is 28.9m, width is 21.6m; the wall width is 1.2-1.7m, constructed by one row of boulders (Fig. 5.1.2.3-4).

F24: in an irregular rectangular shape, the length is 16.4m, and the width is 6.1m; constructed by one row of boulders.

F31: in an oval shape, the length is 9.1m, and the width is 6.6m, constructed by one row of boulders.

F40: single room, in a rectangular shape, the length is 13m, and the width is 8.9m; the wall width is 1m, constructed by two rows of boulders.

F54: two rooms, in a rectangular shape, the length is 12.8m, width is 7.4m; the wall width is 0.5-1.2m, constructed by two-three rows of boulders. There is one door in the middle of the east wall, and the width is 1.1m.

F66: round house, the diameter is 16.1-18.6m; the wall width is 1.5-3m, constructed by boulders.

3.5 Tombs

The tombs are distributed between Structures I, II, and II. All tombs are found with the surface stone mound, either in round/oval or rectangular shape (Fig. 5.1.2.3-5). The report only provides the survey data, and there is no excavation of the tombs.

M2: round surface mound, the diameter is 4.9m, constructed by boulders and filling soil, the height is 0.4m. There are three small stone mounds on the west, north, and east sides; the diameter is 1.0-1.2m.

M18: round surface mound, the diameter is 6.4m, constructed by boulders and filling soil, the height is 0.5m.

M40: round surface mound, the diameter is 5.3m, constructed by boulders and filling soil, the height is 0.4m.

M41: round surface mound, the diameter is 4.8-6m, constructed by boulders and filling soil, the height is 0.5m.

M84: rectangular surface mound, the length is 4.8m, width is 4.2m, height is 0.2m.

M144: round surface mound, the diameter is 5.8m, constructed by one layer of boulders, the height is 0.3m.

In addition, there are four hundred and ninety-six pieces of cliff paintings describing the camel, horse, sheep, hunting, fighting, and carriage wheel scene.

4. Age

There are no excavation data from the Hongshankou site; only the surface features are recorded. Therefore, there are no radiocarbon dating results and stratum sequences to date the absolute age. The relative date can only be conducted by the structure and tomb mound structure.

The location of the Hongshankou site is quite close to the Shirenzigou/Dongheigou site, while Shirenzigou/Dongheigou yields similar large, enclosed stone structures. So, the time range of the Hongshankou site might be between Western Zhou and the late

Warring States period (Northwest University et al., 2014).

5. Interpretation

The location of the Hongshankou site is unique. Structure I is situated on the highest part of the southern peak, which can overview the whole Balikun grassland from the point of Structure I. The stone structures in the area I are distributed in axis order, with some possible stoves remaining; the high location also makes this area difficult for daily water usage. Therefore, it might not be used for everyday living but for fortification and military view.

Structure II might have the same function for a similar reason, while there is one wide road to the northern peak, where three mounds might be used as the sacrificial meeting points.

Structure III area is located on the water terrace on the foothill, which provides plenty of natural resources for daily use. The scale of this area is large, and the distribution of features is more intensive. Therefore, this area is thought to be the living area for the native inhabitants and the military basement.

Stone structures in Xinjiang are more connected with the nomadic lifestyle; the possible Xiongnu identity of Shirezigou/Dongheigou also leads Hongshankou remains to this mobile group. The military view and fortification also prove that the inhabitants who settled here have already developed their fighting system, corresponding with the Xiongnu movement in Xinjiang between the Warring state and Han Dynasty.

1.2.4 Yuegongtai-Xiheigou Site

1. Location

The Yuegongtai-Xiheigou sites group is located on the northern foothill of Balikun Mountain of Eastern Tianshan Mountain, in Balikun County, Hami city. The site group is 3km north-south wide and 5km east-west long, and the Tianshan Mountains ranges

surround it; the Balikun lake is on its northwest (Fig. 5: 10).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C , while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). Today, the climate of Balikun features a short cool summer (17.1°C in July on average) and a long-frozen winter (-18.1°C in January on average). The frost-free period is only 108 days, and annual precipitation is around 210 mm (Zhang 1993).

2. Research History

This site group was firstly found in 1983-1984 during the cultural relics survey in Eastern Xinjiang by the Xinjiang Institute of Cultural Relics & Archaeology (Zhongguo, 1985; Hami, 1993). This site group used to be called "Lanzhouwanzi" or "Shaojia E'bo" site, and all information represents this Yuegongtai-Xiheigou site group. The Eastern Xinjiang archaeological team of Xinjiang Institute of Cultural Relics & Archaeology excavated four tombs in 1984. In 2001, the Northwest University and Hami Institute of Cultural Relics carried out a comprehensive field survey in this area and recorded all the surface structures, tombs, and cliff paintings. The brief report was published in 2005 (Northwest University & Hami, 2005).

Before the comprehensive field survey, the understanding of this region stayed on the "Lanzhouwanzi" stone structures, which cannot represent the whole group's cultural property (Xi, 2014). However, the new survey revealed that this site group comprises large stone structures, tombs, and cliff paintings, which should be a complete ancient nomadic settlement area (Liu, 2009; Xi, 2014).

3. Findings

The excavators divided the site group into western, middle, and eastern sections. There are three stone platforms, one stone wall, and 82 enclosed stone structures.

3.1 Stone Platform

The stone platforms are mainly on the higher slope, in round or oval shape, built by boulders; the diameter is 3-5m. From west to east, there are three platforms: Shuangzha E'bo, Gaojia E'bo, and Nijia E'bo.

Shuangzha E'bo (Fig. 5.1.2.4-1): the platform is 45m long, 40m wide, and the height is 3m. There is one round stone circle on the northern platform. Twenty-four enclosed stone structures are found on the north and west of the platform, named F1: 1-24. All enclosed structures are rectangular, and the size is between $8.6\times 4-14.8\times 10.4\text{m}^2$, and the wall width is between 0.8-2m. Plenty of ash remains, charcoals, animal bones, burnt soil pieces, pottery shards, grinding stones, and axe remained on the platform.

Gaojia E'bo (Fig. 5.1.2.4-2): the platform is round, the diameter is 15m, the height is 5m, and one rectangular boulder remains on the platform, which might be used for sacrificial actions. There are six enclosed stone structures, named F4:1-6, in square and rectangular shapes. The size is between $14\times 13.6-16\times 15.2\text{m}^2$, and the wall width is 0.8-2m. Few pottery sherds remained on the platform.

Nijia E'bo (Fig. 5.1.2.4-3): the platform is round, the diameter is 20-30m, height is 3m. There is one rectangular stone circle on the north of the platform, and the length is 26m, width is 7m. Two layers of boulders construct the platform, and the thickness is 1.5m. There are fifty-two enclosed stone structures on the platform, named F4: 1-52. The size is between $7.6\times 4.8-30\times 30\text{m}^2$. The wall width is 0.8-2m. Small stones, burnt soil pieces, charcoals, and pottery sherds remained on the platform. There is one large rock on the north of the platform, and the height is 1.6m, length is 11.5m. There are more than ten pieces of cliff paintings remaining on it.

The enclosed stone structures are found between the platforms, mainly in a rectangular shape, and are thought to be houses (Fig. 5.1.2.4-4).

3.2 Stone Wall Structure

The *Shaojia E'bo* stone wall has one oval stone mound on the surface; the diameter is 30m, height is 3m. The unearthed structure is rectangular, and the scale is 200m². There are two sections. The main section is on the south; several post holes are located on the bottom, with poles remaining inside. The other section connects the main area with a door passage and one door on the east side. There are three layers of activity surfaces; both have stove pits. The wall height and thickness are 2m. There are plenty of charcoals, ash remains, horse/sheep/deer bone, carbonized grains, pottery sherds, bronze objects, and lithic tools remaining in the structure. In addition, there are seventeen individual human bodies found altogether (Fig. 5.1.2.4-5).

3.3 Tombs

More than three hundred tombs in this site group are primarily distributed in the valley entrance area. The tomb pit is rectangular; the length is 2.2-3m, and the width is 1.2-1.8m (M102, M103). M105 has a rectangular stone circle on the surface; the length is 7.2m, the width is 6.5m, and the orientation is 172°. There is one rectangular pit on the south (Fig. 5.1.2.4-6).

The tombs excavated in 1984 are in a similar form. The surface mound diameter is 4-5m; the vertical shaft pit length is 1.4-2m, the width is 0.5-1.4m, and the depth is 1.5-2m. The body is in supine flex and supine straight form. The grave goods include pottery wares, bone items, iron objects, stone beads, and cowry items, with horse and sheep bones found altogether (Zhongguo, 1985, pp. 257).

3.4 Cliff Painting

The cliff paintings are mostly found on the northern slope of Balikun Mountain, mainly describing the animal patterns, like sheep, deer, wolf, horse, camel, dog, and cattle; also including the hunting, riding, and carriage scenes (Fig. 5.1.2.4-7).

3.5 Others

The grave goods are mainly collected from the *Shaojia E'bo* (Lanzhouwanzi) stone structures, including pottery jars, bronze pot *Fu*, bronze knives, grinding stones, and

stone axe from *the Shuangzha E'bo* stone structure (Fig. 5.1.2.4-8).

4. Age

The Yuegongtai-Xiheigou sites group only did the field survey and surface collection; there is no stratum sequence information. Therefore, the relative dating can only be conducted by the representative grave goods. However, the bronze pot Fu and knife are the unique bronze objects from this site group, which have solid regional characteristics and can be used as time indicators.

The Bronze Fu has two round handles over the lip; the deep belly and trumpet stand looks the same type as the Bronze Fu from the Kanerzi site in Qitai County and also similar to the Bronze Fu from Xiaoquancun in Shanxi Province. Therefore, Guo assumed this type of Fu should be populated during the 9-8th centuries BC (Guo, 2003), between the Spring & Autumn and Warring States periods.

The bronze knife with a round end and straight back can be seen in many Northern Tianshan sites, including Yanbulaq, Yanghai, and Chawuhu site, which might be between 1200-500 BC (Xi, 2014). A similar knife can also be seen in M86 from Jundushan cemetery in Beijing (Liu, 2009), around the late Spring & Autumn period.

There is only one radiocarbon dating result published in 1985; both lab number and original ¹⁴C dates are absent, and only the calibrated result shows that the absolute age is 3285±75 BP (1335±75 BC) (Zhongguo, 1985, pp. 256).

Therefore, we may suggest the date range of Yuegongtai-Xiheigou is between 1200-300 BC, during western Zhou to Spring & Autumn and Warring States period.

5. Interpretation

The large scale of the stone structures in the Yuegongtai-Xiheigou sites group indicates the ancient living group in the Balikun Mountain region. This site group includes sacrificial areas, living places, and burial cemeteries, which is a complete living mode,

especially for the nomadic lifestyle. The platform is situated on a higher slope, which can be used for sacrificial actions or fortification functions. At the same time, most smaller structures are found in the valley entrance and plain foothill area, which is commonly the winter camp for the herdsman.

The above interpretations all lead to the high class of the inhabitant who lived in the large structures. Therefore, the excavator believes that this site group should be one political summer center for the nomadic group (Northwest University & Hami, 2005). To be more reasonable, this site group could be in the Yuezhi territory (Wei et al., 2015).

1.2.5 Nanwan Site

1. Location

Nanwan site is located in the Kuisu town, Balikun County. This site is also situated on the eastern edge of Tianshan Mountain; the Liutiao River on the north flows from east to west until Balikun Lake (Fig. 5: 11).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C , while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). Today, the climate of Balikun features a short cool summer (17.1°C in July on average) and a long-frozen winter (-18.1°C in January on average). The frost-free period is only 108 days, and the annual precipitation is around 210 mm (Zhang 1993).

2. Research History

1981, the Hami Institute of Cultural Relics archaeological team found this site during the Eastern Xinjiang cultural relics survey, and they did a trail digging. In 1982, the archaeology team carried out another excavation season. The report published two tombs M66 and M95 (Chang, 1985; Xinjiang, 1987).

Since the excavation, Nanwan site has been discussed due to its unique pottery wares (Chen, 1982; Lv et al., 2001). It is thought to be the "Nanwan type" of Tianshanbeilu culture in the Hami region, and the cultural status has been doubted and rediscussed since then (Chen, 1991; Chen & Hiebert, 1995; Wang, 1996; Lv et al., 2001; Mei, 2003; Han, 2007; Zhang, 2010; Guo, 2012; Ren, 2012; Festa, 2017; Tian, 2018; Sameer et al., 2018).

3. Findings

More than three hundred tombs were excavated in the 1981 and 1982 seasons; however, only two graves have been published in detail: M66 and M95. The tombs have surface stone circles as the tomb indicator, with no surface mounds. In addition, some pottery types are published in the cultural sub-phase analysis (Lv et al., 2001) (Fig. 5.1.2.5-3).

M66 (Fig. 5.1.2.5-1): The tomb opening is rectangular, the length is 180cm, the width is 143cm, the depth is 145cm, the bottom size is 172cm, width is 135cm. There are two layers of the human body inside the tomb chamber; the top body is side flexed, with no grave goods; the bottom is placed on the rectangular wooden couch, with a beam cover above it. The bottom body is in a side-flex position, and there are stone beads, bronze buttons, bronze strings, earrings, and goat/sheep legs found altogether with the body.

M95 (Fig. 5.1.2.5-2): The main tomb chamber is in a round-rectangular shape, the orientation is 55°, the length is 190cm, the width is 94cm, and the depth is 145cm; the bottom length is 204cm, the width is 106cm. Two human bodies are placed on the wooden couch in the bottom chamber, covered by wooden beams. The two bodies (B & C) are one male (20-year-old) and one female (16-18-year-old), both in side-flex form. In addition, there are six sets of earrings, bronze tubes, bronze buttons, bone tubes, and pottery wares found altogether with the body.

The side chamber of M95 is rectangular; the length is 86cm, the width is 66cm, and the depth is 50cm; there is one human body on the bottom, a 30-year-old male, side flex.

4. Age

4.1 Relative Age

Lv divided Nanwan site into three sub-phases (Lv et al., 2001) according to the types of the grave goods (Fig. 5.1.2.5-4):

Phase I: the pottery wares are slightly slim; the typical pottery wares are double-handled/single-handled jars and double-handled jugs.

Phase II: the pottery wares are fatter than in the last phase, with a deep belly; the typical pottery wares are double-handled/single-handled jars, single-handled cups, and double-handled cups.

Phase III: the pottery size goes back to tall slim, and there is no double-handled jar in this phase, the coexistence of flat-base and round-base shallow bowl appeared in this phase.

The double-handled jar in Phase I is similar to Phase II in Tianshanbeilu site. The bronze axe from Phase II is also identical to the type of Shang axe in northern China.

Therefore, the date range of Nanwan site is contemporary to Phase II in Tianshanbeilu during the late Bronze Age phase.

4.2 Absolute Age

Eighteen samples were tested (CASS, 1991), and the radiocarbon dating results can be seen in Table 4. Combining with the calibrated data, the absolute date range of Nanwan site is narrowed down between 1400 and 1000 BC.

5. Interpretation

As one of the large-scale cemeteries excavated in Xinjiang in the 1980s, the unique painted pottery wares of Nanwan used to be thought of as the typical Neolithic culture in Eastern Xinjiang (Chen, 1982). However, the coexistence of painted pottery and

bronze objects proved that this should be the Xinjiang Bronze Age site (Lv et al., 2001).

Nanwan painted pottery is similar to the Tianshanbeilu pottery wares, especially the patterns on double-handled jars. Some scholars believed that Nanwan might represent a sub-type of Tianshanbeilu culture in the Balikun-Hami region (Han, 2007; Guo, 2012). Others argue that this whole Balikun region should belong to Hongshankou-Shirenzigou cultural group or Eastern Tianshan culture because of the large-scale geographical distribution and the pottery typology (Ren, 2012; Xi, 2014). However, due to the lack of published data, it is still hard to identify the cultural element only from the pottery type.

There are ninety-eight bronze objects found in Nanwan site, and fourteen samples have been analyzed, including the knife, bead, plaque, and circle (Qian, 2006). The analysis reveals that the source of Nanwan bronze objects is complex; arsenic copper accounts for the principal source, while tin is also used in the bronze casting. The bronze-producing technology is similar to the Tianshanbeilu site but not exactly the same. There is one bronze pot *Fu* found in Nanwan that is unique. Its identical style has been found in the northern Tianshan region, like the Altai, Ili, and Urumchi region, representing nomadic grassland elements in the 9-8th century BC, and spread westward through the Altai region in the 8-7th century BC (Guo, 2003).

The cultural group division from modern scholars does not affect the past interactions between Nanwan people with other regions. Firstly, the substantial similarity between Tianshanbeilu and Shirenzigou/Dongheigou reveals the connection between these three sites. The location in between the mountains also pushed the mobile lifestyle of the inhabitants from the above sites. In the meantime, the geographical situation contributes to the communication between the Balikun-Hami region and the Gansu region; the latter is also unique for its painted pottery wares. The painted pottery is thought to be originated from northwest China and then spread east and westward, while Eastern Xinjiang exhibited a significant impact from this spread wave. When Yanbulaq culture revealed a strong Siba Culture influence, the Tianshanbeilu/Nanwan represented a possible Kayue/Xindian impact (Ren, 2012).

1.2.6 Tuobeiliang Site

1. Location

Tuobeiliang site is located in the Tuobeiliang village in Tuhulu town, Yiwu County. The site is on the terrace plain of the Yiwu River (Fig. 5: 12).

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C , while in July, it can be between 20° to 24°C (Domrös & Peng, 1988).

2. Research History

In 2009, to cooperate with the earthquake-resistant construction in Tuobeiliang village, the Xinjiang Institute of Cultural Relics & Archaeology, Hami Institute of Cultural Relics, and the School of Cultural Heritage and Archaeology of Northwest University carried out the salvage excavation in Tuobeiliang site. The excavation report was published in 2014 (Northwest University et al., 2014).

3. Findings

There are sixteen tombs (M1-16), one enclosed stone structure (F1), and three sacrificial remains (J1-3) in total. The tombs are found on the northern terrace plain and can be divided into four sub-areas (Fig. 5.1.2.6-1); most tomb mounds are constructed with large stones and filled with soil. A vertical shaft pit and stone chamber are two primary chamber forms in Tuobeiliang.

M1 (Fig. 5.1.2.6-2): The surface mound is round, the diameter is 4.7-5.1m, height is 0.6m. The tomb pit is under the surface mound, round-rectangular vertical shaft, the length is 2.4m, width is 1.5m, and depth is 2.5m. Some wooden traces remained on the chamber wall, which might be the wooden coffin. There is one human body in the western chamber, supine position, and the lower body is complete. Several human bones, horse bones, pottery wares, golden ornament, agate beads, turquoise tubes, and an iron knife remained in the chamber.

M5 (Fig. 5.1.2.6-3): The surface mound is constructed of stones and soil in a round shape; the diameter is 9m, height is 1.1m. One circle of large rocks out of the mound, with one pottery single-handled cup and jug found inside the circle.

The tomb pit of *M5* is under the surface mound, a round-rectangular vertical shaft pit; the length is 3m, the width is 2.2m, and the depth is 2.5m. There is one rectangular stone coffin in the pit, covered by nine wooden beams, whose diameter is 0.12-0.3m. The stone coffin is oval; the length is 3.1m, the width is 2.3m, and the height is 1.2m. Another wooden coffin is found inside the stone coffin; the length is 1.75m, the width is 0.7m, and the height is 0.35m. There is a small pit between the northeastern wooden casket and the stone coffin; the pit is constructed with stone slides, pottery wares, and bone ornaments are found in which. One human body is found inside the coffin, only the lower body remaining. Some horse bones are found inside the filling soil, pottery wares, bone ornaments, iron arrowheads, golden ornaments, iron knives, and wooden spinning wheels are found inside the coffin.

M10 (Fig. 5.1.2.6-4): No surface mound remained due to the construction damage. The tomb pit is in a round-rectangular vertical shaft pit; the length is 3.05m, the width is 2.05m, and the depth is 1.7m. One stone coffin remained inside the pit; the coffin length is 2.55m, the width is 1.65m, and the height is 0.65m. Boulder layers cover the stone coffin. The human body is found on the northwestern coffin bottom; only several pieces remain. There are four iron objects one bronze arrowhead, one bronze plaque, one bone arrowhead, one iron circle, one iron hook, and nine wooden arrowheads that remain on the grass mat under the body.

There is one horse pit north of the *M10* tomb opening; the pit length is 1.8m, the width is 1.3m, and the depth is 0.36m. One complete horse skeleton is found inside the pit, with one iron circle, one iron object, and one wooden plate in between the horse bones.

M14 (Fig. 5.1.2.6-5): Stones and soil construct the surface mound, round shape, the

diameter is 6.6m, height is 0.6m. The tomb pit is under the surface mound; the round vertical shaft pit's diameter is 2.1-2.4m, and the depth is 0.76m. There is one set of rectangular stone coffin inside the pit; the coffin length is 2.1m, the width is 1.8m, and the height is 0.67m. The coffin top is covered by ten wooden beams, whose length is 1.9m, and the diameter is 0.1-0.3m. Two human bodies are found inside the coffin, side-flex, one male and one female. There is one wooden couch under the body. The couch length is 1.15m, the width is 0.6m, and the thickness is 0.04m. There are three pottery jars, one pottery cup and one iron knife found next to the body, and one boiled goat/sheep bones inside one double-handled jar.

M16 (Fig. 5.1.2.6-6): The surface mound is constructed of stones and soil, round, the diameter is 4.4-5.6m, and the height is 0.3m. The tomb pit is under the surface mound; the length is 1.9m, the width is 1.7m, and the depth is 1.7m. There is no coffin mark in the pit, but a secondary platform on the east side. The human body is found in the western chamber, supine straight. One single-handled pottery jar, one bronze circle, and one bone ornament remained on the left hand.

The rest grave goods can be seen in Fig. 5.1.2.6-7.

4. Age

The grave goods from Tuobeiliang are similar to the Hanqigou and Heigouliang sites. At the same time, there are more iron objects and fewer bronze items found in Tuobeiliang, indicating the relatively later time phase, which is in the Early Iron Age, during the Warring States and early Han periods.

The excavation report only provides three calibrated data (Northwest University et al., 2014; Xi, 2014) tested by the Technology Archaeology Laboratory of the School of Archaeology and Museology of Peking University; the origin ¹⁴C data is absent, so the absolute age of Tuobeiliang site can only rely on their results (Table 4). Therefore, the absolute age of Tuobeiliang site can be summarized between 500 BC-100 AD.

5. Interpretation

There are two main tomb types in Tuobeiliang site: vertical shaft pit and shaft pit with the stone coffin. Wooden beams usually cover the coffin; some are also found with the wooden coffin, wooden couch, and grass mat. Single-burial and double-burial are both popular. Horse bones are mostly found inside the tomb chamber or next to the surface mound, which is thought to relate to sacrificial actions.

Pottery wares and iron objects are the most common grave goods. The single-handled pottery jar, jug, and cup are similar to the Baileqier site. At the same time, the bone ornament, iron knife, and bronze mirror are like the metal objects from Qunbake and Heigouliang site (Xi, 2014).

A large number of horse bones and the related metal harness equipment found with the horse altogether indicate the intense mobility of the Tuobeiliang people (Li et al., 2020), while it also shows the pottery tradition in the Balikun region, e.g., Nanwan and Heigouliang sites. They all exhibit the admixture characteristic of nomadic and sedentary lifestyles, contributing to the regional interaction in the mobile process.

1.2.7 Heigouliang Site

1. Location

Heigouliang site is situated on the northern edge of Balikun Mountain, between the Koumenzi and Songshutang in the eastern Balikun Basin, Balikun County, Hami city (Fig. 5: 14). The site is located in the northern valley of Heigou gully; therefore, it is named "Heigouliang site."

This site is in the Middle Temperate Arid Zone, with powerful seasonal contrast. The annual precipitation is between 50 and 250 mm. At the same time, the temperature shows a significant variation between winter and summer: in January, it can be -10° to -12°C, while in July, it can be between 20° to 24°C (Domrös & Peng, 1988). Today, the climate of Balikun features a short cool summer (17.1°C in July on average) and a

long-frozen winter (-18.1°C in January on average). The frost-free period is only 108 days, and the annual precipitation is around 210 mm (Zhang 1993).

2. Research History

Heigouliang site was firstly discovered in 1993 during a field survey before the Hami-Balikun Road construction project. Xinjiang Institute of Cultural Relics & Archaeology and Hami regional Institute of Cultural relics carried out two seasons of excavations in 1993 and 1994 (Xinjiang & Hami, 1994).

The excavation yielded sixty-four tombs with abundant grave goods. Mo compared the archaeological type with Shirenzigou/Dongheigou from the burial form and grave goods tradition and believed these two sites should all belong to one same cultural group (Mo, 2010). Ren also discussed the distinguished tomb characteristic and the nomadic lifestyle (Ren, 2011). Several physical anthropological analyses also reveal the complexity of Heigouliang status and its possible cultural group (Wang & Xi, 2009; Zhang et al., 2009; Wei et al., 2012; Li, 2012; Zhao et al., 2014; Gurianov et al., 2015; Wang et al., 2015; Eng et al., 2020).

3. Findings

The whole site group can be divided into four sub-sections: Nr. I-IV section, distributed on the east and west side of the Heigou Gully.

3.1 Nr. I. section

Nr. I section is located on the western slope. Most tombs have surface stone mounds, and the diameter is 2-7.5m. There is one rectangular stone circle in the eastern section. The tomb pit is under the mound in a vertical shaft, and the shaft pit is with a side chamber. The depth of the pit is 1-2.6m. Most of the tombs are single-burial, in supine straight format. While some other bodies found altogether in the filling soil or pit bottom might be the secondary burial. The grave goods include pottery wares, bronze, iron, cowry ornaments, silver, lacquer objects, and animal bones (Fig. 5.1.2.7-1).

IM28: there is one wooden coffin in the chamber, and the human body is in the supine straight position. There are plenty of grave goods altogether with the body, including seven pottery wares between the coffin and the western wall. The rest of the goods are found in the coffin, including bronze buttons, bronze ornaments, bronze forks, cowry ornaments, earrings, bronze mirror, bronze arrowheads, bronze axe, bronze sword, bone arrowheads, eyebrow stone, turquoise beads, agate beads, etc. (Fig. 5.1.2.7-2: 1). In addition, there are five bodies found in the filling soil and chamber bottom, named RS1-5. These bodies are not complete, and few pottery sherds are found altogether. These bodies are thought of as the enslaved/sacrificial people (Fig. 5.1.2.7-2:2).

3.2 Nr. II section

Nr. II section is located on the peak of Heigou gully and top of the western slope. All tombs have surface stone mounds, and the diameter is 1-9m. There are some standing rocks around the graves.

3.3 Nr. III section

Nr. III section is located on the eastern slope, and there are twenty tombs which can be divided into two sub-groups. Group A is found on the north of Group B, with seven graves. The largest tomb in Group A has a surface stone mound; the diameter is 17.5m, and the height is 1m. The rest six tombs are distributed in an arc shape on the west. Some standing rocks are on the north of Group A. Group B is 50m south of Group A, with twelve tombs. The largest tomb of Group B has the surface stone mound, the diameter is 20m, and the height is 1m. The rest eleven tombs are distributed in the arc shape on the west and north.

3.4 Nr. IV section

Nr. IV section is located on the eastern slope. The twenty tombs can be divided into two sub-groups. Group A is found 30m west of Group B, with ten graves. All burials have a surface stone mound, and the diameter is 7.3-9.6m. In addition, there is one row of standing rocks; the general length is 26-34m, and the width is 20.3m. M1 and M2 are the two largest tombs in Nr. IV section, the surface mound diameter is 9.6m and 9.2m,

respectively. Group B has twelve graves distributed in arch shape; the surface mound diameter is 2-3.5m.

There are some other grave goods yields from Nr. I and II section, the detail can be seen in Fig. 5.1.2.7-3.

4. Age

There are no radiocarbon dating results on Heigouliang site; the detailed stratum sequence has not been published either. Therefore, the dating of this site can only be conducted by comparing burial tradition and grave goods. Nevertheless, plenty of iron, silver, and golden objects indicate that Heigouliang is an Iron Age site.

Heigouliang site is close to Shirenzigou/Dongheigou site in the Balikun Mountain range, and their burial tradition is also quite similar. All have surface stone mounds filled with soil, stone, and sacrificial bones; all use the wooden coffin in the tomb chamber. The pottery jar, jug, and shallow bowl are also very similar. The single-handled pot *Dou* is also one typical pottery ware in Hanqigou and Yanbulaq site. The bronze mirror from IM25 shows significant similarity with the central China/Xiongnu mirror during the late Warring States and Western Han period. In the meantime, the golden/silver plaques with animal patterns, especially bird and tiger patterns, used to be populated in the Xiongnu culture from the north. Combining with the historical records, *Shiji*, Yuezhi and Xiongnu took over this region during the Han period. Therefore, the relative time of the Heigouliang site could be in the early Western Han period.

5. Interpretation

5.1 Burial tradition and grave goods

Most of the tombs contain multiple individuals, while the burial manner is different. Usually, one complete human body is found inside the coffin, while the others are partly placed in the filling soil or on the pit bottom. The one in the coffin is found with various types of fine grave goods, who is thought to be the tomb owner; the rest only have broken pottery sherds from their daily life, and they are believed to be the

slaves/sacrificial victims (Wang et al., 2015). This obvious distinction indicates the possible social hierarchy within the population (Mo, 2010).

Double-handled pot Fu is one of the typical pottery wares in Heigouliang, which is thought to be a functional daily ware since there are holes under the lip. As for the smaller-sized wares, pottery jars, jugs, and shallow bowls are more common; this pottery combination can also be seen in Yanbulaq culture. While for the metal objects, the bronze and iron knife, bronze harness, bronze buttons, and golden plaques with animal patterns are mostly seen in the Xiongnu cultures from Inner Mongolian and Ningxia sites (Ren, 2012). The nomadic influence is apparent.

5.2 Subsistence

The physical anthropological analysis reveals that the Heigouliang tomb owner mostly has a northeastern Siberian feature, while the slaves/sacrificial victims are closely related to the central Asian population, especially in the modern Uyghur people of Xinjiang (Li, 2012; Zhao et al., 2014; Gurianov et al., 2015). Furthermore, the slaves/sacrificial victims have exhibited physical trauma and regrowing evidence, indicating that these individuals might be warriors captured in battle and used as a human sacrifices for the tomb owner (Wang et al., 2015), corresponding with the description of the fighting/warfare phenomena from the historical records.

Numerous farming implements and faunal remains were unearthed from Heigouliang. The osteological analysis reveals riding is also possible in their daily lives (Wei et al., 2012), proving that the tomb owners were pastorals focused on animal husbandry. Furthermore, the isotopic research suggests that wheat, barley, foxtail millet, and common millet might be their significant plant sources (Wang et al., 2015).

5.3 Summary

Heigouliang site is a nomadic pastoralist group with complex social classification in the eastern Tianshan region. Together with Shirenzigou/Dongheigou, they might be used for the mobile seasonal transition and settlement. The grave goods from tomb owners

exhibit remarkable Xiongnu cultural elements but are absent in the slaves/sacrificial victims' pits, indicating the Xiongnu control over the local inhabitants. This also corresponds with the historical description in *Shiji*, and the native inhabitants might be the early Yuezhi in the eastern Tianshan region.

1.3 Turfan Region

1.3.1 Yanghai Site

1. Location

Yanghai site is in the Yanghai Village, Shanshan County, and it is situated on the Gobi Desert of southern Huoyanshan (Flaming) Mountain (Fig. 5: 15). The three sub-cemeteries are located on the bench terrace, while nine Karez wells go through the terrace (Fig. 5.1.3.1-1). The surface of the site consists of a layer of the Gobi pebbles, beneath which is a stratum of pure Quaternary loess with a compact structure.

This site is in the Warm Temperate Arid Zone. In total, summer and winter represent a distinct wet and dry season; this area receives the lowest precipitation in China, mostly dropping to an annual capacity between 15 and 50 mm. Due to the extremely low rainfall counts, all months are usually dry. The seasonal temperature amplitude exceeds 70°C (Domorös and Peng, 1988). This area often experiences windstorms, which cause severe wind erosion on the surface.

2. Research History

In October-November 1988, the Yanghai site was firstly excavated by the Xinjiang Institute of Cultural Relics & Archaeology. The excavation scale is about 1208,5 m², and there were eighty-two tombs excavated in total (Wenwu, 1990).

Since the Yanghai site was discovered in 1985, it has been kept robbed for the next eighteen years (Xinjiang, 1989; 2011). After it was robbed again in 2003, the Xinjiang

Uygur Autonomous Region Cultural Relics Bureau, Turfan District Cultural Relics Bureau, and Xinjiang Institute of Cultural Relics & Archaeology decided to carry out the rescue excavation, which started in March 2003 and ended in May 2003 (Xinjiang et al., 2004; Xinjiang et al., 2011; Turfan et al., 2019).

In 1987, some grave goods were reclaimed back by the police. There are one hundred and sixty-six items in all (Turfan, 2011), including one hundred and thirteen pottery wares, twenty-three wooden objects, twenty-three bronze objects, two iron objects, one bone strap fitting, one whetstone, one golden flower, one cowry ornament, and one glass bead. From 1988 to 2002, ninety-four items were reclaimed by Shanshan County Police, including thirty pottery wares, twenty-five bronze objects, thirty-one wooden objects, one bone comb, one horn comb, one horn cup, and five woolen textiles. These reclaimed back grave goods are displayed in Shanshan County Museum. In March 2003, before the official excavation started, the excavation team carried out a pre-survey around this area. They collected plenty of exposed objects, including twenty-eight pottery wares, thirty-two wooden objects, fourteen leather items, one bronze bell, one bronze knife, one iron knife, five bone objects, three horn objects, three lithic tools, and one millet bread. However, the unearthed unit is not traceable since these items were robbed, reclaimed, or collected from the field survey.

In 2006, to build the Ground Protection Station, Turfan Cultural Relics Bureau found eight robbed tombs in the northern Nr. I section excavating in October (Tulufan et al., 2019).

Besides the excavation reports finally published after sixteen years, the research on Yanghai site never stopped. The pottery type, chronological sequence, plant remains, musical instruments, wooden objects, horse harnesses, clay adobe, glass bead, physical anthropological feature, textiles, animal DNA, and so on have been studied since then (He, 2005, 2006; Liu et al., 2006; Jiang, 2006, 2008; Jiang et al., 2007; Li, 2009; Luo, 2009; Zhang et al., 2009; Yang et al., 2010; Ma et al., 2011; Akber, 2012, 2015; Si et al., 2013; Beck et al., 2014; Kramell et al., 2014; Li et al., 2017; Lu, 2017; Lv et al., 2017;

Schröder et al., 2016; Xin et al., 2017; Zhu, 2018; Palidan, 2019).

3. Findings

In different tombs, the bodies are found in various positions. There are supine with bent limbs, burials on their side with bent limbs, burials on their side with extended limbs, and reburials. The grave goods are mostly for daily use, placed near the head of the tomb occupant; some are also found along the body side or below the feet. The burial implements include wooden couches, straw mattresses, and woolen textiles (could be blankets and carpets initially). The tomb openings are covered by a horizontal beam, on top of which are reed mats, camel thorns, and some other plant material.

3.1 2003 season

The tombs are distributed in three sections, Nr. I section has 218 graves, Nr. II has 223 tombs and Nr. III has 80 tombs.

Section Nr. I is located on the west; the north-south length is 350m, the east-west width is 45m, and the total scale is 15,750 m². Nr. II is situated to the east of Nr. The length is 300m, the width is 80-100m, and the scale is 25,800 m². The Nr. III is located to the south of Nr. II, the length is 150m, the width is 100m, and the scale is 15,000 m².

The grave goods are in the detailed table (Nr. I section: Table 6; Nr. II section: Table 7; Nr. III section: Table 8) and figures (Figure collection 5.1.3.1-2).

3.2 2006 season

There are eight tombs in Nr. I Section. The grave goods are in the detailed table (Table 9) and figures (Figure collection 5.1.3.1-3).

4. Age

4.1 Relative Age

According to the tomb description, the Yanghai tombs can be divided into four types: A, oval vertical shaft tomb; B, rectangular shaft tomb with two layers; C, rectangular

vertical shaft tomb; D, vertical tombs with a side chamber; and correspondingly divided into four periods: 1, 2, 3 and 4. The graves in section Nr. I are mainly type A and B, tombs in Nr. II are mainly type C, while the burials in Nr. III are mainly D type. The detailed distribution can be seen in Table 10.

Even though so many tombs are found in Yanghai, there is no apparent disturbance between different types. Therefore, the relative date conducting can only be defined by the grave goods and the tomb type. Type A can be characterized by Period 1; there are fewer pottery objects, especially the painted pottery. At the same time, the bronze items contribute more; for example, the bronze axe with gift eyes (管銚铜斧) and the bronze knife with arc back and ring handle(弧背环首铜刀), those can be only found in type A tombs. These two bronze items are primarily found in the northern grassland culture, dated between the end of Shang (ca. 1600-1046 BC) and the beginning of Zhou (ca. 1046-256 BC). This type could be firstly defined between 12-11th BC. Type A tombs are situated southwest of Section I.

Type B tombs are primarily found in the central south of Nr. I Section and can be characterized into Period 2. More bone check pieces are found in type B tombs, and the check pieces are made in animal head shapes like the horse, which is thought to belong to the pre-Scythia time (10-8th cc. BC). In the meantime, the bronze gag bit with double rings and the complex bow with a single arc found in type B tombs are also thought to belong to the 8th century BC in the central Asian style. So, the possible date could be between the 10th and 8th century BC.

Type C has the most number of types; this type can be found in most Nr. II Sections, northern section I and southern Section III, can be characterized into Period 3. Its shaft pit has been found from other earlier excavated sites in Turfan Basin, and the shaft pit tombs are earlier than the shaft tombs with side chambers. Painted pottery vessels are abundant, some with triangle patterns and variants of triangle patterns with whorls.

Type D tomb is characterized by Period 4, the items with Han Dynasty elements started

to increase, like the wooden cup with the ear (耳杯) and the pottery jar with string patterns. In addition, there is one tomb found in Section I in 2006, unearthed with the written documents showing the time is around 433 AD (“北凉缘禾二年高昌郡高宁县赵货母子冥讼文书”).

The number of grave goods from different tombs is abundant, but there is no fixed grave-good combination, so we can only define its chronology by the shape, pattern, technique, etc. Nevertheless, the results suggest that type A tomb is in the earliest phase, which belongs to Period 1, and then type B (Period 2), type C (Period 3), and type D (Period 4). The classification of the grave objects can be seen in Table 11.

The sequence of four tomb types can be seen as A→B→C→D, so type A is the earliest type while type D is the latest. Viewed from a larger perspective, type C tombs coexisted with type B and D tombs for several time. All three sections of the site started from the south and stopped when they reached their northern edge. Periods 1 and 2 belong to the Bronze Age, period 3 belongs to the Iron Age, and period 4 belongs to Han Dynasty and after Han.

4.2 Absolute Age

The radiocarbon dating technology has dated 46 samples, and the details can be seen in Table 4⁷. According to the radiocarbon dating result, the absolute time range of Yanghai site is 1261-49 BC (Lv et al., 2017). Combining with the sub-phases of Yanghai, the four different periods are: 13-11th BC for period 1, 10-8th BC for period 2, 7-4th BC for period 3, and 3rd-2nd BC for period 4.

5. Interpretation

5.1 Grave goods

Pottery, wooden objects, and woolen textiles are the most common grave goods from most tombs. Bronze tools and weapons are thought to be used by men for production and fighting. Some tombs are found with goat/sheep skulls, while some even with a

⁷ According to my calibration result, the time range would be 1147 BC-41 BC; this can also be seen in Table 4.

whole goat/sheep, horse, or other animal parts, while the food remains are relatively few. This might indicate their development of animal husbandry while the lack of agriculture.

Jar, cup, and jug are the most numerous ceramic objects; handles are the most typical feature; the upright and side handles are found in most jars and cups, with one or two handles. Some handles are shaped like a mountain goat/sheep's head. In the meantime, painted pottery is abundant, while most have black designs on a red background; some are shown with composite designs in black, white, and yellow colors.

The most found wooden objects are buckets, bows, spinning wheels, (shallow) bowls, plates, cups, combs, whipsticks, and wooden sticks. Most of the buckets have continuous patterns of triangles on the outside of the rim around the opening at the top; some of the buckets have triangular patterns from *lithospermum officinale* seeds pasted around the outer edges of the opening. At the same time, the surface is painted with animal patterns, including mountain goat/sheep, horse, wolf, tiger, dog, camel, red deer, bird, etc. There are a lot of wooden sticks found in the tombs, and some are quite large with one sharp point end. This type of wooden stick might be used for striking the ground, especially when choosing the location of the tomb in the cemetery; the wooden sticks can be knocked around the four corners of the grave. Some smaller wooden posts are found with the textile so that they might be used as the needle. A wooden stick between 40-50cm might be used for the meat cooking. In addition, the fire-making plank is also unique in Xinjiang; this type of complex tool is usually placed in the arrow bag and is mainly used by the hunting man who needs to go out frequently.

The bronze objects are mostly found with a ring-handled knife, long axe, straight axe, horse gag bit with two holes, knife with a straight handle, bronze buttons on the bridle, bronze ornament in cowry shape strap fittings.

The lithic findings include millstone, pestle, ball, and so on. The iron objects include knives and gag bit. There are few golden and silver objects, which are mostly used for

ornaments. The bone and horn objects are primarily found in the comb, cup, check piece, arrowhead, tube, and button. Cowry is another mainly founded remain, and most are used for head ornament. Baskets, leather goods, felt objects textiles for clothing have also been found in some tombs, even though most are fragments because they are hard to preserve. In addition, saddle, ceramic-tipped blowpipe, clay figurines, leather armor, and grapevines are also found on this site.

5.2 Subsistence

The abundant finds of woolen textiles, animal patterns, complete sets of equipment for riding, and archery represent that animal husbandry and hunting are the primary modes of production. While the tools production and rich remains of textile also indicate that, with the development of animal husbandry, the handicraft industry in Yanghai also developed with the rising of husbandry. The studies on the Yanghai pants from M21 in Nr. I section have revealed that the production of the trousers with crotch is specially made for someone special, according to his/her body size, and the design for the crotch is particularly for horse riding (Beck et al., 2014).

The patterns on the Yanghai woolen textile displayed various images, like the line, broken line, grid, sawtooth, diamond-shaped, and so on. Combining multiple patterns and producing techniques also shows a bidirectional influence from central China and Siberia.

At the same time, they also planted small plots of wheat, barley, and millet; vegetables, grapes, and other plants (like cannabis) are also grown on their land. While some plants are used for daily diet, some may be utilized for ritual/medicinal purposes (Jiang et al. 2006). From another perspective, ancient Yanghai people believed in Shamanism, their burial grounds located beneath the highest peaks of the Huoyan (Flaming) Mountain, the practice of skull perforation and tattoo, and the utilization of cannabis may also prove that.

5.3 Summary

The Turfan Basin is a complete and independent geographical unit that has been carried out a series of archaeological works. Before Yanghai site, Subeixi is thought of as the earliest archaeological culture in this oasis depression, distributed over all of Turfan Basin. Subeixi culture is characterized by shaft-tomb and tomb with a side chamber; the typical grave goods are the pottery jar and jug with triangles, twisted triangles, and whorled patterns. While taking this standard to compare Yanghai, only Period 3 and 4 objects are shown with Subeixi elements, so in general, Yanghai is way much earlier than Subeixi culture.

The artifacts consisting of equine equipage, bronze weapons, and animal patterns are known as the “three Scythian essentials,” while these three essentials have been seen in Yanghai site. Animal elements can be seen everywhere in Yanghai site, regardless of animal patterns from the daily used items to the ovicaprid heads or other parts found in the burials. Few accompanying horse pits may indicate the use of the horse for transportation has appeared in the later period.

The Yanghai site is divided into four periods that experienced four stages of gradual evolution: origin, development, prosperity, and decline, during which it established a complete cultural system. From the origin stage, a small group of Scythians might come from southern Siberia firstly settled down here (Xu, 2015; Tulufan et al., 2019) and then started their life in the neighboring region. The native cultural system adopted their culture, and that is when Yanghai culture developed and prospered. With the rising and movement of Xiongnu, the oasis region was affected by the outside nomadic; in the meantime, people who lived in the western Hexi corridor also started moving westward; the outcome can be seen from the Yanbulake pottery with the Siba culture elements. This movement is also shown in Yanghai culture.

There are still no similar Yanghai type A and B tombs found in Turfan Basin, while the similarity appeared in Yanbulake culture to the east and Chawuhu culture to the west. The parallel with Yanbulake culture also shows in the double-handled Jar. Compared with Chawuhu culture, similar bronze harness, knife, pottery type, and patterns are

apparent; the bronze knife with ring handle is also primarily found in the northern grassland culture. Similar wooden buckets, boomerangs, and combs can be seen in the Zaghunluq culture to the south. In addition, the musical instrument Harp (Kong Hou) found all over Xinjiang may originate from Asia Minor or Mesopotamia.

Before Yanghai site, Subeixi culture is thought to be the Early Iron Age culture, while the results from Yanghai may reassign Subeixi as a Bronze Age culture. Furthermore, the connection with Yanbulak and Chaewighul cultures may have revealed the early cultural communication in the Bronze Age Eastern Xinjiang.

1.3.2 Subeixi Site

1. Location

Subeixi site is in the Subeixi village in a small oasis to the north of the Flaming Mountain (Huoyan Shan) in the Turfan Basin, and it's under the control of Tuyugou Township, Shanshan County (Fig. 5: 16). The site lies in the center of Flaming Mountain, 3km south of Subeixi Village. It is on an irregular terrace which is surrounded by cliffs. The site is scattered with stone artifacts, pottery sherds, woolen textile fragments, and adobe wall foundations (Xinjiang et al., 2002).

Turfan is in the Warm Arid Temperate zone. Although summer and winter represent distinct wet and dry seasons, this area receives the lowest precipitation in China, mainly dropping to an annual total between 15 and 50 mm. Due to the extremely low precipitation counts, all months are usually dry. The seasonal temperature amplitude exceeds 70°C (Domorös and Peng, 1988). This area often experiences windstorms, causing severe wind erosion on the surface.

2. Research History

The first excavation was conducted in 1980 by the Turfan Prefectural Museum and Turfan Institute of Cultural Relics. Eight tombs were excavated, and then the report was published in 1984 (Turfan, 1984). In 1985, the phenomenon of tomb robbery started,

and the Tuyugou gully was robbed. The estimated robbed tombs are over fifty; the Turfan Institute of Cultural Relics did some salvage field survey, and they collected several grave goods from the Subeixi site (Turfan, 1988).

In 1988, Turfan archaeological survey team carried out a clear field survey in this area, and they named the house site, Nr. I and Nr. II cemetery (Xinjiang et al., 1988), and the excavation report of Nr. I cemetery was published in 1993 (Xinjiang, 1993). In 1991, the road construction found another tomb body, so the third cemetery in the Subeixi area was found and then named Nr. III cemetery (Xinjiang et al., 1994). In 1992, the Xinjiang Institute of Cultural Relics & Archaeology re-excavated three house sites (east of Nr. III cemetery), Nr. I and Nr. III cemetery and the general excavation report were published in 2002 (Xinjiang et al., 2002).

Since the first excavation of the Subeixi site, the importance of this unique archaeology culture has been noticed by Chinese archaeologists. In 2001, Chen named “Subeixi Culture” for the first time (Chen, 2001), and then this culture was extensively discussed. Most discussions are focused on the relationship between this site and other sites in this area, including the typology, dating, origin, developments, etc. (Chen, 2002; Han, 2007; Guo, 2012; Shao, 2012;). At the same time, food remains, ancient recipes, and milk products from the Subeixi site have also been studied (Yiwen et al., 2010; Chuan et al., 2011; Chuan et al., 2012; Anna et al., 2013).

3. Findings

About 600m north of the house site is Nr. I section, and it has two sections: the east section has twenty tombs while the west has thirty-two. Nr. I section covers more than 15,752m² (Fig. 5.1.3.2-1). Nr. II section is located west of the Subeixi village, about 500m. Nr. II is on the front terrace of Flaming Mountain, and there are more than thirty tombs found here; most of the tombs are on the northwest platform, and the rest are found on the ridge on the southeast. Nr. II cemetery covers around 45,750m². The Nr. III section is on the terrace, about 80m west of the house site. There are thirty tombs excavated from the site, and it covers 700m² (Fig. 5.1.3.2-2).

3.1 1980 season

There are eight tombs have been excavated, named 80SASM1-8. The details can be seen in Table 12, and the grave goods can be seen in Fig. 5.1.3.2-3~5.

3.2 1985 Season

Due to the grave robbery, the Turfan Institute of Cultural Relics only did the field survey on the northwestern terrace and collected fifty-four objects, naming 85SASM: 1-54. The details can be seen in Table 13 and Fig. 5.1.3.2-6. Several collected pottery pieces and human bones were found in 1988 (Fig. 5.1.3.2-7). The overall findings belong to Nr. II cemetery.

3.3 1992 Season

1992 Season excavated the house site, Nr. I and Nr. III cemetery.

The house is located on the terrace between the Tuyugou River and the gully. There are three house sites (Fig. 5.1.3.2-8).

F1 is composed of three single rooms. The north and south walls are parallel. The north wall length is 13.6m, the south wall length is 13.1m, and the width is 8.1m. The rooms are rectangular, and the walls are made of mud and grass. In the west room (7.25m long, 5.25m wide), there is one round utilization, its height is 26cm, and the surface is plastered with grass mud. There are five round pits on two sides, the diameter is 50cm, and the depth is 16-42cm. The middle room is 7.4m long and 4.4m wide, there is one mud platform on the northern side, and the height is 40cm. Each northwest and northeast wall has one round pit; on the southeast corner is an underground tunnel going through the wall to the east room. There is a round stove on the east side of the door, the diameter is 80-35cm, and the height is 20cm; several ashes are found inside. There is one pillar hole on the central, the diameter is 40cm, and the depth is 31cm. There is one square pool on the southwest corner of the Eastern room, plastered with mud, the scale is 120cm², and the height is 40cm. On the south of the pool, there is one irregular open,

which might be a pottery kiln; there are two pillar holes on the central ground, and one round pool, whose diameter is 224cm, and the height is 82cm, divided by adobe clay into two even part. There are two rectangular pools on the east side, Nr. 1 pool is 133cm long and 90cm wide, Nr. 2 pool is 98cm long and 85cm wide; there are three round pits on the northern wall. In front of the house is a rectangular open space, which might be a plaza, the length is 11m, and the width is 8m on the east, and west sides are 8 round pits, no burial goods are found (Fig. 5.1.3.2-9~10).

F2 is found on the southern side of the site; few walls remain. Several pits are located on the two sides.

F3 is found on the northern side of the site. According to the mountain arc, the north wall is built, and there are three rooms; some adobe clay pieces are found outside the north wall, which might be the wall standing.

In addition, there are three artificial roads found on the terrace, named D1-D3; two routes are in front of the river, 70cm wide, could be used for water taking; another one is flat and wide, it is the only way to go up and down.

In Nr. I cemetery, five tombs are excavated, named 92SASM9-13 (1993, 2002). The details can be seen in Table 14 and Fig. 5.1.3.2-11~13.

As for the Nr. III cemetery, three mummies are found during the construction work between Subeixi village and the 312 National Road. Then Xinjiang Institute of Cultural Relics & Archaeology and Cultural Relics and Turfan District Museum started the excavation (1994, 2002). Thirty tombs are excavated, named 92SASM1-30. Regarding the overlap on the name, we will use the 92SASIIIM1-30 to differ from Nr. I cemetery, the details can be seen in Fig. 5.1.3.2-14~18.

4. Age

4.1 Relative Age

There are two main tomb types in the Subeixi site: vertical shaft tomb and vertical shaft tomb with side chambers. There is no disturbance between the two types, and the orientation is almost the same so that the cemeteries could have been planned, and there might be a sequential order when burying.

According to the chronology from neighboring areas, the shaft tombs are earlier than those with side chambers. Most of the vertical shaft tombs are found in Nr. III cemetery, while the side chamber tombs are located in Nr. I cemetery, so the Nr. III cemetery is relatively earlier than Nr. I cemetery. The pottery sherds show similar features to the grave goods found in Nr. III cemetery, which may indicate the same relative age.

In the Subeixi site, the iron object is one noticeable grave goods type found in the tombs; according to the pottery and iron type, the general age of the Subeixi site is between 5th–3rd century BC, which, in Chinese chronology, is between the Warring States Times and Han Dynasty.

4.2 Absolute Age

There are six radiocarbon dating results, two were published in 1991, and four were published in 2002. The details can be seen in Table 4. According to the radiocarbon dating result, the time range of the Subeixi site is 530~330 BC.

5. Interpretation

5.1 House Site

There are living remains found in the house sites, including one pottery kiln and some utilizations. This indicates the local pottery making. Some food remains are located in the pottery and house, and from the grave goods, they might have already started their agriculture. The house is half underground, and three artificial roads go up and down to the terrace, which means that the Subeixi people have planned this living place: they live in the house, make their pottery ware, and feed themselves. In addition, the living area is not far away from the cemeteries, so this might be a residing settlement that had lasted for a certain period.

5.2 Tomb Tradition

The abundant grave goods and complete mummy found in Nr. I and III cemeteries indicate the Subeixi handicraft and agriculture industry development. Pottery bowls are the mostly findings in the tomb and the jar and basin. The wooden objects are mostly wooden plates, wooden bowls, wooden spoons, and wooden fire-making sticks; some objects are found with meat pieces inside. The millstone and grinding stone are also found in some tombs. All these mostly found grave goods are related to food cooking or preparation. Most of the pottery wares are painted pottery, with red coating and black patterns; the patterns are triangular, swirl, and grid patterns. The wooden bow & arrow, the leather arrow bag, and the harness found in the tomb indicate that hunting and animal utilization are also part of their lives.

Many woolen fabrics also indicate the development of the animal industry, at least goat/sheep husbandry (Hong et al., 2012). The millet bread (Anna et al., 2013) and grass-seed-necklace also indicate the plant used in the daily recipe and even in the medical aspect. The food processing revealed by proteomics indicated that barley was not only cultivated in Turfan at 500-300 BC (Gong et al., 2010) but already is a common staple food component. In addition, the found of domesticated cereals in Subeixi also indicate the interaction route passing Turfan Basin (Gong et al., 2010).

The dry climate helped preserve the mummy, and so did the clothes. Different leather and woolen clothes have provided excellent references to ancient Xinjiang clothing. On the other hand, the dry climate also helped preserve the paintings on the body: in tomb M2, which has been destroyed, the male body is found with several string patterns on the forehead, and it is not a tattoo; this could be some specific actions when they bury the body, and they will paint on the face. In addition, some makeup lithic tools are found in small leather bags, and some are identified as eyebrow stones. Together found with the eyebrow stones are comb, dyed material in black, white, and red, the bronze mirror and iron hairpin indicate the makeup or the trousseau spirit developed in Subeixi.

5.3 Summary

Subeixi site is a settlement composed of sites, cemeteries, houses, and pottery workshops. It is a complete settlement that lasted for a certain period (between 5th~3rd century BC). The inhabitants of Subeixi had their subsistence strategy, they baked the bread, raised the animals, took the wool and leather, and made their clothes, and when they died, they had their unique burying traditions. It is an independent settlement and an essential foothold for those who are traveling from east to west or west to east. The similarities of Subeixi goods and other nearby sites' objects become a great prehistory culture in Turfan Basin, contributing to this depression as a habitable oasis in the Gobi Desert.

1.3.3 Yu'ergou Site

1. Location

Yu'ergou site is situated in the Dabancheng District of Urumqi City, about 300km to the south of Urumqi. It is located on the western edge of the Turfan Basin, also on the meeting point of Aierigou (which flows from north to south) and Alagou River (which flows from west to east) (Fig. 5: 17). The site is located on the floodplain, and the scale is 200m wide and 400m long.

Due to the location in Turfan Basin, the climate of Yu'ergou can be characterized as a typical continental arid climate in the Warm Arid Temperate zone; in total, summer and winter represent a distinct wet and dry season, this area receives the lowest precipitation in all of China which mainly drops to the annual capacity between 15 and 50 mm. Due to the meager totals of rainfall, usually, all months are dry. As a result, the seasonal temperature amplitude is above 70°C (Domorös and Peng, 1988). In addition, this area often experiences windstorms, which cause severe wind erosion on the surface.

2. Research History

Yu'ergou District was developed during the 1960s; several significant factories and mining areas were built here; until the flood disaster in 1996, most of them moved out

of this district. In 2008, before the Turfan-Kuche multiple-track railway construction work, Xinjiang Institute of Cultural Relics & Archaeology, Urumqi Institute of Cultural Relics, and Tuokexun Institute of Cultural Relics excavated this area. The excavation report was firstly published in 2011 (Xinjiang), and then the combination report of Yu'ergou and Alagou was published in 2014 (Xinjiang).

Due to the location and the similarity to the Subeixi site, Yu'ergou has been characterized as Subeixi Culture (Shao, 2012; Jiang et al., 2013). Besides the belonging of the cultural content, the botanical investigation and radiocarbon dates have also been discussed (Jiang et al., 2013).

3. Findings

Yu'ergou site consists of two areas: northern and southern. The north part is on the second terrace of the Yu'ergou River; there are many huge boulders and very little vegetation nearby because of the floodplain. There are three house remains and stone walls found in the northern part. The southern part is on the second terrace of the Alagou River; the environment is similar to the north part. There are more house remains left than in the north. The 2008 season yielded three house sites, five rows of stone walls, and three tombs.

3.1 House and Wall Remains

The stone walls are found in the center of the site, built by large boulders. Two rows of the walls are laid from southwest to northeast, and three rows of the fence are laid from southeast to northwest. The longest wall is 70m long, the width is 0.5-1.2m, and the remained height is 0.2-0.8m. A few pottery sherds are found with the stone walls, while there are no cultural layers near both sides of the wall (Fig. 5.1.3.3-1).

The houses are numbered F1, F2, F3. F1 is located on the western part of the site, the length from north to south is 20m, and the width from east to west is 10m. Four rooms are remaining, named F1a-d, the house walls are broken, the remained width is 0.7m, and the height is 1m. F1 is built by boulders, not mud-plastered. Many pieces of pottery

sherds are found in F1 (Fig. 5.1.3.3-2).

F2 is located on the eastern part of the site, and it is a combination of surface structure and half underground structure; the lowest amount is under the surface 100cm. F2 is 13m long from north to south and 10m wide from west to east. There are four rooms, named F2a-d. The remaining house walls are 0.4-0.6m wide and 1.2m high. They are also built with boulders, not mud-plastered. Many pieces of pottery sherds are found in F2 (Fig. 5.1.3.3-3).

3.2 Cliff Painting

Several cliff paintings are located on the rocks on the northwestern part of the site. There are eight paintings found on 6 giant boulders (Fig. 5.1.3.3-4).

3.3 Tombs

There are three tombs excavated in the 2008 season, named M1, M2, and M3.

M1: It has been robbed on the edge of the terrace. Some stone implements are on the surface; under the boulders is the round tomb chamber. The orientation is 122°, diameter is 0.24m. Seven layers of boulders construct the chamber wall, and the chamber opening is covered by one layer of wood, and then a layer of the boulder and a layer of grass above the wood layer. There are two complete human skeletons found on the north, supine, head to the northwest. There are disturbed human bones found in the tomb chamber, which could belong to eleven individuals. In addition, there are two sheep/goat skulls and twelve grave goods, including bronze earrings and pottery wares found in the tombs chamber (Fig. 5.1.3.3-5).

M2: located on the southeast edge of the terrace. Some stone implements are on the surface; under the boulders are three chambers named M2A-C. M2A is under the large stone implement; the orientation is 127°, the opening length is 3.25m, the width is 2.54m, and the depth is 2.65m. Ten layers of boulders construct the chamber. There are six individuals found in M2A, including one teenager. Several thin poles are also found

in the chamber. In addition, there is one pottery cup and one sheep/goat jaw found in M2A. M2B is outside the stone implement, rectangular, the orientation is 122°, the length is 2.4m, the width is 1.26m, and the depth is 0.47m. There are sixteen individuals found in M2B. In addition, bronze objects, bone objects, wooden wares, and pottery wares are also found in M2B. M2C is on the west side of M2A, oval; the orientation is 125°, the diameter is 0.3-0.4m, and the depth is 0.4m. The chamber opening is one giant rock. Only one infant is found inside, with one shallow wooden bowl found on the belly (Fig. 5.1.3.3-6).

M3: The construction work in the north destroyed it; only half the chamber remained. The stone implements on the surface might be rectangular according to the remaining left. Under the boulder is the tomb chamber, round-rectangular, the orientation is 130°, the length is 3m, the width is 2m, and the depth is 2.5m. There are three poles left in the chamber; above the poles is one piece of rock. At least five individuals with many kinds of grave goods are found in M3 (Fig. 5.1.3.3-7).

4. Age

4.1 Relative Age

Many painted pottery sherds indicate the relative late time in the whole Subeixi culture. Also, the amount of bronze and iron objects shows the development of the metal casting industry. Therefore, compared with other nearby sites like Alagou and Subeixi sites, the relative age of Yu'ergou could be the late phase of Subeixi culture, about the Spring & Autumn period in Chinese chronology.

4.2 Absolute Age

Three samples are dated by the radiocarbon method, and the calibrated dates are around 550-350 BC. The details can be seen in Table 4.

5. Interpretation

The house sites are found in relatively good preserved condition. Each house consists of several independent rooms, with some fireplace, stove, and pole holes remaining inside

the room, so the usage of the house could be in multiple ways. Most houses are built by the boulders that could be found next to the river, so they have considered when choosing the living area.

The archaeobotanical analyses (Jiang et al., 2013) indicate that Yu'ergou people had crop processing and plant storage skills. The plant remains found inside the grave goods may represent the storage products and display the offering to another world. Even though there is not much evidence of the spiritual actions at other sites like the Subeixi site, the tomb offering could also lead to this possible action.

The Yu'ergou district is one crossroad in ancient Xinjiang. The Alagou Valley is one essential point alongside the main routes of the Silk Road. As the meeting point of different rivers, Yu'ergou could be a critical settled down place during the interaction between the east and west. Combining with the date of this site is between Spring & Autumn period, this could be an essential communication point much earlier than the official beginning of the Silk Road in the Han Dynasty.

1.3.4 Alagou Site

1. Location

Alagou Site is located in the Nanshan Mining District of Urumchi City, about 300km to the south of Urumqi, close to the Yu'ergou site (Fig. 5: 17). It is situated on the meeting point of Aiweiergou (which flows from north to south) and Alagou River (which flows from west to east).

Due to the location in Turfan Basin, the climate of Alagou can be characterized as a typical continental arid climate in the Warm Arid Temperate zone. In total, summer and winter represent a distinct wet and dry season; this area receives the lowest precipitation in China, mostly dropping to an annual capacity between 15 and 50 mm. Due to the meager totals of rainfall, usually, all months are dry. The seasonal temperature amplitude exceeds 70°C (Domorös and Peng, 1988). This area often experiences

windstorms, which cause severe wind erosion on the surface.

2. Research History

Between 1976 and 1978, the construction work of the South Xinjiang Railway dug out several ancient relics remain. Hence, the Archaeological Team of Xinjiang District Museum excavated in the eastern Alagou River and Yu'ergou Station. Eighty-five tombs are excavated in all, while four have shown unique features, named Alagou Type. The excavation report of these four tombs was published in 1981 (Xinjiang, 1981). In 1986, during the construction work of Alagou Water Station, some ancient objects were dug out, and then the Turfan Institute of Cultural Relics excavated this area again. Unfortunately, most of the tombs have been destroyed, only some tomb graves were found, and the report was published in 1991 (Tulufan, 1991). The radiocarbon dates were published in the same year (CASS, 1991)

After the excavation of Alagou and Yu'ergou, because of the nearby location and similar tomb graves, these two sites have always been discussed together, and they were both characterized as one phase of Subeixi Culture in Turfan Basin (Shao, 2012; Jiang et al., 2013; Xinjiang, 2014).

3. Findings

3.1 1976 Season

There are four tombs excavated in 1976: 76WYM18, 76WYM19, 77WYM30, and 77WYM31. All tombs are shaft pits with wooden structures. The report only provides detailed data on two tombs: M18 and M30.

76WYM18 (Fig. 5.1.3.4-1): Rectangular shaft pit with stone implements on the ground, the implement is 0.5m high above the ground, and the diameter is 5.5m; with a circle of rectangular boulders outside, the length is 24.5m, width is 11m. The tomb chamber is under the stone implements; the length is 3.2m, the width is 1.6m, and the depth is 6.1m. The stratigraphic sequence includes: Topsoil, a layer of sand, then sand gravel; the boulder layer is under the sand gravel, the height is 3m, and then the bottom is a layer of

the giant rock, each rock is around 1m long/wide/thick. The wooden structure is found at the bottom of the tomb chamber; five rows of pine poles are made in a rectangular shape by tenon-and-mortise skill. Above the saturates are one layer of lumber, a layer of the wooden board above it, and the reed grass on top, making the wooden structure an outer coffin.

77WYM30 (Fig. 5.1.3.4-2): The surface stone implements had been destroyed. The tomb chamber is rectangular; the length is 6.56m, the width is 4.22m, depth is 7.1m. The stratigraphic sequence includes a layer of sand, which is 1.6-2.2m high, under the wooden structure. Thus, eight layers make the wooden structure of pine poles, and the structure is 1.72m wide, 5.66m long, and 0.8m high; this structure is supposed to be an outer coffin. One female skeleton is found in the tomb chamber, with one drilled hole on the forehead, and the hole diameter is 0.5cm.

3.2 1986 Season

Three tombs were excavated in the 1986 excavation season; all are rectangular shaft pits. Due to the construction work, there is no more detailed information on the tomb feature; the 1991 report only provides the grave goods information (Fig. 5.1.3.4-3).

4. Age

4.1 Relative Age

The findings of golden, silver, and lacquer objects indicate that the Alagou site was in a time phase when the metal industry had been developed. Especially the lacquer plate, which is similar to the lacquered object found in Mawangdui Tomb in Hunan Province, the pattern was also popular between Warring States Time and Han Dynasty. In addition, the pottery wares' feature also corresponds to the pottery type in central China during Warring States —Western Han Dynasty.

4.2 Absolute Age

There are seventeen samples dated from the Alagou site, while two samples were taken from one of the four tombs excavated in the 1976-19777 season (M30-1 & 2), so we

could only use these two data for further interpretation (Table 4), and the absolute date could be between 395-90 BC (CASS, 1991).

5. Interpretation

The tombs found in Alagou have shown a significant number of different kinds of grave goods. Taking M30 as an example, the golden objects are the most; silver objects, bronze ware, lacquerware, silk fabrics, pearl, and agates are also found in M30. As for the other three tombs, even though they have been robbed or destroyed, there are still several golden foil pieces found in the filling soil, indicating that the other three grave goods have large amounts of metal tomb offerings. Therefore, we may assume that the tombs found with precious metal and lacquer objects belong to the people from the tribe or settlement with a higher hierarchy. Also, the giant rock boulders found on the ground prove that the identities of the four tombs are not regularly ordinary people, while they cannot afford such large rock boulders as the tomb implements. The horse and goat/sheep skeletons may indicate the elopement of the animal husbandry during that time; the iron knife may also prove that.

The close location with Yu'ergou and similar time phase indicate that these two sites could belong to the same culture once developed here. According to the pottery types and patterns, these two sites could be the late phase of the Subeixi culture in the Turfan Basin. Moreover, the location of these two sites is on the meeting point of different rivers, so they could have played an essential role in the interaction between the east and west before the official beginning of the Silk Road.

1.3.5 Sangeqiao Site

1. Location

Sangeqiao Site is located in the Sangeqiao Village, Lukeqin Town, Shanshan County in Turfan Basin in Eastern Xinjiang. The site is found on the Gobi Desert terrace on the southern oasis. This site is close to the Yanghai site to the east. (Fig. 5: 19).

Due to the location in Turfan Basin, the climate of Sangeqiao can be characterized as a typical continental arid climate in the Warm Arid Temperate zone; in total, summer and winter represent a distinct wet and dry season, this area receives the lowest precipitation in all of China which mostly drops to the annual total between 15 and 50 mm. Due to the meager totals of precipitation, usually, all months are dry. The seasonal temperature amplitude exceeds 70°C (Domorös and Peng, 1988). This area often experiences windstorms, causing severe wind erosion on the surface.

2. Research History

The 1988 Xinjiang Archaeological Survey found this site (Xinjiang et al., 1988), and then this area was robbed. In 1990, the Xinjiang Institute of Cultural Relics & Archaeology, Turfan District Museum, Shanshan Cultural Relics Bureau, and the History Department of Xinjiang University carried out the salvage excavation; the excavation report was published in 1997 (Xinjiang et al., 1997), and 2002 (Xinjiang et al., 2002).

After the excavation, scholars characterized the Sangeqiao site as part of the Subeixi Culture due to the similarity of the grave goods and the location (Han, 2007; Shao, 2012).

3. Findings

The 1990 season has yielded twenty-seven tombs and six animal pits, naming as 90SASM for tombs and 90SASK for the animal pits.

M5: rectangular shaft pit, the orientation is 260°, the length is 1.94m, the width is 1.3m, and the depth is 1.98m. The northern wall has been destroyed. Some horn cups, leather objects, painted pottery pieces, and woolen fabrics are found in the filling soil.

M9 (Fig. 5.1.3.5-1): oval shaft pit, the orientation is 247°, length is 2.25m, width is 1.12m, depth is 1.05m. Two individuals are found in the tomb; on the south side is a child, supine straight, on the north side is a 25-year-old female, side flexed. *M9* has

been robbed. Some pottery wares, leather objects, iron objects, and wooden pieces are found in the filling soil.

M13 (Fig. 5.1.3.5-2): shaft pit with a side chamber, the orientation is 260° , the main chamber length is 2.1m, width is 1m, depth is 1.45m, the side chamber is on the north of the main chamber, the length is 1.5m, height is 0.54m, depth is 0.44m. there are three individuals in M13, all head toward the west. On the south side is one 50-year-old male, supine straight; in the middle is a 30-year-old female; in the northern chamber is one 50-year-old female, secondary burial. M13 has been robbed. Many grave goods are pottery wares, woolen fabrics, wooden sticks, etc.

M18 (Fig. 5.1.3.5-3): Catacomb in knife shape. The passage to the chamber has four stairs, and the length is 3.46m, the width is 0.65m, the depth is 2.2m; the paved path is 0.18m long; the tomb door is rectangular, height is 1.12m, width is 0.6m; the chamber length is 2.34m, width is 1.28m. There is one wooden couch in the chamber, covered with a reed sheet. There are several silk fabrics and pottery wares found in the filling soil.

K21: round shaft pit, flat base, the diameter is 1.36m, depth is 0.32m. Several horse bones are found.

M23 (Fig. 5.1.3.5-4): round-rectangular shaft pit, the orientation is 273° , the length is 2.1m, width is 1.16m, depth is 0.88m. M23 has been robbed, with only some pottery sherds and textile fabrics left in the chamber.

K30 (Fig. 5.1.3.5-5): round shaft pit, flat base, the diameter is 1.3m, depth is 0.5m. One broken horse skeleton is found in K30.

M35 (Fig. 5.3.1.5-6): oval shaft pit with a side chamber, the orientation is 70° , the main chamber is a flat base, the length is 1.95m, width is 0.92m, depth is 1.4m; the side chamber is on the south, the length is 1.92m, height is 0.54m, depth is 0.56m. There is

one 16-year-old female found in M35, supine straight. There is one broken wooden outer coffin found in M35. One pottery bowl and one pottery jar are found in M35.

The rest grave goods can be seen in Fig. 5.1.3.5-7.

4. Age

Unfortunately, there are no radiocarbon data from the Sangeqiao site, so we can only assume the absolute date of the Sangeqiao site by the grave goods and burial traditions. The tombs in Sangeqiao can be divided into two types: type A is an oval shaft pit, and type B is a shaft pit with a side chamber/catacomb.

According to the grave goods, the large percentage of iron and metal objects may indicate the widespread usage of the iron object, which narrowed the date to the Western Zhou—Han Dynasty. The pottery from Type A is more similar to the pottery wares found in Subeixi Nr. I and II cemetery, so type A in Sangeqiao site could be around Warrior States Period. In type B, the shaft pit with side chamber is more similar to the Astana and Alahezhuo site, around Jin Dynasty and Middle Northern and Southern Dynasties; the catacomb is more similar to the Tang Dynasty tomb burial. So, in general, type B of the Sangeqiao site is between Jin Dynasty and Tang Dynasty. (Xinjiang et al., 2002)

5. Interpretation

5.1 Burial Tradition

The tombs of the Sangeqiao Site can be divided into two types: Type A is mostly oval shaft pit, and Type B is mostly shaft pit with a side chamber/catacomb.

Type A has two subtypes: subtype I is the shaft pit grave including seventeen tombs (M2, 5, 6, 7, 9, 16, 22-25, 28, 29, 31-34, 36); II only has one tomb: M13, which is one shaft pit with side chamber. In addition, six animal pits belong to type A graves: K3, 14, 15, 21, 26, 30; the animal pits are found with animal bones like horses or camels, some are found with few felt and woolen rope fabrics.

Type B also includes two subtypes. Subtype I has four tombs (M17, 19, 27, 35) in a shaft pit with a side chamber. Subtype II consists of five tombs (M4, 10, 12, 18, 20); they are all catacombs in knife shape with slope passage.

The grave goods from Type A and Type B are different, indicating different time phases. Most type A tombs are found with multi-individuals, supine straight body, head towards the west; the six animal pits are located between the tombs, and they might be the offer sacrifice pit for those joint burials. The grave goods are mainly single-handled round-base painted pottery wares; the painted patterns are similar to the Subeixi painted designs. Some bronze and iron objects are also found in Type A tombs. In addition, there is one single-handled cup made of animal horn, which is unique. There are many woolen fabrics and leather products found in type A tombs. According to the grave goods, type A of Sangeqiao could belong to the second phase of Subeixi Culture (Shao, 2012). The hat found in M9 is also quite like the Subeixi hat, proving the similar time phase (Xin, 2015).

The grave goods of Type B are much later than Type A's, especially the silk and woolen fabrics; combined with the unique tomb chamber shape, and Type B may lead the date to Jin and Tang Dynasty (Xinjiang et al., 2002).

5.2 Summary

The location of the Yanghai and Subeixi sites indicates the close relationship with Subeixi Culture. Sangeqiao site completes the Subeixi Culture, which contributes to the chronology sequence of Turfan Basin. It shows that the oasis area has lasted before the Han Dynasty and until the Tang Dynasty.

1.3.6 Shengjindian Site

1. Location

The Shengjindian site is situated in the Shengjindian Village of Turfan City. The site is

found on the northern slope of the Huoyanshan Mountain (Flaming Mountain) and also on the eastern part of the Tianshan Mountains (Fig. 5: 20). The Shengjindian reservoir is located to the north of the site, and a river of snowmelt water flows east to west from the Tianshan Mountains through the reservoir. On the northern side of the reservoir is the Shengjindian Oasis, a part of the Turfan Oasis.

Due to the location in the Turfan Basin, the climate here can be characterized as a typical continental arid climate in the Warm Arid Temperate zone. In total, summer and winter represent a distinct wet and dry season; this area receives the lowest precipitation in China, mostly dropping to the annual capacity between 15 and 50 mm. Due to the meager totals of rainfall, usually, all months are dry. The seasonal temperature amplitude exceeds 70°C (Domorös and Peng, 1988).

2. Research History

Shengjindian site was firstly found due to the construction of 312 National Road, and the fieldwork was carried out in May 2006 by the Xinjiang Institute of Cultural Relics & Archaeology. In 2007, the construction team found the tombs on the south side of the road. Therefore, the official excavation started from October to November 2007 and in April 2008 by the Turfan Institute of Archaeology. The excavation reports were published in 2013 (Turfan, 2013; Xinjiang, 2013).

Shengjindian is located in the Tupan Basin. The cultural elements seem pretty similar to the Subeixi culture close by; scholars defined this site as part of the Subeixi culture in this region. After the excavation of the Shengjindian site, several unique features lead the research from different fields of the scholars, including the physical anthropological study on the individual health study (Li et al., 2013; Li, 2015; Zhang et al., 2020), archaeobotanical research (Liu et al., 2013; Li et al., 2015; Jiang et al., 2015), woolen fabric study (Chen & Zhao, 2018).

3. Findings

The site is located on the terrace of Huoyanshan Mountain's northern slope; the

distribution of the tombs can be seen in Fig. 5.1.3.6-1. There are thirty-one tombs yielded from Shengjindian Site, which can be divided into three types: A, B, and C. The tomb details can be seen in Table 15 and Fig. 5.1.3.6-2~7.

4. Age

4.1 Relative Age

Due to the absence of the tomb disturbance on the stratum, the relative time dating can only be conducted from the typology of the grave goods. Most of the grave goods are wooden items, leather and fur products, pottery wares, bronze items, iron objects, lithic tools, agate, and glass bead. The wooden and leather hair ornaments are similar to the point-hat found in Yanghai, Subeixi, Algou, and Sangeqiao sites, indicating a similar time phase.

4.2 Absolute Age

There are eighteen samples from this site tested for radiocarbon dating, and the details can be seen in Table 4. According to the calibrated results, the date range of the Shengjindian site is 370 BC-10 AD.

5. Interpretation

5.1 Tomb Tradition

The tombs of the Shengjindian site can be divided into three types: A, B, and C. Type A is the vertical shaft with a secondary platform. The platform is built on the two sides of the tomb chamber, with a cover beam built on it, then covered by felt or reed mat, and then planted with straw and clay to seal the tomb opening. Type B is the vertical shaft tomb, with a similar tomb cover on the tomb opening. Type C is the vertical shaft with a side chamber, the side chamber is usually found on the bottom, and the chamber entrance is also covered as Type A.

A few tombs are found with wooden couches, in a rectangular shape, tied by thin leather ropes; some couches are found with an arch coffin cover made by thin tamarisk branches and cowhide strap. Most of the tombs have light sand and plant straw on the

chamber bottom.

The tombs are found with single-burial and double-burial, while mostly double-buried graves include one female and one male, and few are found with the same gender. Some human bones are found covered by leather cloth. The burial positions are mainly straight supine and straight flex. Most of the wooden and pottery wares are located close to the body head, while the weapons are found on the right body side, and the arrow bags are found hanging on the cover beam.

5.2 Subsistence

The wooden items include bowls, cups, plates, buckets, sheaths, hairpins, awls, buttons, spinning wheels, bows, walking sticks, hair ornaments, and leg prostheses. The leather products include shoes, buttons, sheaths, arrow bags, and paintings. The pottery wares include cups, bowls, jugs, basins, and jars. And the metal objects have iron knives, iron buttons, bronze knives, bronze earrings, golden earrings, and golden ornaments.

Many plants remained in the tomb chamber, including wood, seeds, fruits, leaves, inflorescences, and stems. The archaeobotanical research (Jiang et al., 2015) showed that cereals are found in considerable quantity, while barley is found only in small numbers. At the same time, wheat and grape are also found in some tombs. The discovery of the grape seeds showed that at least some indigenous people led a sedentary but not necessarily pastoral life. The abundant cereal remains and the grape seeds appearing together in the tombs indicated that plant cultivation was widespread in Turfan. And this further suggests that agriculture and horticulture activities would have played essential roles in their daily life. While the wild plant findings also indicate the indigenous people's utilization of local wild plants (Liu et al., 2013).

In the meantime, the rich findings of the wooden and leather products suggest the well-development of the animal utilize, not only on the meat and fur consumption but their mobility is also assured by the animal usage, especially the large number of the horse animals found in the tombs. In addition, the unique leg prosthesis from M2, which

is the only one found in the Turfan region, exhibits the development of the artificial wooden industry. The technical evidence of the heavy traces of wear on the prosthesis, and the absence of muscle atrophy in regions of the skeleton other than the affected leg, also suggested an active lifestyle even years after the injury (Li et al., 2013). And the raiding conflict pattern, like the nomadic attack in the middle of the Eurasian Steppe, might exist in this site (Zhang et al., 2020).

In addition, the findings of the coffin cover may also reflect their living style before death; the similar shape to the nomadic yurt may also point to the agro-pastoral lifestyle (Turfan, 2013).

5.3 Summary

According to the historical documents like "Hanshu," when the Han Dynasty made their trip to the western regions, they first got to know this area as "Gushi," a small state in Turfan Basin. The iron objects indicate the later period compared to the above similar sites; therefore, the Shengjindian people might be the "Gushi" people during Western Han Dynasty.

As part of the Subeixi culture, Shengjindian exhibits similar cultural elements while also corresponding with the description of the "Gushi" features. Shengjindian site completes the Subeixi culture in the Turfan Basin and completes the historical records.

1.3.7 Aidinghu Site

1. Location

Aidinghu site is located in Aidinghu County, Turfan, Xinjiang. The site is situated on the western side of Aidinghu Lake (Fig. 5: 21). Due to wind erosion, some of the tombs have been exposed.

Aidinghu site is situated in the Turfan Basin in eastern Xinjiang. The climate of Alagou can be characterized as a typical continental arid climate in the Warm Arid Temperate

zone. In total, summer and winter represent a distinct wet and dry season; this area receives the lowest precipitation in China, mainly dropping to an annual capacity between 15 and 50 mm. Due to the extremely low rainfall counts, all months are usually dry. The seasonal temperature amplitude exceeds 70°C (Domorös and Peng, 1988).

2. Research History

In May 1980, the villagers found the site and dug out several pottery wares, bronze, and golden objects, and then they reported to the Turfan Institute of Cultural Relics. Turfan Institute carried out the field survey and excavation in the same year, yielding about fifty tombs. The excavation report was published in 1982 (Xinjiang et al., 1982). In September 1989, another group of bronze and golden objects was found in the Karez well at Aidinghu County. There are four bronze wares and two golden ornament pieces found in total. The report was published in 1992 (Liu, 1992).

After the excavation, the Aidinghu site is considered part of the Subeixi culture in the Turfan region (Han, 2007; Shao, 2012; Chen, 2017), which completes the Subeixi culture.

3. Findings

The tombs from Aidinghu are all rectangular vertical shaft pits, single-buried, straight supine, and head towards the west.

80TADM22 (Fig. 5.1.3.7-1): rectangle. The length is 1.92m, width is 0.85-1.1m. the depth is 0.5m. The human body has been rotted. There are four pottery wares with red coating found next to the head, and under the foot, one pottery is with a black painting.

80TADM18 (Fig. 5.1.3.7-2): rectangle, the length is 1.35m, width is 1m, depth is 0.3m. One male body is found inside; the lower body has been destroyed.

Due to the wind erosion, many grave goods cannot be found in its original tomb unit, and the details can be seen in Table 16 and Fig. collection 5.1.3.7-3.

4. Age

Unfortunately, there are no radiocarbon dating results from the Aidinghu site; the wind erosion has also destroyed the stratum sequence. Therefore, the dating of this site can only be conducted from the grave goods.

The tomb's bronze, golden, and iron objects indicate the Iron Age period. The bronze mirror with no patterns is similar to the Xiongnu tomb in Inner Mongolian, belonging to the Western Han period (206 BC-8 AD). Therefore, the excavator suggests the relative age of the Aidinghu site is between the 2nd century BC and 1st century AD.

5. Interpretation

The painted pottery wares with red coating have always been considered native production in Eastern Xinjiang, which can also be seen in the nearby sites Subeixi and Yu'ergou. The bronze and iron arrowheads are unique from other regions, indicating the local development of the Turfan Basin. The bronze mirror and animal shapes on bronze/golden plaques also represent the possible Xiongnu influence from the north (Liu, 1992).

According to the Han records *Hanshu* and *Hou Hanshu*, the "Cheshi" state that controlled Turfan Basin in the Han period; the Aidinghu site might be part of the "Cheshi" people that have been settled down here for generations.

2. Northern Tianshan Mountain

2.1 Saensayi Site

1. Location

The Saensayi site is situated on the second terraces and the hillside of the Saensayi gutter entrance (east bank of the Urumqi River) of Baiyanggou Township in the southern suburb of Urumqi City. Urumqi is in the middle of north Xinjiang, on the

south edge of Junggar Basin. Saensayi site is about 68km north of Urumqi city and 7km south of the Urumchi Yuejin Steel Factory (Fig. 5: 24).

Urumqi is located in the Middle Arid Temperate Zone. The precipitation shows a distinct annual variation with a short summer peak and a prolonged winter deficit. The yearly precipitation is about 194mm. Winter and summer experiment with severe seasonal contrasts in temperature, which establish winter as a long and intense season, whereas summer is comparably warm but for a short period. The warmest time is between July and August, around 25.7°C; while in January, the lowest temperature is -15.2°C. The powerful seasonal contrast of temperature and precipitation, thus making a long, severe, and dry winter compared to a short but relatively warm summer, contributes to the most typical characteristic of this temperature zone (Domorös and Peng, 1988).

2. Research History

Saensayi Site was firstly found in the Second National Archaeological Survey in 1989. In 2006, to coordinate with the construction work of the Daxigou Reservoir, Xinjiang Institute of Cultural Relics & Archaeology with Urumqi Management of Cultural Relics carried out three times of field surveys in January, February, and September, and they started the excavation in November 2006, which yield nine tombs. In the 2007 season, the excavation yielded one hundred and forty-three tombs, and in July 2008, they excavated thirty tombs in the area. There are one hundred and eighty-two tombs found in Saensayi site. Saensayi Site was awarded “one of the most important Chinese Archaeological Finds” in 2009.

The first report was published in 2010 in the collection introduction of “important Chinese archaeological finds in 2009” (NCHA, 2010) and some other introductions (Ruan, 2013). The brief excavation report was published in 2012 (Xinjiang & Urumqi, 2012). In addition, there are some other related studies on the anthropological physical features (Fu & Wang, 2009; Fu et al., 2010), botanical and artificial research (Lin et al., 2019; Li, 2020; Yang, 2020).

3. Findings

The site scale is about 700m long from north to south and 650m wide from east to west. The excavation yielded one hundred and eighty-two tombs (Fig. 5.2.1-1), while twenty-one tombs are found with no tomb chamber. And only a few graves are found with wooden or stone coffins. In addition, there are two tombs found only buried with complete animal (horse) skeletons, which are thought of as the sacrificial pit. According to the grave goods and tomb structure, the time difference is quite apparent. Most of the tombs are found with several grave goods, including pottery vessels, bronze wares, bone items, lithic tools, iron, silver, golden, and cowry ornaments. The details can be seen in Table 17 and Fig. Collection 5.2.1-2.

There are one hundred and eighty-two tombs in Saensayi site; the tombs can be categorized into two major types: with surface mound and without the mound; the details can be seen in Table 18.

4. Age

4.1 Relative Age

There are not so many disturbance stratum between the individual tombs so that the relative dating can only be conducted from the burial form and grave goods. According to the grave goods and the burial tradition, the tombs can be divided into seven sub-groups. The details can be seen in Table 30. According to the tomb form, the seven sub-groups show time differences. The first three sub-groups have no iron objects (or very few), only pottery and bronze grave goods, which might belong to the Bronze Age.

While for the rest groups, in Group 4 and 5, the iron objects are increasing. The pottery and burial tradition exhibit a remarkable similarity with the neighboring sites, i.e., the Subeixi site, Chaiwopu site, and Alagou-Yu'ergou Site, indicating that they belong to the same Iron Age period. The excavator believed that the time phase should be extended until Han & Jin Dynasty (Xinjiang, 2013).

Group 6 shows a unique burial tradition similar to the Chinese Turk tradition in Tang Dynasty: the complete horse skeleton. At the same time, the bronze ornament and silk fragments also indicate the Tang style.

Tombs of Group 7 have few grave goods found inside the tomb chamber. At the same time, some scholars pointed out that the tomb structure might follow the initial Islamic tradition between Song & Yuan Dynasties (Xinjiang, 2013), which has not been confirmed yet. Still, the time could be much later than the previous groups.

Therefore, we could divide the Saenasayi site into four phases: the first three subgroups belong to the first time range, subgroup 4 & 5 are in the second time range, and sub-group 6 and 7 belong to the third and fourth time range, respectively (Table 19).

4.2 Absolute Age

There are seven radiocarbon dating results, and the details can be seen in Table 4. The tested samples are selected from different tomb groups, and the results also correspond with the relative age we conducted above. Saensayi site is a long-lasting site that started in 2200 BC and might be ended in 1300 AD. The exact date of each phase could be in Table 20.

Frist Period: Bronze Age	Sub-group 1	2200-1500 BC
	Sub-group 2	1500-1100 BC
	Sub-group 3	1100-500 BC
Second Period: Han & Jin Dynasty (汉晋时期)	Sub-group 4	100-400 AD
	Sub-group 5	
Third Period: Sui & Tang Dynasty (隋唐时期)	Sub-group 6	500-900 AD
Fourth Period: Song & Yuan Dynasty (宋元时期)	Sub-group 7	900-1300 AD

Table 20. Saensayi sub-groups dates

5. Interpretation

5.1 Burial Tradition

Group 1 tombs have stone circles on the surface ground but without standing mounds, which show the similarity with the Afanasievo and Andronovo culture tombs. One unique characteristic is the four small pits on the chamber bottom, which might be used to support the beam cover. The stone and pottery jar exhibit a similar style to the jars found in Qiemuerqieke site in the Altai region in northern Xinjiang. In all, the tomb structure and grave goods indicate a significant Andronovo cultural effect (Xinjiang, 2013).

The amount of Group 2 tombs is few. There are no surface stones/mounds on the ground, while there are some round pits with burnt traces on the tomb opening, which might be used for sacrificial actions. There are not so many grave goods in group 2 tombs. The pottery Jar with a slim neck can correspond with the nearby Xintala and Sidaogou characteristics, leading to the possible cultural element effect (Xinjiang, 1982; 1986; 1988).

The amount of Group 3 tombs is the most in the whole Saensayi site, which shows the high development during this time. The tomb structure includes a vertical shaft pit and stone shaft; the chamber walls are embedded with stone slabs. Animal heads can be seen in most of this group's tombs. The mostly appeared pottery is round base ware, also with colored painting. The round base pottery Jar is also one of the typical wares in Karasuk culture in the middle reach of the Yenisei River. While the bronze objects show the similarity with neighboring sites and even in central China, for instance: the patterns of bronze mirrors from M113 are pretty similar to the Tianshanbeilu Site in Hami, Mohuchahan Site in Hejing, and Fuhao Tomb (妇好) in Henan Province. In addition, similar bronze weapons and harnesses can also be seen in the Banfanggou site in Urumchi and Simutasi Site in Ili; they all indicate the possible influence of northern grassland culture. The grave goods are usually placed close to the body head, while the animal heads (horse, sheep/goat) are found on the body or foot side. The weapons are placed on the waist side. This type of burial tradition is quite similar to the Karasuk

burial tradition (IACASS, 1980; Wu, 1985; Urumqi, 1990; Yang, 2004; Qian, 2006; Ma, 2008; Xinjiang, 2013).

Most Group 4 tombs are vertical shafts with a side chamber, and stones block the chamber entrance. In Group 4 tombs, a few iron objects started to be found as grave goods; the sheep/goat bones are also found, along with a few horse bones. The painted pottery patterns are similar to the Subeixi culture, indicating the increasing artificial and eastern effects (Turfan, 1984; 1991; Chen, 2001; 2002).

The tomb structure of Group 5 is variable, including a vertical shaft, a shaft with a side chamber, and a stone shaft. The wooden coffin is relatively widespread, and iron objects are increasing. There are several silk fragments, no buried horse and sheep/goat heads, and no painted pottery. The tomb tradition of Group 5 indicates the strengthened communication with central China (Xinjiang, 2013).

The typical feature of Group 6 tombs is the oval/half-moon-shaped shaft, with the secondary platform and complete horse skeleton. These features are commonly found in the northern Tianshan sites, like Baiyanghe site in Fukang, Jilintai site in Ili, etc. There is no pottery ware in the tomb, while mostly grave goods are the bronze ornament, iron harnesses, and weapons. The bronze ornament shows a remarkable similarity with the Wuzhongbeijiao Tang tomb in Ningxia Province (吴忠北郊唐墓). The Sui & Tang cultural effect is quite apparent (Xinjiang, 2004; Ningxia et al., 2009).

The tomb structure and burial form of Group 7 are highly united, with vertical shafts with a side chamber; the chamber is on the western wall, and the entrance is blocked by peddling stones. There are no grave goods found in the tomb chamber at all. Some scholars believe the tomb structure is under the early Islamic tomb burial rule, but it is hard to prove (Xinjiang, 1984; 2013).

5.2 Subsistence

The unique geographical situation assures that Saensayi is in a belly location with ample

water and lush vegetation. At the same time, with no cold air from Siberia in the north and no dry hot from Turfan Basin in the east, the Tianshan mountain can protect itself from the erosion of Tarim sand.

There are several faience beads ornament found in Saensayi site, which is thought to be one of the earliest faience in China; the similar beads were firstly found in central Asia, while Saensayi could be the first introducing spot on the spreading trip. The strings of faience beads are seen as the ornament and then buried with the body, which shows their preference for the decoration ornament. This trip not only in terms of the material exchange but also conveys the communication of ideas of value and beauty and the spread, adaption, and development of specialized technologies (Lin et al., 2019).

Several lithic tools found from Saensayi tombs are grinding tones, stone mortar, and millstones related to the early grain processing. Despite that, the starch residue research on the lithic tools also reveals that wheat, millet, and beans have appeared in the Saensayi people's daily lives (Jia, 2013). Due to the special location and time range, the wheat starch granule residue suggests a possible route through which wheat came from the west, along the Tianshan mountain, and eastward to the Hami region (Jia & Chau, 2019).

Many bone tools and animal bones (horse and sheep/goat) lead to the well-developed of animal utilization, primarily pointing to the livestock industry.

The amount of pottery wares is relatively small among the whole grave goods, and the type is quite simple, which might be made for easy-carrying purposes during the movement. There are no specific agricultural tools (spade or axe); the findings are mostly bronze weapons and harnesses; there are few cow bones, no sedentary animal bones (pig, dog, or chicken) at all, but mostly found with horse and sheep/goat bones. In addition, the teeth and trauma study also show that some of their traumas are caused by sharp weapons, and their teeth worn are caused mainly by meat chewing but not eating processed farm products (Fu & Wang, 2009).

The evidence mentioned above all indicates that Saensayi people lived in a livestock-based economy, with an early nomadic lifestyle and combining with simple farm products.

5.3 Summary

Saensayi Site is a large-scale and long-lasting cemetery situated on the middle point of the route between northern and eastern Xinjiang. Their people lived a nomadic lifestyle while also exchanging materials and ideas with both the north and east sides. In the early phase of this site, the northern influence is quite apparent. At the same time, after the settlement, they started to produce their cultural elements when the communication with the east began to increase. While in the later phase, with the strengthening of eastern power, especially after the development of the Han Dynasty, the central Chinese element is overwhelming through the "Silk Road."

In general, Saensayi site provides precious archaeological materials to survey the central section of the Tianshan Mountains and even the whole Eurasia Steppe Nomadic culture. Different products and technologies are exchanged in both directions through this site, making Saensayi an essential site for communication in prehistoric and historical Xinjiang.

2.2 Luanzagangzi Site

1. Location

Luanzagangzi site is situated in Miaoziwan village in Jimusaer County. The site is found on the Wutanggou River plain, and the sea level is 1486m. The site is on the northeastern slope of Tianshan Mountain and the southeastern edge of Junggar Basin (Fig. 5: 25).

Luanzagangzi is located in the Middle Arid Temperate Zone. The precipitation exhibits a distinct annual variation with a short summer peak and a prolonged winter deficit. The

annual precipitation is about 194mm. Winter and summer experiment with severe seasonal contrasts in temperature, which establish winter as a long and intense season, whereas summer is comparably warm but for a short period. The warmest time is between July and August, around 25.7°C; while in January, the lowest temperature is -15.2°C. Thus, the powerful seasonal contrast of temperature and precipitation, thus making a long, severe, and dry winter compared to a short but relatively warm summer, contributes to the most typical characteristic of this temperature zone (Domorös and Peng, 1988).

2. Research History

This site was named because of the findings of some Yuan Dynasty on the river mound, and the yearly rain wash makes an erosion pit alongside the road from Quanzijie Town to Gongsheng Village. The pit is about 2m wide and 1.5m deep. The pit profile of the pit contains charcoals, carbonized grains, and pottery sherds.

To prevent further destruction, the Xinjiang Team of the Archaeology Institute of the Chinese Academy of Social Sciences carried out a trial digging next to the pit in 2007. The brief report was published in 2013 (Xinjiang, 2013).

The abundant charcoal and carbonized grain remain to provide new evidence in the analysis of agricultural settlement. Jia published eight radiocarbon dating results and analyzed its botanical situation, leading Luanzagangzi with Banjiegou into the same cultural tradition in the mid-northern Tianshan area (Jia et al., 2011). Zhang studied the botanical remains and discussed the possible agricultural actions in a steppe community (Zhang et al., 2017). The findings in Luanzagangzi have provided new evidence for discussing early agricultural and crop transmission among Bronze Age mobile pastoralists in the Eurasia Steppe (Betts, 2014; Spengler et al., 2014a; 2014b).

3. Findings

The 2007 season opened a 1×2.5m unit next to the pit, and there are ten stratigraphic layers from the 4m deep profile (Fig. 5.2.2-1). The cultural layers are rich in charcoal,

pottery sherds, bone pieces, stone tools, and bronze pieces.

- ①: Topsoil, naming 10YR4/1, the thickness is 18cm.
- ②: yellow soil, with few boulders, the thickness is 42cm.
- ③: yellow-grey soil, with few charcoal pieces and pottery sherds, the thickness is 20cm.
- ④: yellow-grey soil, with charcoal pieces and pottery sherds, the thickness is 23cm.
- ⑤: yellow-grey soil, with burnt soil pieces and ash remains, and large charcoal pieces and pottery sherds, the thickness is 46cm
- Ash Trench*: G1, yellow-grey soil, with charcoal pieces and pottery sherds.
- ⑥: yellow-grey soil, with burnt soil pieces, carbonized grains, and pottery sherds; the thickness is 32cm.
- ⑦: grey soil, with burnt soil pieces and a layer of dark ash (2-3cm thick); the thickness is 26cm.
- ⑧: yellow-grey soil, with charcoal pieces and pottery sherds, the thickness is 52cm.
- ⑨: yellow sand soil, with few boulders, charcoal, and pottery sherds, the thickness is 67cm.
- ⑩: yellow soil, with some charcoal pieces and pottery sherds on the bottom; the thickness is 80cm.

Below Layer ⑩ is raw soil and yellow sediment with no traces of occupation debris. The pottery sherds and stone tools can be seen in Fig. 5.2.2-2.

4. Age

4.1 Relative Age

No tombs are excavated in Luanzagangzi; therefore, relative time dating can only be conducted from the collected pottery sherds. The pottery round-base jar with applied veins on the rim from Luanzagangzi is similar to the Banjiegou site from Qitai County. The absence of iron objects may narrow down the date of the Luanzagangzi site during the late Bronze Age time in the northern Tianshan area.

The ceramic evidence suggests two main stages of occupation in Luanzagangzi: an early stage with painted pottery wares and a later one with plain coarse wares (Jia, 2011).

4.2 Absolute Age

There are eight radiocarbon dating results from the charcoal samples (Table 4), and the absolute date of Luanzagangzi is between 1300-900 BC. The early stage is between 1300-1000 BC, while the later stage is between 1000-900 BC.

5. Interpretation

The stratigraphy information and radiocarbon results suggest that the Luanzagangzi site has been continuously or sporadically used for about four hundred years, which must have experienced the interaction with neighboring regions.

The red grid pattern on the round-base wares and the applied veins decoration style are distinguished from the Tianshaanbeilu culture in the Eastern Xinjiang region but like the Kaersang site on the southeast corner of Junggar Basin, while the most similar site is the Banjiegou site. Therefore, the excavator believed these two sites belong to the same "Luanzagangzi-Banjiegou" cultural tradition that dominated the late Bronze age in the mid-northern Tianshan area (Jia, 2011; Xinjiang, 2013). At the same time, this pottery style has been suggested to receive the Xindian cultural tradition from Gansu Province (Shao, 2007). Xindian culture evolved from the late Chinese Neolithic culture along the upper Yellow River region. The possible cultural spread might indicate the communication route from central China to Xinjiang through the Mongolian plateau (Jia, 2011).

The botanical analysis reveals that wheat and barley are the main grains from Luanzagangzi samples, which might be the evidence of wheat spread road from central Eurasian to Gansu province (Spengler et al., 2014). And the herders may have adopted a range of crops into their subsistence strategy in the late Bronze Age, which might be the early model of agricultural practices in the steppe community (Zhang, 2017).

Luanzagangzi is a long-lasting settlement in the mid-northern Tianshan region. It might play an essential role in the economy and culture exchange route from central Eurasian to central China through the Mongolian plateau. The exchange may also contribute to the evolution of living hood for the steppe inhabitants during the late Bronze Age.

2.3 Qiongkeke Site

1. Location

Qiongkeke site is located in Kemeng Town, Nileke County. The site also lies on the southern bank of Kashi River, the Ili River sub-branch that flows from east to west. The tombs of the Qiongkeke site are distributed on the Qiongkeke terrace washed by the Kashi River (Fig. 5: 28).

Qiongkeke site is in the Warm Arid Temperate Zone. In total, summer and winter represent distinct wet and dry seasons; the precipitation conditions may vary considerably between the different types. The precipitation shows a slightly higher on the foothills towards the Tianshan than in the Taklamakan desert. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the tiny number of rainy days, which as a monthly figure reaches the most and varies for the whole year, generally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

In 1985, the Xinjiang Institute of Cultural Relics & Archaeology discovered a series of cliff paintings on the foothill of the northern Kashi River from an archaeological survey. The cliff painting survey was carried out for the second time in 2003 (Northwest University et al., 2006; Wang, 2006). In 2001, before the Jilintai hydropower project, Xinjiang Cultural Heritage Administration, Ili Kazak Autonomous Prefecture Institute of Cultural Relics, and Nileke County Institute of Cultural Relics carried out a complete field survey on the terrace. They found more than one hundred tombs from the first and second terrace, naming Nr. I and Nr. II section, respectively. The excavation was carried

out in the same year, while the salvage excavation was on four other tombs on the southeast of the terrace. There are fifty-five tombs, and two sacrificial features have been excavated. The excavation report of Nr. I section was published in 2002 (Xinjiang, 2002). And the information of Nr. II section was published in 2011 (Liu, 2011).

The excavation of Qiongkeke site yielded abundant amounts of pottery wares, bronze and iron objects, and wooden and bone items, making Qiongkeke another late Bronze Age-early Iron Age site in the Ili River region. The excavation also brought a heated interpretation of its cultural tradition and the cultural connection, primarily through the Ili River valley (Han, 2007; Guo, 2012; Liu, 2019). The human diet and physical study also contribute the more understanding of the cultural group belonging to the Qiongkeke population (Zhang et al., 2006).

3. Findings

3.1 Occupation site

This site is found from the lowest stratigraphic of Qiongkeke sediment, which is thought to be the first usage period of this site. Many microlithic, pottery sherds and bone arrowheads are found in this layer, which shows a solid Andronovo cultural style. And then it was entirely covered by the section.

3.2 Nr. I section

Most of the tombs are found in Nr. I section, with two sacrificial features on two sides of the terrace (Fig. 5.2.3-1). Most graves have surface stone mound indicators, the diameter is between 10-15m, and the height is 30-40cm. The tomb pit is under the stone mound; a boulder circle circles the whole tomb opening. Most mounds have one tomb chamber underneath, while one has two chambers, and another example has three chambers. Single-burial and supine straight is more common, and the grave goods are placed close to the head. The tomb details can be seen in Table 21 and Fig. collection 5.2.3-2.

Sacrificial Feature Nr. I

Located on the eastern terrace, 40m to the north of Kashi River, and 100m to the tomb section. The sacrificial feature has one surface stone mound, with a diameter of 12.75m and a height of 0.8m, built by small boulders, whose lengths are between 40-60cm (Fig. 5.2.3-3).

Sacrificial Feature Nr. II

Located on the mid-western terrace, 40m to the north of Kashi River, and 200m to the tomb section. The surface stone mound is constructed with small stones and filling soil. The diameter is 14m, height is 0.65m. Few animal bones and pottery sherds are found inside the filling soil (Fig. 5.2.3-4).

3.3 Nr. II section

It is located on the east of Nr. I section. Most tombs have surface mounds on the ground, and the primary tomb form is vertical shaft stone pits, with few vertical shafts and a side chamber tomb. Single-burial and multi-burial are common. The grave goods include pottery wares, bronze and iron objects, and golden ornament, with many sheep/goat bones buried.

4. Age

4.1 Relative Age

The proportion of bronze and iron objects indicates that the Qiongkeke site is between the late Bronze Age and the early Iron Age.

Liu believed that the chronology of Qiongkeke should include two stages: Stage I, represented by the lowest occupation site layer, while Stage II is the site period, which is the primary usage time for the Qiongkeke population. Stage I is a Bronze Age site, and Stage II is an Iron Age cemetery (Liu, 2011, 2019).

4.2 Absolute Age

Only two calibrated data were published from the excavation report (Table 4). And the date range seems not complete only from these two samples compared to the relatively

long-term Qiongkeke stage I and II. The similar stone coffin between the Qiongkeke site and the Chawuhu type II tomb may indicate its time range (Guo, 2012). Therefore, the excavator assumed that the date of the Qiongkeke site is between 1000-500 BC.

5. Interpretation

5.1 Burial Tradition and Grave Goods

The surface stone mound indicator is one typical feature of Qiongkeke tombs; except for the stone mounds, most of the tomb opening is also surrounded by stone circles. Stone coffin is also one noticeable feature. The most common burial form is the single body in the supine position. The grave goods are not so abundant; the rich items are especially rare. Daily wares and metal weapons are the most popular grave goods, while painted pottery ware accounts for most.

The human dietary studies reveal that meat is the main component in the food structure of the ancient inhabitants of Qiongkeke, while their plant provider may come from wheat/barley. Iron knives and the sheep/goat bones from the tombs also point to the herding lifestyle. The location of the Qiongkeke site in the river valley also ensured the development of diverse economic strategies (Zhang et al., 2006).

There are no painted pottery sherds found from Qiongkeke stage I nor other sites in the Ili River valley, making the Qiongkeke stage II a unique cultural element. The pottery and burial tradition have made Qiongkeke stage II an independent culture group representing a long-term prehistoric culture in the first millennium. Therefore, this site's cultural elements can be considered one independent cultural group in the Ili River region.

5.2 Summary

The overlap by the site may indicate that around 1000 BC, the stage II Qiongkeke cultural group suddenly replaced the Andronovo complex in the upper Ili valley (Liu, 2019). The painted pottery flourished in the eastern Tianshan region. At the same time, its tradition has been continually spread eastwards until the Ili River region, establishing

a unique material culture that replaced the Andronovo culture and then kept extending to the lower Ili River region.

The Qihe River region on the east of Balkhash Lake has always been thought of as the primary activity area of the Saka-Wusun tribes. The spread of Qiongkeke cultural elements may provide more material on the Wusun study (Liu, 2019).

2.4 Jirentai Goukou (Jartai Pass) Site

1. Location

Jirentai Goukou site is located in the Qialege'er (Chalger) village, Nileke County. The site is located 1.5km east of the village, on the third terrace on the northern bank of the Kashi (Kax) River, and the site scale is about 80,000m². Enclosed by high mountains on both sides, the Kashi River is on the south of the site, and the entrance to the valley is on the west; the Kashi River gorge is on its eastern side, which makes this site a semi-enclosed basin settlement area (Fig. 5: 29).

Jirentai Goukou site is located in the Middle Arid Temperate Zone. The precipitation shows a distinct annual variation with a short summer peak and a prolonged winter deficit. The annual precipitation is about 194mm. Winter and summer experiment with severe seasonal contrasts in temperature, which establish winter as a long and severe season, whereas summer is comparably warm but for a short period. The warmest time is between July and August, around 25.7°C; while in January, the lowest temperature is -15.2°C. Thus, the powerful seasonal contrast of temperature and precipitation, thus making a long, severe, and dry winter compared to a short but relatively warm summer, contributes to the most typical characteristic of this temperature zone (Domorös and Peng, 1988).

2. Research History

Jirentai Goukou site was firstly discovered in 2015 during construction work; the Xinjiang Institute of Cultural Relics & Archaeology carried out a field survey in June

2015 (Wang & Ruan, 2016) and two times of salvage excavations in 2015 and 2016 (Xinjiang et al., 2017; Xinjiang et al., 2018). The third and fourth seasons were made by Xinjiang Institute of Cultural Relics & Archaeology and Archaeology and Renmin University in 2018 and 2019 (Wang et al., 2019; Yuan et al., 2020).

The excavation revealed a large scale of settlement remains in the Kashi-Ili River region; fourteen radiocarbon dating results were published in 2017 (Wang et al., 2018). Furthermore, the discovery of mine and grain remains to provide more evidence on the human dietary and livelihood study by a multidisciplinary approach (Wang et al., 2018; Wang et al., 2020; Zhao et al., 2020). As a result, the Jirentai Goukou site was awarded as one of the "Ten Major Archaeological Discoveries" in 2018.

3. Findings

3.1 Stratigraphic sequence

The general stratum sequence can be divided into three layers:

- ① is the Topsoil, dark brown, the thickness is 0.2m.
- ② is yellow soil, the thickness is 1m; there are several houses (F5, F7-13, F16-20) and tomb (M13, M20, M31, M49, M52, M72, M73, M75) remains under this layer.
- ③ is yellow soil, the content is quite complex, and it can be divided into ③A and ③B two sub-layers. The house remains (F2, F6, F14, and F15) are found under ③A and break ③B layer.

3.2 Other Features (2015-2016 season)

The main features found in Jirentai Goukou 2015-2016 season are houses, fireplaces, ash pits, post holes, and tombs. The house remains are the main feature, which can be divided into large-scale and small-scale two types. There are three large-scale houses (F2, F4, F6), the size is 100-400m², all in rectangular shape, half-underground form, and the walls are constructed of stones, filled with pillars. There is one rectangular fireplace in the house center. There are seventeen small-scale houses, the size is 20-60m², in the round and rectangular shapes and half-underground and above ground forms. There are

several ash pits, fireplaces, activity surfaces, burnt surfaces, and boulder pits in the house. Eight tombs are discovered under the Layer ②, vertical shaft pit, or with the stone coffin. In addition, some historical tombs lasted from Sui Dynasty to Yuan Dynasty (Fig. 5.2.4-1).

The 2018 season yields two pottery kilns (Y4 and Y5) and one stone platform, while there is no detailed information yet. 2019 season excavated another stone platform, with seventeen stone roads and one tomb.

F2

It is in the southeastern part of the site, discovered under the Layer ③A, and F5 overlaps its northeast corner. The length is 15.3m, width is 11.8m. Only the western wall remains, and the post holes are found surrounding the walls; the hole diameter is 0.3-0.4m, depth is 0.7-0.8m. The doorway lies in the middle of the southern wall, and the width is 1m (Fig. 5.2.4-2).

One activity surface (floor) inside the house remains, with solid activity remarks. The fireplace is found in the house center, in an oval shape, constructed by boulder slides; the diameter is 1.75-2.25m (Fig. 5.2.4-3). There are two post holes on both sides of the fireplace (Fig. 5.2.4-4).

There are plenty of burnt surfaces remaining inside the house; one is on the north of the fireplace, in a rectangular shape, the length is 3.5m, width is 1m. Plenty of coal ash surfaces in the southeastern, southwestern, northwestern, and northeastern sections of the house, and mainly raw coal deposit corners on the southwestern and northern areas (Fig. 5.2.4-5). There are five boulder pits in the north and western section, and the diameter is 0.6-0.8m (Fig. 5.2.4-6). And one round fireplace on the outside of the eastern wall. Plenty of animal bones, pottery wares, lithic tools, bronze knives, bronze pieces, pottery mold for bronze mirrors, and bronze awl found from F2 (Fig. 5.2.4-7).

F6

It is located in the western part of the site, on the highest point, built on the southern hill slope and digging a dustpan-shaped semi-subterranean house foundation into the hill. The house foundations are below Layer ③A, and its southern part is disturbed by M40, F19, and F20. A round wall is built on the outside, both sides of the wall are built with large stones, and the core is filled with earth, which makes a higher structure for the rain flow. The floor length is 21m, width is 17.8m. The doorway lies in the middle of the southern wall, and the length is 2.3m, and the width is 1.8m. There are two standing rocks inside the eastern and western border, with several post holes in between (Fig. 5.2.4-8).

The house inside deposits can be divided into three layers; the first layer is 0.1-0.6m thick, with coal, coal ash, crystals, burnt soil, stones, animal bones, pottery sherds, bronze objects, and lithic tools found inside. The second layer of the house remains found chiefly on the northern house; the thickness is 0.05-0.15m, with plenty of charcoals, burnt soil pieces, animal bones, and pottery sherds found inside. The third layer thickness is 0.25m, with plenty of coal pieces, coal ash, stones, animal bones, and pottery sherds found inside (Fig. 5.2.4-9).

There is one fireplace in the house center (Fig. 5.2.4-10), in a rectangular shape, the length is 2.8m, width is 1.6m. Plenty of burnt marks remained inside the pit, with plenty of coal ash, several coal pieces, and animal bones remaining on the burnt surface. One heap of coal ash (Fig. 5.2.4-11) remained on the north of the fireplace, and ten post holes surrounded the fireplace. The post hole diameter is 0.6m, with a foundation stone left on the bottom (Fig. 5.2.4-12). Some ash pits, boulder pits (Fig. 5.2.4-13), burnt activity surfaces in the house remain, and plenty of burnt pieces, charcoals, ash, and carbonized pillars on the northern section.

F6 is thought to be destroyed and abandoned due to a big fire, and the southeastern section is rebuilt into two small houses F19 and F20. F19 length is 4m, F20 length is 6.5m, and the width is 4.5m. Both small houses have round fireplaces that remain inside.

F15

F15 is located on the eastern T2 (Fig. 5.2.4-14) and found under the Layer ③A. Half-underground and in a rectangular shape. The length is 6.5m, the width is 5m, and the depth is 0.3-0.5m. There are eleven post holes around the activity surface inside the house. The hole diameter is 0.3m, and the depth is 0.4-0.5m, with some foundation stones inside. The fireplace is in the house center, plastered by mud, in an oval shape, 0.16m higher than the floor. The doorway is in the middle of the southern wall. There are four ash pits inside the house (Fig. 5.2.4-15).

F16

F16 is in northern T2 and found under the Layer ②. Half-underground, round-rectangle, the size is 5m². The doorway is on the east side, and its entrance connects an east-west road. There is one ash pit, one fireplace, and one kiln pit inside the house (Fig. 5.2.4-16).

M49

M49 breaks the F1 floor, located 0.3m to the northwest of the F1 fireplace. The orientation is 235°. The tomb chamber is in an oval shape, filled with yellow soil and boulders. There is one layer of small stones at a depth of 0.8m; under the stone layer is the yellow filling soil, and the human body is found under the filling soil, supine left flex, with one bronze mirror and one pottery jar found altogether (Fig. 5.2.4-17).

M72

Breaks the southeast corner of F10, and the orientation is 126°. The tomb chamber is oval, straight side with a flat base. The filling soil is yellow soil, with plenty of coal pieces, coal ash, and animal bones found inside. One female body is found on the northeast section, side left flex, with one bead bracelet on the right hand. One layer of ash remains under the body and on the southern bottom of the tomb chamber, with a lot of charcoals and ash inside. The chamber bottom and side are burnt into red (Fig. 5.2.4-18).

M73

Breaks the Layer③, the northern part is disturbed by H25, and the orientation is 87°. The tomb chamber is oval, filled with yellow soil and stones. One stone coffin in the chamber is constructed with two-three layers of stone with no cover. There is one male body inside the coffin, side-flexed. No grave goods are found inside the coffin (Fig. 5.2.4-19).

Y4 & Y5

The pottery kilns are spoon-shaped and composed of a kiln chamber and fire passage. The fire passage is round-rectangular, and the kiln chamber is round. The deposit in the Y4 kiln chamber is 40cm thick, with a lot of charcoal remaining inside. There is one pottery piece found in the Y5 chamber.

3.3 Stone Platform (2018 Season)

The stone platform is located north of the house section, in a square shape, and the length is 140m, height is 7m. Stones construct the platform, and the stones are polished. There are plenty of pottery wares, lithic tools, and animal bones found from the profile.

3.4 2019 Season

2019 season yields one large stone platform, with seventeen stone roads in a radial row from the platform center and one large tomb. The roads are built of small boulders; the length is 30-44.6m, the width is 0.15-1m, and the height is 10-30cm. Many coal pieces, burnt soil pieces, pottery sherds, lithic tools, bronze objects, and animal bones are found inside the road (Fig. 5.2.4-20).

The tomb is found on the platform center, half-underground. There is one stone wall outside the tomb chamber; the wall height is 2.54m, width is 0.4m. The wall is round-rectangular, built of small gravel stones (Fig. 5.2.4-21).

The tomb chamber has one passage. Square stone slides construct both chamber and

passage. The chamber length is 6.8m, width is 5.4m. The tomb chamber is filled with soil, boulders, stone slides, pottery sherds, animal bones, human bones, and wood. The passage length is 1.8m.

There is one secondary platform in the tomb chamber; the height is 0.18m, and the width is 0.35-0.8m. There is one layer of coal & soil solid layer on the secondary platform. Thirteen post holes on the secondary platform, with small coal pieces and burnt soil pieces remained inside the post holes. Some rotted wooden ash and plant marks on the platform might be the wooden coffin remains. There is one layer of burnt soil on the chamber bottom.

There is one retaining wall between the tomb chamber and stone wall, in a round-rectangular shape, plastered with mud. The height is 1.8m, width is 0.8m.

There are 1165 pieces of pottery sherds, one complete pottery jar, bronze awl, bronze chisel, bronze needle, and lithic tools found in the chamber.

4. Age

4.1 Relative Age

The pottery wares, bronze objects, and structure correspond with the Ili River Valley's Bronze Age burial traditions, showing vital Andronovo cultural elements in the Central Asian Bronze Age. Three iron pieces are found from the Jirentai Goukou site, indicating this site could be as late as the early Iron Age.

Jirentai Goukou site has revealed plenty of stratigraphic sequences, with an apparent disturbance between different features. Combined with the stratum disturbance, house structure, and pottery type, the Jirentai Goukou site can be divided into three sub-phases:

- Phase I* mainly have the large-scale half-underground wooden house; small-scale houses are rare. The pottery wares are mostly flat-based pottery with few line patterns.

- The house size of *Phase II* is getting smaller; the stoves are mainly in round or oval shape; the round-based pottery wares and tall-neck round-belly flat-based Jar are widespread, with some applied veins patterns.

- Phase III* has no typical house remaining; stone coffin tomb and vertical shaft pit are the primary tomb type; flat-based pottery Jar is still popular, while small-sized pottery Jar and open-lip round-belly flat-based Jar are new in this phase.

4.2 Absolute Age

There are fourteen radiocarbon dating results published in 2017, and the detail can be seen in Table 4. Combing with the calibrated dates, we may suggest the general date range of the Jirentai Goukou site is between 1600 BC-20 AD. More specifically, Phase I is between 1600-1200 BC, Phase II is between 1200-500 BC, and Phase III is between 500-20 AD. In addition, the site was settled from Sui Dynasty to Yuan Dynasty.

5. Interpretation

5.1 Subsistence and cultural tradition

The excavation yielded abundant lithic tools, bronze objects, carbonized grains, and animal bones. Many burnt soil pieces, activity surfaces, and rows of post holes indicate the Jirentai Goukou site is a living settlement; the ¹⁴C data also point to the long-lasting usage of this site.

The isotopic and lithic study reveals that animal husbandry is the most significant subsistence practice in the Jirentai Goukou site, the native consumed milk and dairy products. Agriculture is the secondary pursuit for their people; mixed cereal, including millet and wheat/barley, are cultivated in this area. Hunting action may also be part of their economy. They contribute a complex subsistence strategy for the daily life of the Jirentai Goukou people (Wang et al., 2018; Wang et al., 2020).

The distinction in the size and construction style of houses and tombs indicates class

division in the Jirentai Goukou site. The higher hierarchy enjoyed more prominent tombs with stone or wooden coffins, usually chamber passages, while the civilians only used the vertical shaft pit. The large stone structure found in 2018 has multiple rooms and might be used as a meeting place, even could be the possible "palace" for higher-class elites (Yuan et al., 2020).

In addition, the large amount of coal remains from the Jirentai Goukou site marks the development of the handicraft industry, which is thought to be the earliest evidence of the use of coal in the world, pushing the coal usage history back by more than one thousand years. There are three ancient mine sites in this region: Nulasai, Yuantoushan, and Kezileke Zangbei site. And the coal source from the Jirentai Goukou site could have come from the nearby mines. The related findings from the Jirentai Goukou site make a complete metal production chain. From the source provided, the casting stove, crucible to the pottery mold, bronze objects, iron pieces, and copper slag not only suggest the high development of the bronze casting industry (Xinjiang et al., 2017; Wang et al., 2019) but also showed the possible connection with the mobile lifestyle.

5.2 Summary

There are not so many Bronze Age sites found in the Ili River region in the western Tianshan range. The tomb burials and grave goods have great similarities with the Andronovo culture. A similar site in this region, the Adunqiaolu site is also thought to be one Andronovo cultural impact in the western Tianshan region (CASS et al., 2013). They all represent the Andronovo cultural spread in the late Bronze Age time.

Jirentai Goukou (Jartai Pass) site provides essential data for organizing social structure, social development, and cultural evolution between the late Bronze Age and early Iron Age. Jirentai Goukou's diverse subsistence strategies of herding, farming, and hunting would have benefited from the extensive exchange between the East and West cultures and suitable environmental conditions (An et al., 2017). The long-lasting settled down promoted the inhabitant's daily life, especially the handicraft industry, and contributed to the social complexity in the Ili River Region.

2.5 Banjiegou Site

1. Location

Banjiegou site is located in the Banjiegou village in Qitai County, about 160km to Urumqi on the southwest, also on the northern slope of Tianshan Mountain (Fig. 5: 30).

Banjiegou is in the Middle Arid Temperate Zone. The precipitation shows a distinct annual variation with a short summer peak and a prolonged winter deficit. The annual precipitation is about 194mm. Winter and summer experiment with severe seasonal contrasts in temperature, which establish winter as a long and severe season, whereas summer is comparably warm but for a short period. The warmest time is between July and August, around 25.7°C; while in January, the lowest temperature is -15.2°C. Thus, the powerful seasonal contrast of temperature and precipitation, thus making a long, severe, and dry winter compared to a short but relatively warm summer, contributes to the most typical characteristic of this temperature zone (Domorös and Peng, 1988).

2. Research History

Banjiegou is situated on the slope along a small river in the village; the modern villagers used to take the mudbrick soil from here, which exposed the profile. There are plenty of pottery sherds, human bones, and sheep bones found from the exposed profile. The Xinjiang Institute of Cultural Relics & Archaeology archaeological team surveyed this site, carried out the trial excavation, and collected several pottery sherds and lithic tools. The report was published in 1981.

The painted pottery wares used to be thought of as one indicator of Xinjiang Neolithic culture; Banjiegou was once considered one Neolithic site in mid-northern Xinjiang (Xinjiang, 1981). Then the existence of the Xinjiang Neolithic was doubted by many scholars. Some other nearby sites proved that the sites with the coexistence of painted pottery and bronze objects belong to the Xinjiang Bronze Age; the relative date of Banjiegou has been remodeled and rediscussed (Jia et al., 2009; 2011; Xinjiang, 2013; Han, 2018).

3. Findings

There are fourteen lithic tools and more than fifty pieces of painted pottery sherds found from the Banjiegou site. The lithic tools include a stone axe, mortar, stone pestle, stone circles, and stone balls. The pottery sherds are mainly painted patterns, yellow-white coating with the triangular and net design. According to the reconstruction of the pottery type, most of the wares are jars with cooking marks on the sherds. The details can be seen in Fig. 5.2.5-1, -2.

4. Age

There are no radiocarbon dating results from the Banjiegou site; the only time dating is from the collected painted pottery sherds and compared with other nearby sites. The pottery sherds are similar to the Luanzagangzi pottery, which may belong to the same cultural elements (Xinjiang, 2013). The Luanzagangzi were tested between 1300 and 900 BC, a late Bronze Age site due to the absence of iron objects. Therefore, we may suggest that the Banjiegou site is also set between 1400 and 1000 BC (Xinjiang, 2013).

5. Interpretation

The similarities in the painted pottery patterns between Banjiegou and Sidaogou sites may indicate the possible cultural contacts. In the meantime, the pottery type of Sidaogou shows a typical Tianshanbeilu culture element, and Banjiegou used to be thought to belong to the Sidaogou culture (Han, 2018).

The substantial similarity in the pottery wares patterns and types (the double-handled and round-based Jar) between Banjiegou and Luanzagangzi may indicate a possible "Luanzagangzi-Banjiegou" cultural tradition in the mid-northern Tianshan region during the late Bronze Age, that distinguished from the Sidaogou-Tianshanbeilu cultural tradition (Xinjiang, 2013). This cultural tradition is a long-lasting local cultural group that also received the Xindian impact from Gansu province, with western influences as populations in the northeastern Tianshan adapted new cultural traits from the Eurasian steppe (Jia et al., 2011).

2.6 Sidaogou Site

1. Location

Sidaogou site is located in the Mulei County, Hui Autonomous Prefecture of Changji. The site is about 10km from Mulei County and situated on the mountain range, about 7m above the dried riverbed (Fig. 5: 31).

Sidaogou site is in the Middle Arid Temperate Zone. The precipitation shows a distinct annual variation with a short summer peak and a long winter deficit. The annual precipitation is about 194mm. Winter and summer experiment with severe seasonal contrasts in temperature, which establish winter as a long and severe season, whereas summer is comparably warm but for a short period. The warmest time is between July and August, around 25.7°C; while in January, the lowest temperature is -15.2°C. Thus, the powerful seasonal contrast of temperature and precipitation, thus making a long, severe, and dry winter compared to a short but relatively warm summer, contributes to the most typical characteristic of this temperature zone (Domorös and Peng, 1988).

2. Research History

In 1976, during the construction work of Mulei primary school, some lithic tools and pottery sherds were discovered. Xinjiang Institute of Cultural Relics & Archaeology carried out two field surveys in 1976 and 1977, while the excavation started in May 1977. The excavation dug two trial digging trenches and six squares and yielded four tombs. The excavation report was published in 1982 (Xinjiang, 1982). Nine radiocarbon dating results were published in 1991 (IACASS, 1991), and the other two results were published in 2013 (Dodson et al., 2013). With the grain findings and radiocarbon dates, the Sidaogou site is thought to be one point of the wheat spread into China (Betts et al., 2014).

3. Findings

The scale of the site is about 10,000m², and the excavation is made in the middle and northern areas; the excavation area is about 200m², and the excavation square is named T1-T6. There are one hundred and one ash pits (H1-101), four stove pits, ten post holes,

and four tombs (M1, M3, M5, M6) yield from the 1977 season.

3.1 Stratigraphic sequence:

There are five layers can be seen from the profile (Fig. 5.2.6-1):

- ①: Topsoil, the modern soil layer, the thickness is 20cm.
- ②: the thickness is 20-40cm; the 2A is grey soil, while 2B is grey-yellow soil. There are millstones, stone balls, pottery cups, pottery pot Fu and other sherds found inside this layer.
- ③: the thickness is 20-40cm; the ③A is light-yellow soil, while ③B is dark-grey soil. There are millstone, stone pestle, and pottery sherds in this layer. There is also one ash pit H65 found in ③A layer.
- *Activity Surface*: the thickness is 5cm, and the content is relatively solid.
- ④: the thickness is 32-80cm; the 4A is admixture soil, with burnt soil pieces and charcoals found inside. ④B is dark-grey soil, with ceramic shallow bowl, pottery spinning wheel, and sherds found inside.
- ⑤: yellow soil the thickness is 70cm. There are millstones, stone pestles, stone drills, bone needles, bone arrowheads, pottery jars, basins, and sherds found inside this layer. There is one ash pit H75 on the bottom of this layer.

3.2 Other Features

H52 (Fig. 5.2.6-2): situated in T3, the depth to the surface ground is 1.7m. The pit length is 72cm, width is 66cm, and depth is 44cm. The filling soil is yellow, with charcoals, pottery sherds, and goat/sheep bones.

H70 (Fig. 5.2.6-3): situated in T6, the depth to the surface ground is 2.4m. The pit length is 66cm, the width is 58cm, and the depth is 44cm. The filling soil is yellow on the straight side, with pottery sherds, goat/sheep bones, and charcoals remaining inside.

H81 (Fig. 5.2.6-4): situated in T6, the depth to the surface ground is 2m. The pit length is 70cm, the width is 50cm, and the depth is 52cm. Straight side, the filling soil is

yellow sand, with no remains inside.

Stove Pit 1: situated on the southwest corner of T6, the depth to the surface ground is 2.5m. Oval shape, the diameter is 80cm, the bottom is constructed by boulder slides, under the boulders are one layer of 30cm burnt soil, and 10cm white ash remains.

Stove Pit 2: situated on the north of T6, the depth to the surface ground is 1.77m. Round-rectangular shape, the length is 2m, width is 1m. Boulders construct the pit, and the stove entrance is on the southern side. There are burnt and white ash remains in this pit; the pile thickness is 24cm.

Stove Pit 3: situated on the west of T6, the depth to the surface ground is 0.54m. Round shape, constructed by giant boulder slides. There is one pottery jar with a red coating on the south of the stove.

Stove Pit 4: situated on the northwest corner of T6. Round, the diameter is 1.5-1.8m, and the depth is 0.35m. Plenty of burnt soil pieces, burnt bones, pottery sherds, and stones remained inside. There is one burnt layer on the eastern side, and the thickness is 40cm.

Post Hole Nr. 1-7: round shape, diameter 12-30cm, and depth 14-47cm. There are some small boulders on the bottom and rotted wood in the filling soil.

Post Hole Nr. 8-10: round shape, 25-40cm diameter. Nr. 8 is filled with small boulders. Nr. 9 has one boulder slide on the bottom, the diameter is 12cm, the thickness is 4cm, and then another boulder above it, the thickness is 30cm. Nr. 10 has one boulder on the bottom, the thickness is 4cm, and then one slide stone above it, the length is 10cm, the width is 8cm and then filled with one boulder, the boulder thickness is 30cm; there are some rotted woods in the filling soil.

MI(Fig. 5.2.6-5): found under Layer④, the depth to the surface ground is 1.16m. The

tomb chamber is a rectangular vertical shaft; the chamber length is 1.8m, width is 0.9m, and depth is 0.2m. Due to the disturbance, several broken human bones and boulders remained in the chamber.

M3: situated in the southeast corner of T6. M3 is one Catacomb. The orientation is 42°. There is one round-rectangular tomb passage; the length is 0.72-0.76m, the width is 0.56-0.6m, and the depth is 1.1m. The tomb chamber is on the northwestern bottom, in round-rectangular shape; the length is 1.7m, the width is 1.2m, and the height is 0.95m. There is one stone wall made of large boulders in the middle of the chamber, dividing the chamber into two sections. There are two kids and one old female found in the northern section. The two kids are placed on the left side of the female. There are five bronze circles and one bronze ornament found on the female body. The southern section is an empty section with nothing remaining.

M5 (Fig. 5.2.6-6): found on the north of T5, above the ash pit H80 and Nr. 2 post holes. The tomb chamber is in a round-rectangular vertical shaft; the length is 0.92m, the width is 0.34m, and the depth is 0.2m. One kid is found in the chamber, side straight; no grave goods remained. There is one boulder on the filling soil.

M6 (Fig. 5.2.6-7): situated in the northern T4, broken by H74 and H76. No tomb chamber is found. The human body is in supine flex form, with no grave goods. There is one boulder on the filling soil.

The rest goods collected from other excavation areas can be seen in Fig. 5.2.6-8.

4. Age

4.1 Relative Age

The activity surface between Layer③ and Layer④ divided the Sidaogou site into two sub-phases; the lower layers might represent an early stage, while the upper layers are later. And the construction of post holes and stove pits indicate that Sidaogou is a continuously living settlement.

The absence of iron objects and the painted pottery wares indicate Banjiegou is a Bronze Age site in the northern Tianshan region. The round-based Double-handled Jar looks very similar to the Tianshanbeilu pottery tradition (Jia, 2008; 2011). And the excavator believed that the Sidaogou site might be between Western Zhou and Warring States (Xinjiang, 1982).

4.2 Absolute Age

There are eleven radiocarbon dating results from Sidaogou samples (Table 4). According to the calibrated data, the two sub-phases division is apparent. The early stage is between 1500-1100 BC, and the later stage is between 800-100 BC.

5. Interpretation

The charcoals, burnt soil pieces, post holes, and activity surface indicate that the Sidaogou site is a long-lasting living settlement in the northern Tianshan area. Plenty finds of lithic tools are thought to be used for agricultural practices, including millstones and stone pestles (Dai, 1989); the cereal seeds from Sidaogou prove that assumption, which corresponds with the wheat spread route into China (Betts et al., 2014).

The round-based pottery jar from the Sidaogou site is thought to be part of the Tianshanbeilu cultural tradition, which is distinguished from the "Luanzagangzi-Banjiegou" cultural tradition in the same mid-northern Tianshan region (Jia et al., 2008; 2011). Sidaogou site might have played an essential role in connecting the Balikun region and mid-northern Tianshan in the late Bronze Age.

2.7 Suodunbulake Site

1. Location

Suodunbulake site is located in the Suodunbulake village in Qiongbola Town, Chabuchaer County. The site group is situated on the national boundary between China and Kazakhstan; its east is the Suodunbulake gully, which flows from the southern

Wusun Mountain; while its north is the Ili River; the sea level of this site is around 1000-1500m (Fig. 5: 44).

Suodunbulake site is in the Warm Arid Temperate Zone. In total, summer and winter represent a distinct wet and dry season, and precipitation conditions may considerably vary in each and for the different types. The precipitation shows a slightly higher amount on the foothills towards the Tianshan than in the Taklamakan desert. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the minimal number of rainy days, which as a monthly figure reaches the most, and varies for the whole year, generally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

Huang Wenbi discovered the tombs in Suodunbulake village in 1958 during a field survey in the Ili River Valley (Huang, 1983). In 1987, due to the construction work destruction, the Xinjiang Institute of Cultural Relics & Archaeology carried out the salvage excavation and yielded three tombs (Xinjiang, 1988). In the national Cultural Relics survey in 1989, more than three thousand tombs were found; the construction work from the Suodunbulake village destroyed several tomb surface mounds, which required an urgent salvage. The excavation was carried out by the Xinjiang Institute of Cultural Relics & Archaeology in 1990 and yielded thirty-three tombs in total, and the excavation report was published in 1999 (Xinjiang, 1999).

The excavation of Suodunbulake has provided new material for the research of Ili River Region cultural elements (Chen, 2003; Liu, 2011, 2019; Ding, 2011; Guo, 2012; Zhang & Festa, 2020), which complete the Ili River region culture and provide more evidence on the related cultural group like Saka-Wusun, Yuezhi, etc.

3. Findings

3.1 1987 Season

1987 season excavated three tombs in two excavation units. M1 and M2 are in the

northern unit, while M3 is in the southern unit.

87M1: The surface mound and tomb opening have been destroyed. The tomb chamber is a rectangular vertical shaft, and the orientation is 265°. The tomb length is 440cm, width is 160cm, depth is 90cm. There are many wooden pillars in the eastern chamber. The human bones are scattered randomly due to the large stone above the body. No other tomb furnishings were found inside the chamber.

87M2 (Fig. 5.2.7-1): The soil and boulder layers construct the surface mound. The tomb chamber is under the surface mound, covered by one layer of pillars, and the length is 2m. There are some grass mat marks on the tomb opening. The tomb chamber is in round-rectangular shape; the length is 400cm, the width is 190cm, the depth is 200-220cm, and the orientation is 270°. The chamber filling is yellow soil and boulders. The human body has scattered randomly in the chamber while still being identified as an adult female. One of her thighbones has some knife marks remained. There is a row of wooden pillars remaining in the western chamber, the height is 50cm, and the diameter is 6cm.

87M3 (Fig. 5.2.7-2): Boulders construct the surface mound; the diameter is 800cm, and the orientation is 260°. There is one soil mound inside the stone mound, and the height is 20cm. There are some pottery sherds found inside the soil mound. There is one round pit under the surface mound; the diameter is 800cm, depth is 44cm. There are four rectangular tomb pits on the bottom, named chamber A-D.

-*Chamber A*: the length is 106cm, the width is 40-50cm, and the depth is 20cm. One kid in the chamber, supine straight, with one pottery Jar found altogether.

-*Chamber B*: the length is 190cm, the width is 66-76cm, and the depth is 76cm. There is one row of wooden pillars on the northern wall, and the diameter is 6cm. There are three wooden pillars on the body, and the diameter is 2cm. One adult female is buried in the chamber, supine straight; one pottery shallow bowl, one pottery jar, one sheep/goat

bone, and one cattle bone are found altogether.

-Chamber C: the length is 194cm, the width is 60-70cm, and the depth is 40cm. There is a row of wooden pillars on the northern wall, and the diameter is 6cm; there are four wooden pillars on the body, and the diameter is 2cm. One adult male is buried in the chamber, supine straight; one pottery single-handled jar and two ceramic shallow bowls are found altogether.

-Chamber D: the length is 190cm, the width is 74cm, and the depth is 60cm. The chamber is filled with boulders. The human body is buried under the adult male, with one pottery single-handled jar, two pottery shallow bowls, one bronze pin, one bronze bell, several stone beads, one iron object, and two bronze earrings found altogether.

3.2 1990 Season

The 1990 season yielded thirty-three tombs, five tombs (M1-M5) are on the north of the Suodunbulake gully, while twenty-eight tombs (M6-M33) are on the southern terrace (Fig. 5.2.7-3).

Most of the tombs have a surface mound as the tomb indicator. The southern section tombs are mainly stone mounds, the diameter is 290-1005m, and the height is between 10-75cm. Some tombs have a smaller tomb circle inside the mound, and the diameter is between 200-620cm. As for the northern section, most mounds are constructed with soil and boulders, the diameter is between 300-500cm, and the height is around 40cm.

Of the thirty-three tombs, M3 has no tomb chamber, M19, M21, and M33 has two chambers, the rest tombs only have one tomb chamber, and it can be divided into vertical shaft tombs with a side chamber and vertical shaft pits, two types. The tomb details can be seen in Table 22 and Fig. 5.2.7-4.

4. Age

There are no obvious stratum sequences in the Suodunbulake site, the iron objects are

more than bronze objects, so this could be an Iron Age site. In addition, the painted pottery ware from this site has been thought to be commonly used before the Han period. There are three radiocarbon dating results published in 1999 (Table 4). According to the calibrated data, the absolute age of Suodunbulake could be between 700-200 BC.

5. Interpretation

The tombs with surface stone indicators are the primary feature of the Suodunbulake site. Most tombs are in a vertical shaft, some with a side chamber. Single-burial and supine position is more common, while secondary burial is not rare. There are few painted pottery wares with triangular and wave patterns. These features are distinguished from the Andronovo culture in the previously Ili River region but showed significant similarity with the Tiemulike in Xinyuan County, Xiata, and Boma sites in Zhaosu County. The vertical shaft side chamber tomb and painted pottery patterns. All these sites are situated on the riverside of the Ili River, which might indicate the possible same cultural element spread along the river.

The Ili River region has been thought of as the early living region for the Saka-Wusun group. While most Saka tombs have stone mounds and circles on the ground, Wusun tombs have fewer. The physical anthropological study also reveals that the Suodunbulake population is closer to the Altai-Saka-Wusun, Shihezi-Nanshan, and Tianshan-Saka-Wusun groups (Chen, 2003). The painted pottery wares and lithic tools found that the inhabitants may have lived a settled life. In contrast, many sheep/goat and cattle bones and metal knives may also indicate the pastoralist meat-based economy strategy (Zhang & Festa, 2020). The inhabitants of Suodunbulake may have settled down in the Ili River valley before the Han dynasty. Therefore, the excavator and other scholars believed that Suodunbulake could be the past Saka settlement (Xinjiang, 1999; Ding, 2011; Guo, 2012).

Similar tomb structures and painted pottery patterns are found in Chawuhu and Yanghai sites in the mid-Tianshan region when Chen assumed that the Suodunbulake pottery patterns could be influenced by the Yanbulaq site in the Eastern Tianshan region (Han,

2007). This may provide a new route on the regional communication approach.

Some scholars believe this site represents "Suodunbulake Culture" in the Ili River region, including Qiongkeke, Halatubai, Qiongbola, Heishantou, and Tiemulike site, etc. (Ding, 2011; Guo, 2012). At the same time, some scholars insist on using the "Ili River Region Culture" to describe the prehistoric culture in this region (Han, 2007). There is no need to argue the name identification; more arguments will make it more complex. The essential point is to understand that one central large cultural zone once covers this region.

2.8 Chawuhu Site

1. Location

Chawuhu site is situated in Houshan Village, Hejing County. It is a large cemetery group. The first found is on the western side river terrace of Chawuhu Gully, and the other groups are located on both terraces of the Chawuhu riverbed. Chawuhu site group is situated on the southern slope of mid-Tianshan Mountain, and the Chawuhu Gully flows from the north to south; the Yuledusi Basin is on its northwest. The Kaidu River flows from the Yuledusi Basin spread on the oasis of southern Chawuhu Gully, which makes the Ha'ermodun plain. There is one small mountain range on the north of the plain, and in the north is the Chawuhu Gully. All tombs are distributed on the Gobi platform along the Tianshan foothill, arranged from low to high land (Fig. 5.3: 26).

Chawuhu is situated on the northern slope of Tianshan mountain, in the Warm Arid Temperate Zone. Summer and winter represent distinct wet and dry seasons, and the precipitation conditions vary considerably in each and for the different types. The precipitation shows slightly higher on the foothills towards the Tianshan than in the Taklamakan desert. Due to the meager precipitation, usually all months are dry; evidence for this is also given by the tiny number of rainy days. A monthly figure reaches the most and varies for the whole year, generally between 15 and 40mm (Domorös and Peng, 1988).

2. Research History

Chawuhu site was discovered in 1983 during a field survey by the Xinjiang Institute of Cultural Relics & Archaeology. They found more than ten exposed tombs by flood erosion, and then they found more than seven hundred tombs on the terrace, which is the Nr. I cemetery group.

Nr. II and Nr. III are located on the east and south of Nr. I cemetery, respectively. The excavations were carried out in 1983 and 1984. The brief reports of Nr. I cemetery were published in 1987 and 1988 (Xinjiang, 1987; CASS, 1988), the Nr. II cemetery reports were published in 1989 and 1990 (Xinjiang, 1989; CASS, 1990), and the Nr. III reports were published in 1989 and 1990 (Xinjiang, 1989; CASS, 1990). In 1986, the Xinjiang Institute of Cultural Relics & Archaeology started a new excavation season on Nr. I cemetery, while Nr. IV and Nr. V Cemetery were discovered at the same time. The excavation reports were published in 1990 and 1992 (Xinjiang, 1990, 1992). In addition, Nr. VI, Nr. VII, and Nr. VIII cemeteries were found during the fieldwork. The general excavation report was published in 1999 (Xinjiang, 1999).

The discovery and excavation of the Chawuhu site have raised a heated discussion since the 1990s. It is one of the largest ancient cemeteries in mid-south Xinjiang, and the excavation reveals various tomb types and grave goods, which provides abundant research material. Chawuhu site used to be called "Chawuhugou" or "Chawuhugoukou" due to its location at the entrance of Chawuhu gully. It was finally named "Chawuhu" site in the last excavation report, which is also the name of "Chawuhu Culture," and its cultural context has been discussed by many scholars (Chen, 1993, 2001a, 2001b; Zhou, 1994; Zhou, 1998; Lv, 1999; Mei, 2003; Han, 2007; Guo, 2012; Betts, 2019). In addition, the social status and economic strategies have been studied in multidisciplinary approaches (An & Yuan, 1998; Yu, 1999; Xie et al., 2005; Zhang et al., 2005; Dai, 2015).

3. Findings

The excavation yielded one hundred and thirty-two tombs in Nr. I cemetery, twenty-four

tombs in Nr. II cemetery, twenty tombs in Nr. III cemetery, two hundred and forty-eight tombs in Nr. IV cemetery. Twenty-four tombs in Nr. V cemetery (Fig. 5.2.8-1).

3.1 Nr. I Cemetery

Located on the southwestern terrace of Chawuhu gully, the terrace length is 250m, width is 50m. More than seven hundred tombs from the field survey and one hundred and thirty-two tombs were excavated, named IM8301-IM8308, IM200-IM222, IM224-IM297, IM299, and IM325. All tombs are vertical shaft stone tombs with stone circles on the ground. The tomb chambers are constructed by stone slides, covered by wooden beams or stone slides. In addition, nine tombs are found with tomb couches inside the chamber. There are eleven single-burials and thirty-five multi-burials.

The grave goods include pottery wares, bronze objects, wooden items, bone items, and lithic tools. The pottery wares are mostly placed on the chamber top or in front of the head; the gravels tone, bronze knife, bronze button, and awl are found on the male waist. There are some broken pottery sherds found on the chamber cover beam. In addition, there are eight children's pits and a few animal pits found in Nr. I cemetery. The tomb details can be seen in Table 23 and Fig. collection 5.2.8-2.

3.2 Nr. II Cemetery

It is located 3km to the south of Chawuhu gully. More than one hundred tombs are found from the field survey, and twenty-four tombs have been excavated. There are seven vertical shaft stone tombs with surface stone circles, ten vertical shaft stone tombs with surface stone mounds, and seven stone tombs with to tomb chamber. All burials are scattered and distributed on the terrace.

Single-burial and multi-burial are both found in Nr. II cemetery, while single-burial accounts for most. Pottery wares are the primary grave goods, while bronze, lithic tools, bone, wooden, and iron objects are also found altogether. In addition, there are some children's pits found in between the stone tombs, also constructed by stone slides and surface stone mounds. The tomb details can be seen in Table 24 and Fig. 5.2.8-3.

3.3 Nr. III Cemetery

It is located on the terrace southwest of Chawuhu gully, and the terrace is 200m long and 65m wide. There are two hundred and fifty-five tombs discovered from the field survey, and twenty tombs have been excavated.

All tombs have surface stone mounds or circles. The tombs are in a vertical shaft stone pit, shaft pit with a side chamber, shaft pit with double chambers, and vertical shaft pit. In addition, eight tombs have been found with wooden coffins or frames. There are seventeen single-burials and three multi-burials. The grave goods include pottery wares, bronze objects, bone items, lithic tools, wooden objects, and golden and silver objects. The tomb details can be seen in Table 25 and Fig. 5.2.8-4.

3.4 Nr. IV Cemetery

It is located on the northern side of the Chawuhu gully on the terrace; the terrace is rectangular; the length is 165m, and the width is 65-80m. There are two hundred and forty-eight tombs excavated in Nr. IV cemetery, naming M1-M22, M24-M64, M66-M250. Nr. IV cemetery is composed of a sacrificial section and tomb section.

The sacrificial section is located on the eastern and northern terraces. In this section, ten sacrificial features are divided into two sub-groups: group A has three parts on the north terrace, named JI-JIII; group B has seven features on the eastern terrace, named JIV-JX. The sacrificial features are constructed by stones, with one round stone mound on the outside, the red/yellow/black/white boulder placed on top, and one stone circle on the inside, whose diameter is 1-3m, filled with sandstones and Gobi soil.

The tomb section is located on the middle and eastern terrace. The tombs are mainly vertical shaft stone chamber tombs with surface stone circles. Boulders construct the tomb chambers, and rectangular stone slides cover the tomb openings; some have layers of stones above the cover.

There are two hundred and forty-seven tombs found with the human body and eight

hundred-eighty individuals. Thirty-seven single-burials and two hundred and ten multi-burials, including fifty-eight double-burials. The grave goods include pottery wares, bronze objects, wooden items, bone items, lithic tools, woolen fabrics, and golden, silver and iron objects. Pottery and wooden objects are mostly found close to the head; bronze knives are found on the waist side, and the spinning wheel, bead ornament, button, and cosmetic sticks are mostly found alongside the female body. In addition, there are fifty-two animal pits and a children's pit in this section. The tomb details can be seen in Table 26 and Fig. 5.2.8-5.

3.5 Nr. V cemetery

It is located on the western terrace. The terrace is 95m long, 50-70m wide. More than one hundred and fifty tombs from the field survey and the excavation only yielded twenty-four tombs. All tombs have a surface boulder circle on the ground, and the tomb chamber is under the stone circle; the length is between 150-200cm, the width is between 80-150cm, depth is about 150cm. Three-six layers of stone slides construct the tomb sides, and the chamber opening is covered by large stones filled with small gravel stones. Wooden beams cover two tombs. Most tombs have no couch in the tomb chamber, while only one exception is that the body is placed on wooden sticks (M5).

There are seventeen single-burials and seven multi-burials, thirty-four individuals in total. Most bodies are in supine flex form. The grave goods are mainly pottery wares, with few bronze objects, wooden items, horn and tooth items, and lithic tools found altogether. The tomb details can be seen in Table 27 and Fig. 5.2.8-6.

4. Age

4.1 Relative Age

The tombs from Chawuhu can be divided into four types:

- Type I*: single-burial with a supine straight body, the stone circles are triangular. The tomb pit is shallow, with no standing rocks and no animal pit.

- Type II*: multi-burial. The stone circle is triangular, with vertical rocks surrounding the

circle. There is one entrance to one tomb chamber, and the stone circle overlaps the animal pit.

•*Type III*: multi-burial and secondary burial. The stone circles have standing rocks, animal pits, and children's pits surrounding alongside. The tomb chamber has no entrance, and the chamber is constructed of more than ten layers of stones. The chamber passage is typical in this type, and mostly chamber walls are becoming bigger from top to bottom. The chamber cover stones parallel to the surface ground.

•*Type IV*: multi-burial. The stone circles are round and oval in shape; only a few triangular circles remain, and the stone circle length is usually more than 5m. Animal pits and children's pits are common. The chamber walls are generally straight, with no chamber cover. The tomb entrance is higher than the surface ground.

There are 448 tombs excavated in Chawuhu site, reveals plenty of complex stratigraphic sequences that can reflect the different phases of Chawuhu site. The stratum sequence in Chawuhu is quite complex, with three conditions: disturbing, avoiding, and "borrowing." The avoiding relationship is usually seen from the surface stone circles, and to avoid destroying the previous tombs, the later stone circle changed the popular triangular shape. The "borrowing" relationship uses the stone circle from both sides and only constructs the chamber pit.

Disturbance group (15')	Avoiding relationship (9')	"Borrowing" relationship
IM320→IM319, IM308→IM307, IM283→UT (unexcavated tomb), IM213→IM279, IM201→IM202, IM219→IM296, IM249→IM250, IM266→IM267, IM278→IM280, IVM32→IVM190, IVM52→IVM233, IVM117→IVM154, IVM89→IVM156, IVM35→IVM42.	IM246→IM248, IM228→IM229, IM268→UT, IVM112→IVM25&110, IVM127→IVM104, IVM103→IVM174&162, IVM163→IVM161, IVM134→IVM137, IVM126→IVM104&129	IVM84→IBM85→IVM86

Table 28. Chawuhu stratum conditions

IVM52 is a type III tomb in these disturbing groups, IVM233 is type II; while the IVM35 is type III, IVM42 is type I. The disturbing relationship indicates that type III is later than type II and I, while four types from I to IV show a continual development from early to late phase. Therefore, the relative time sequence of four tomb types is type IV→III→II→I, type I is the earliest, while type IV is the latest. The distributions of different types in Nr. IV cemetery from low to high and from south to north is from I to IV, which indicates the utilization of this site is from the lower terrace to higher.

Combining with the grave goods, especially the pottery types and patterns, the phases of Chawuhu can be divided into three sub-phases: the type I tombs are mainly in Phase A, including thirty-two tombs in Nr. I cemetery, one hundred and fifty-one tombs in Nr. IV cemetery and twenty-four tombs in Nr. V cemetery. Phase A is the beginning of the Chawuhu site. Type II and III tombs belong to phase B, including ninety tombs in Nr. I cemetery, five tombs in Nr. II cemetery, and eighty-seven tombs in Nr. IV cemetery, which is the flourishing period. Tomb type IV belongs to phase C, including six tombs in Nr. I cemetery, eleven tombs in Nr. II cemetery and five tombs in Nr. IV cemetery, the accounts of the tomb number are decreased, indicating the recession period.

The large amounts of bronze objects indicate the Bronze Age time phase, while in some later tombs, iron objects are increased. Therefore, the time of Chawuhu site could be between the late Bronze Age and early Iron Age period.

4.2 Absolute Age

There are twenty-six radiocarbon dating results tested from Chawuhu samples, and the calibrated data can be seen in Table 4. In general, the absolute age of Chawuhu is between 1100 BC-200 AD. More accurately, phase I is between 1100-500 BC, Phase II is between 500-200 BC, and Phase III is between 200 BC-200 AD.

5. Interpretation

5.1 Burial Tradition and grave goods

The tombs from Chawuhu have typical features, and the forms change according to different time phases. The ground structure changed from triangular to round and oval stone circles and then stone mounds. All tomb chambers are in vertical shaft pits, mainly constructed with stones. The early phase is single-burial mainly, while in the later stage, multi-burial and secondary burials are more common, the animal pit and children pit increased.

Tombs with surface stone indicators have shown a great southern Siberian cultural element, from Afanasievo culture to Qiemu'erqieke culture, indicating a spread route from the north (Guo, 2011).

Pottery wares are mainly grave goods and then are the bronze objects. Pottery jars and cups are the primary types. In phase I, the spouted pottery wares and painted patterns are few, with few bronze objects and no iron objects. The spouted pottery wares and painted patterns account for the most in Phase II, bronze objects are common in phase II tombs, and the iron objects started to appear. The pottery pattern in Phase II is the most typical feature of Chawuhu site, including triangular, line, grid, and cloud-shaped patterns. The various shaped patterns are replaced by simple line patterns in Phase III, when bronze and iron objects become popular. The marks on the pottery wares indicate that these are the daily used ware and buried with the dead (Zhou, 1998; Xinjiang, 1999).

The structured stone tombs and painted pottery are the most typical feature of the Chawuhu site, representing a unique cultural tradition in the southern Tianshan slope region. Its cultural influence may spread eastwards through the mountain route (Zhou, 1994).

5.2 Subsistence

Large amounts of bronze objects are found in the Chawuhu site, including the small knife, harness, bells, arrowhead, etc., suitable for mobile usage. The spouted pottery ware is also thought to be designed as the milk-drinking vessel (Xinjiang, 1999). The horse and sheep/goat bones found in the independent animal pits and the tomb chamber indicate the development of herding and livestock husbandry (An & Yuan, 1998). The location of Chawuhu site has the ideal condition for hunting and transhumant, which also proves their herding strategy (Zhou, 1998).

The cereal remains from the pottery wares, and the physical anthropological study suggests that cultivated wheat and barley may have been practiced in Chawuhu (Zhou, 1998; Xinjiang, 1999; Zhang, 2005; Dai, 2015). But there are no agricultural tools found. At the same time, the dietary study reveals that the inhabitants in Chawuhu lived mainly on meat products with only a small number of plants (Zhang, 2005).

The production of pottery, pattern drawing, bronze casting, wooden items, and woolen textile processing represent the highly developed handicraft industry and the long-term settlement. The orderly distributed tombs on both sides of the Chawuhu gully are the public cemetery for the inhabitants of Chawuhu, without a doubt, and could be a pre-planned constructed cemetery that followed the sloping terrain by the settlement.

In addition, the mtDNA study also reveals that the Chawuhu population is an admixture of Euro-Asian lineage, which may prove that the communication by migration may have appeared in the mid-Tianshan region in the late Bronze Age time (Xie et al., 2005).

5.3 Summary

Chawuhu people lived in a diverse subsistence strategy of herding, farming, and hunting (Betts, 2019). They use their environmental benefits for the transhumant lifestyle while also keeping a relatively sedentary lifestyle. The large-scale public cemetery and unique painted pottery wares make Chawuhu the largest late Bronze Age-early Iron Age settlement in the mid-Tianshan region, contributing to the "Chawuhu Culture," distinguished from other painted pottery cultural traditions in Xinjiang.

The development of tomb structures and the daily wares shows the transformation from the mobility lifestyle to the semi-sedentary economic strategy with social complexity.

Chawuhu population settled in the oasis basin developed its cultural tradition while also interacting with other neighboring regions through the mountain route, contributing to the cultural exchange in the late Bronze Age and early Iron Age.

3. Southern Tianshan Mountain

3.1 Gumugou Site

1. Location

Gumugou site is located in the Taklamakan Desert of northern Tarim Basin, on the shore of the dried-up Kongque River (Peacock River) about 70km to the west of Lop Nur Lake. The site lies on the second terrace of the Kongque River (Fig. 5: 32).

The Tarim Basin is situated in the Warm Arid Temperate Zone. In total, summer and winter represent a distinct wet and dry season; this area receives the lowest precipitation in China, mostly dropping to an annual capacity between 15 and 50 mm. Due to the meager totals of rainfall, usually, all months are dry. The seasonal temperature amplitude exceeds 70°C (Domorös and Peng, 1988).

2. Research History

In the 1930s, Stein and Bergman had surveyed the Lop Nur region (Bergman, 1939). They defined several sites by the exposed wooden coffins and collected objects, including the "Xiaohe" site and the later called "Gumugou" site.

The actual research started in the 1980s by the Xinjiang Institute of Cultural Relics & Archaeology. Led by Wang Binghua, the archaeological team confirmed this site on the terrace of the Kongque River in 1979; there was one lithic site and one single Han Dynasty tomb close to the terrace. The excavation lasted 27 days (Wang, 2014), the brief report was published in 1983 (Wang, 1983), and the final excavation report was published in 2014. The Second National Archaeological Survey in 2009 reconfirmed the geographical coordination (Wang, 2014).

The excavation of Gumugou brought great attention from scholars and the public. The continued research focused on the burial traditions and living model (Wang, 1983a, 1983b; Aimaiti, 2011; Cui et al., 2002a, 2002b), cultural content and connections with other regions (Wang & Wang, 2016), physical features (Han, 1986; Cui & Zhou, 2004; Zhang et al., 2006; Qu et al., 2013), plant, dietary and environmental research (Xia, 1997; Zhang & Zhu, 2011; Xin et al., 2013, 2015;

Zhang et al., 2015), grave goods and artifacts industry research (Chen, 1995; Xin, 2017). After the excavation, Gumugou site is thought to belong to Xiaohe Culture in the Lop Nur region (Wang, 2014).

3. Findings

The site is 45m long from north to south and 35m wide from east to west; the full scale is 1,600m². Forty-two tombs are found in total, naming 79LQ2M1-42. This site can be divided into two sections: there are six tombs with vertical wooden sticks in circles in the northern section. The tombs in a rectangular shaft pit are on the southern part of the site. 79LQ2M1, 6-10 are located in the north, and the rest are in the south region (Fig. 5.3.1-1). The details of the grave goods can be seen in Table 29.

3.1 Northern Section

79LQ2M1 (Fig. 5.3.1-2): M1 is situated northeast of the site. The standing sticks are found under the surface ground of about 30-70cm; there are seven circles of timber pile, the long diameter is 280cm, short diameter is 180cm. The diameter of the timber pile starts from 2cm and increases to 4, 5, 7, 8, 18, 28cm from the center to the outer circle, and the height increases from 18cm to 24, 26, 30, 42, 78 and 100cm. On the east of the ring, there are nine radial rows of timber piles; the complete row is composed of seven timber piles, while the rest has been damaged in the later period.

Under the ground mound is one rectangular sandpit; the length is 240cm, the width is 67cm, and the depth is 145cm. There might be a wooden coffin inside no longer existed anymore; only the ashes remained. The thickness of the ash is 1cm, the length is 230cm, width is 60cm. The body is preserved in good condition, in a supine straight position, and the orientation is 90°. The body is an adult male, and no grave goods are remaining.

79LQ2M6 (Fig. 5.3.1-2): M6 is situated on the site's northwest corner, and M1 is on its northwest. The construction of the M6 ground mound might damage the radial row of M1. There are seven circles of thin timber piles 20cm under the surface, and the diameter of the circles is 250cm-450cm. The diameter of the timber pile is between 5-10cm. There are fourteen radial

rows of timber piles on the east of the circle, the diameter of the timber pile is 35cm, and the height is around 100cm.

The coffin of M6 is in a rectangular sandpit; the pit is 230cm long, 80cm wide, and 190cm deep. The coffin is 230cm long, 42-70cm wide, and 12cm thick. There are twelve wooden boards on top. The body in the coffin has been damaged, and only the lower body has remained. Supine straight, the orientation is 85°. The body is an adult male. There are two wooden objects found in the coffin.

79LQ2M7 (Fig.5.3.1-4): M7 is situated on the east of the site; its north is M1, south next to M8, and northwest to M6. The east of M7 is the end of the site. M7 is the most complete remained tomb in the northern part.

There are seven circles of timber piles, the diameter of the pile is between 2-15cm, and the height is between 20-100cm. There are six hundred and forty-five timber piles in total. The long diameter of the circle is 350cm, the short diameter is 200cm, and the distance between each ring is 10cm. There are forty-five radical rows of timber piles outside the circle; each row has about seven timber piles; there are two hundred and forty-nine timber piles in total. Most of the timber piles are made of poplar.

The wooden coffin of M7 is in a rectangular sandpit; the pit is 210cm long, 76cm wide, and 190cm deep. The coffin is rotted; the length is 210cm, width is 40-70cm. The body in the coffin is preserved in good condition, supine straight, and the orientation is 90°. The body is an adult male; according to the physical features, it is an older adult. Several black-brown ashes are found on the body, which might be the textile remains. There is one bronze roll found on the chest.

79LQ1M8 (Fig. 5.3.1-5): M8 is situated in the southeast, north to M6, 2.5m southwest to M31. There are seven circles of timber piles on the surface ground; outside the circles are seventeen radical rows of timber piles. M7 radical rows damaged the northern timber piles, and the construction of M31 damaged the western timber piles.

The wooden coffin of M8 is in the rectangular sandpit; the pit length is 255cm, the width is 90cm, and the depth is 65-85cm. The coffin length is 200cm, width is 30-50cm. One body found inside the coffin might be an old male; the body is not preserved in good condition, and several bones are located in the sand fillings. The body is in a supine straight position, and the orientation is 90°. There is one wooden figurine found in the sand fillings.

79LQ2M9 (Fig. 5.3.1-6): M9 is situated on the central west, 2m south next to M12, west to M33 and M34, northwest to M18. There are seven circles of timber piles on the surface ground, the diameter is between 180-280cm, and there are thirteen radical rows of timber piles outside the circles; some of the timber piles are damaged due to the construction of the M11, M15, M18, M32, M33, and M34.

The wooden coffin is in the rectangular shaft pit; the pit is 360cm long, 140cm wide, and 160cm deep. The coffin is 235cm long and 42-60cm wide. The body in the coffin is preserved in good condition, supine straight, and the orientation is 92°. The body is an old male. No grave goods are remaining in the coffin.

79LQ2M10 (Fig. 5.3.1-7): M10 is situated southwest of the site, east next to M30, M41, M42, and south next to M20, M25, M26, M37. There are seven circles of timber piles on the surface ground, while the east part has vanished, which might be due to M25, M37, or M3. There are thirteen radical rows of timber piles outside the circles; under the radical timber, piles are M41 and M42, so the stratum sequence is M41&M42→M10→M25, M37&M3. There are six hundred and eighty-three timber piles in total, the diameter of the timber is 3-30cm, and the height is around 75cm.

The wooden coffin of M10 is in the rectangular shaft pit; the pit is 200cm long, 80cm wide, and 210cm deep. The coffin is rotted; the length is 180cm, width is 40-60cm. The body found in the coffin is preserved in good condition, supine straight, and the orientation is 90°. The body is an old male. There are bone ornaments, bronze objects, and stone ornaments found inside the coffin.

3.2 Southern Section

79LQ2M2 (Fig. 5.3.1-8): M2 is situated on the site's southwest corner, southeast to M28, northwest to M4, northeast to M3. There is no surface mound, and the coffin is 20cm under the surface ground. The coffin is in a rectangular pit. The coffin is made of poplar boards; the length is 80cm, and the height is 20cm. A piece of dark sheep leather covers the coffin.

An infant body is found in the M2 coffin, supine straight; a yellow woolen blanket covers the body, and under the head is a piece of sheep leather. Some *Ephedra twigs* are found on the chest, one jade bracelet on the wrist, and a pair of leather boots on foot. In addition, there is one grass basket next to the head.

79LQ2M3 (Fig. 5.3.1-9): M3 is situated on the southwest corner, 2m to the east of M2, 1m to M10. There is no surface mound; the coffin is in a rectangular sandpit; the pit is 200cm long, 70cm wide, and 150cm deep. The wooden coffin is made of ten wooden boards; the coffin is 190cm long, 65cm wide, and 150cm deep. The orientation is 80°.

The body found in the coffin is preserved in good condition, supine straight, and belongs to an adult female. Some black-brown ashes remained in the coffin, which might be the textile ashes. In addition, there are one wooden figurine, one jade ornament, and one bracelet stringed by bone bead found in the coffin.

79LQ2M4 (Fig. 5.3.1-10): M4 is situated on the site's western edge, 1m north of M2. There are several small standing wooden sticks on the surface ground. The wooden coffin is in a sandpit; the length is 100cm, the width is 50cm, and the depth is 50cm. The coffin is 98cm long and 49cm wide, and it is made of two pieces of poplar boards, while the coffin cover is composed of five small panels. In addition, there are three pieces of sheep leather.

One infant body is found inside the M4 coffin, supine straight, the orientation is 70°, and a woolen blanket covers the body. The hair is yellow and not rotted, and there is one felt hat on the head; and one pair of leather shoes on foot. There are some *Ephedra twigs* on the right shoulder of the body, two grass baskets with some wheat grains inside, animal horn objects, and jade beads found in the coffin.

79LQ2M5 (Fig. 5.3.1-11): M5 is situated on the southwest edge of the site, 1.5m northeast of M4 and 2m east of M3. There are two small wooden standing sticks on the surface ground, in front, and behind the coffin; the coffin is in a rectangular pit. The coffin is 20cm under the sand surface. The right and left sides of the coffin are two large planks, the length is 107cm and 112cm, respectively, and the cover board of the coffin is composed of 5 pieces; above those are four pieces of goat/sheep leather.

One child's body is found inside the M5 coffin, 6-year-old, supine straight, and the orientation is 80°. A woolen blanket covers the body, with a yellow felt hat, one leather jacket, and one leather pouch inside the hand; only one leather shoe remained. One grass basket, one leather pouch, and one beef piece are found inside the coffin.

79LQ2M11 (Fig. 5.3.1-12): M11 is situated between M6 and M9. The vanish of the radical timber piles of M6 and M9 might be because of the construction of M11. There is no surface mound. The coffin is in a rectangular sandpit; the pit is 196cm long, 65cm wide, and 125cm deep. The coffin is 85cm under the surface sand, composed of eight boards. The coffin's length is 176cm, the width is 30-45cm, and the height is 23cm.

There is one female body found inside the M12 coffin, supine straight. In addition, there is one felt hat found on the head, some wooden basins, grass baskets, wooden objects, and *Ephedra* twigs located in the sand.

79LQ2M12 (Fig. 5.3.1-13): M12 is situated in the western site, north to M6 and south to M13. There are some rectangular wooden planks on the surface ground. The coffin is in a sandpit; the pit length is 200cm, the width is 90cm, depth is 170cm. The coffin is 110cm under the surface sand and the coffin is 185cm long. There are some red paintings on the coffin board from inside. The cover board of the coffin is composed of eight panels, above which are the leather and reed mat.

An old female body is found inside the M12 coffin, supine straight, and the orientation is 90°.

Several wooden objects, animal horn objects, wooden figurines, wooden bow, and grass baskets are found inside the coffin.

79LQ2M13 (Fig. 5.3.1-14): M13 is situated in the northwest of the site, between M6 and M9, 1m to the east of M11, 1m to the north of M12, 2m to the west of M14, M15, M16. The damage to the timber piles of M6 and M9 might be because of the construction of M13. There are three small timber piles under the surface sand; between the timber piles are reed walls to fix the frame, making a tomb pit. The pit is 140cm long, 60 cm wide, and 120cm deep. The coffin is 90cm below the surface sand, and the orientation is 90°. The coffin is 120cm long, and the board is 21cm high and 2cm thick; 6 boards make the coffin cover.

There is one child's body found inside the M13 coffin, supine straight, and the height is 55cm. The textile has rotted. In addition, there are several wooden objects, grass baskets, and animal horn objects found in the sand.

79LQ2M14 (Fig. 5.3.1-15): M14 is situated on the northwest of the site, 2m to the east of M13, 1m to the south of M15, 50cm to the north of M16. There are some small wooden standing sticks on the surface sand, in a rectangular shape. The coffin is in a rectangular sandpit; the pit length is 150cm, the width is 80cm, and the depth is 125cm. The coffin comprises seven top boards and different gate plates, no bottom board.

One infant body is found inside the M14 coffin, supine straight, covered by a woolen textile. In addition, there are several wooden objects and one wooden figurine found inside the coffin.

79LQ2M15 (Fig. 5.3.1-16): M15 is situated on the northwest of the site, 1m to the north of M14, and 50cm to the southwest of M17. There is no noticeable feature on the surface sand. The wooden coffin is in a rectangular pit, and the pit is 100cm long, 40cm wide, and 70cm deep. The orientation is 90°. The coffin is 50cm under the sand surface. The top coffin comprises five boards with rotted leather above it.

One infant body is found inside the M15 coffin, covered by woolen textile, supine straight. In

addition, there are some *Ephedra* twigs in a small bag, some woolen fabrics, and one grass basket found inside the coffin.

79LQ2M16 (Fig. 5.3.1-17): M16 is situated northwest of the site, south of M14, and northeast to M12, between M6 and M9. There are six standing sticks on the surface. The wooden coffin is in the rectangular sandpit; the pit is 157cm long, 90cm wide, and 125cm deep. The coffin is 110cm under the surface sand; the coffin is 137cm long, 40-68cm wide, and 15cm high. The orientation is 100°. One infant body is found in the coffin, covered by a woolen blanket; the body is about 90cm high. There are no grave objects found inside the coffin.

79LQ2M17 (Fig. 5.3.1-18): M17 is situated in the northwest of the site, southwest to M15, southeast to M18, M17 is located in the radical row of M9. Nothing remains on the surface ground. The wooden coffin is in the rectangular sandpit; the pit is 220cm long, 90cm wide, and 120cm deep. The coffin is 180cm long, 47-60cm wide, and 31cm high. The orientation is 90°. There is one old female body found inside the coffin, supine straight. There is one wooden cup found near the head.

79LQ2M18 (Fig. 5.3.1-19): M18 is situated on the northwest of the site, 1m to the west of M17, and southeast to M9. There are three standing sticks on the surface ground. The wooden coffin is in the rectangular sandpit, and the pit is 246cm long, 64cm wide, and 136cm deep; four timber piles fix the pit in the corner. The coffin is 100cm under the surface sand; the length is 196cm, the width is 36-48cm, height is 40cm.

One female body is found inside the M18 coffin, supine straight, and the orientation is 80°. In addition, there are one wooden bow, one stone figurine, and one bronze bead found in the east of the coffin.

79LQ2M19 (Fig. 5.3.1-20): M19 is situated on the southwest edge of the site, 3m to the north of M23 and 4m to the east of M21. There are two standing planks on the surface ground. The wooden coffin is found in the rectangular sandpit; the pit is 210cm long, 95cm wide, and 115cm deep. The coffin is 200cm long, 36-46cm wide, and 20-46cm high; the coffin cover comprises

nine boards.

One female body is found inside the M19 coffin, supine straight, and the orientation is 95°. Some woolen blanket fabrics are under the body, and some felt hat ashes are on the head. In addition, there are some *Ephedra* twigs in a small bag, one jade bracelet, one small stone, and one wooden figurine face found in the coffin.

79LQ2M20 (Fig. 5.3.1-21): M20 is situated on the southern site, northeast to M19, east to M26, north to M25, and 3m south to M10. There are ten vertical planks on the surface ground, making an outer coffin. The outer coffin is fixed by reed mud. The inner coffin is 200cm long, 36-54cm wide, and 60cm high.

One female body is found inside the M20 inner coffin, supine straight, the orientation is 90°. In addition, there are twenty-six animal horns and one wooden object outside the east coffin, several bone beads on the necklace, one bronze roll on the right wrist, and one female wooden figurine on the northwest corner of the coffin.

79LQ2M21 (Fig. 5.3.1-22): M21 is situated on the site's southern edge, north to M22 and east to M40. There is no noticeable feature on the surface ground. The wooden coffin is in the rectangular sandpit; the pit is 235cm long, 55cm wide, and 150cm deep. The coffin is 220cm long and 50cm wide.

There is one male body inside the M21 coffin, supine straight, the orientation is 70°. Woolen fabrics partly cover the body. There are three animal horns, two bone Awls, three jade beads, several bone beads, and one small stone found inside the coffin.

79LQ2M22 (Fig. 5.3.1-23): M22 is situated on the southern edge of the site, south of M21; there is no obvious on the surface ground. The wooden coffin is in the rectangular sandpit; the pit is 210cm long, 50cm wide, and 150cm deep. The coffin had been rotted; only ashes remained. One female body remained in the coffin, not in good condition, and the orientation is 80°. There is one jade bead found inside the sand.

79LQ2M23 (Fig. 5.3.1-24): M23 is situated on the site's southwest corner, 3m south to M19, 50cm north to M24, and 1m east to M36. There are four vertical sticks on the surface ground. The wooden coffin is in a rectangular sandpit; the pit length is 180cm, the width is 50cm, depth is 52cm. The coffin is found 30cm under the surface sand. The coffin cover comprises 12 boards, above which is one grass dustpan.

One female body is found inside the M23 coffin, supine straight, and the orientation is 75°. A woolen blanket covers the body. The body is 145cm high, and she wears one point felt hat and one pair of leather shoes. In addition, there is one grass basket with several *Ephedra* twigs found inside the coffin. This female body was called "Loulan Beauty" after it was published.

79LQ2M24 (Fig. 5.3.1-25): M24 is situated southwest of the site, south to M23, and north to M28. There are two standing sticks on the surface ground. The wooden coffin is in the rectangular sandpit; the length is 150cm, the width is 60cm, and the depth is 50cm. The coffin is 30cm under the surface sand, and the coffin cover is six slabs, above which are animal leather and dustpan. The coffin boards are 20cm high. One infant body is found inside the coffin, supine straight, the orientation is 83°. A woolen blanket covers the body. In addition, there is a grass basket found in the coffin.

79LQ2M25 (Fig. 5.3.1-26): M25 is situated on the southern site, south to M20 and north to M10. There is no noticeable feature on the surface ground. The wooden coffin is in the sandpit; the length of the pit is 240cm, the width is 80cm, and the depth is 106cm. The coffin is found 80cm under the surface sand. The coffin board is 180cm long and 26cm high. One female body is found inside the coffin, supine straight, the orientation is 90°. There are several *Ephedra* twigs in a small bag.

79LQ2M26 (Fig. 5.3.1-27): M26 is situated east of M20, south to M38, northwest to M25, and southwest to M27. There is no noticeable feature on the surface ground. The coffin is in a sandpit; the pit is 200cm long, 100cm wide, and 160cm deep. The coffin is 180cm long, 30-45cm wide, and 23cm high. A piece of goat/sheep leather covers the coffin cover, and seventeen animal

horns are on the west. There is one dustpan on the western leather. One old male body is found inside the coffin, supine straight, the orientation is 90°, with a felt hat. One grass basket lies next to the head, and two bone awls in the coffin.

79LQ2M27 (Fig. 5.3.1-28): M27 is situated on the south of M20. There is one standing stick on the surface ground, and the stick diameter is 30cm. The wooden coffin is in the rectangular sandpit. The pit is 100cm long, 50cm wide, and 77cm deep. The coffin is 105cm long, 20-30cm wide, 22cm high.

There is an infant body found inside the M27 coffin, supine straight, the orientation is 90°. A woolen blanket covers the body, also wears a felt hat; and one jade bracelet on the right wrist. In addition, one wooden object is found in the upper filling sand, which might be a wooden shovel; the length is 22.5cm, the width is 7cm, and the thickness is 2cm. This object is broken, which might be due to the construction of M27, indicating the utilization of the wooden tools in Gumugou Site.

79LQ2M28 (Fig. 5.3.1-29): M28 is situated southwest of the site, south to M24, north to M2. There are two standing sticks on the surface ground. The wooden coffin is in a sandpit, and the coffin is rotted. Two upright boards make a corner on the northeast of the pit; the length of the boards is 20cm and 40cm. There is one vertical board on the southeast corner (40cm long, 10cm thick); two panels corner on the southwest, the length is 20cm and 35cm, and the thickness is 4-8cm. These sticks are used for fixing the sandpit. The pit is 200cm long, 80-120cm wide, and 200cm deep. There are only coffin ashes remaining in the pit.

One old male body is found in the pit, supine straight, and the orientation is 81°. One bone bead necklace is found on the neck, a bone bead bracelet is on the right wrist, six bone awls are found on the body, and one grass basket piece is on the right shoulder.

79LQ2M29 (Fig. 5.3.1-30): M29 is situated in the middle of the site, north to M30, northwest to M10, and west to M26. There are five vertical sticks on the surface ground, and the diameter of the sticks is 10-20cm. The wooden coffin is in a sandpit, and the pit is made into a tomb chamber

by several fixed standing poplar boards. The pit is 240cm long, 140cm wide, and 190cm deep. There are four standing boards on the east of the chamber, making a tomb passage. The coffin is 180cm long and 30-50cm wide; the coffin cover comprises 18 boards. One male body is found inside the pit, supine straight, and the orientation is 85°. The attached cloth has rotted. There is one small stone found alongside the body.

79LQ2M30 (Fig. 5.3.1-31): M30 is situated on the eastern site, southeast to M29, north to M41, and 3m west to M10. There is no noticeable feature on the surface ground, while M30 is in the radical timber piles of M10. The wooden coffin is found in a sandpit; the pit is 200cm long and 110cm wide. The coffin is 134cm under the surface sand. The coffin is 180cm long, 80-106cm wide, and 46cm high. The coffin cover comprises eight boards, with a piece of reed mat above it. The mat is 80cm long and 30cm wide.

There are two adult male bodies found inside the M30 coffin, supine straight, the orientation is 56°. There is one grass basket next to the head, four bone awls to fix the woolen blanket that covered the body, three bone awls on the chest, and one stone arrowhead on the right hip bone, at where, is the fatal wound.

79LQ2M31 (Fig. 5.3.1-31): M31 is situated southwest of M8. There is no obvious feature on the surface ground. The wooden coffin is in the sandpit; the pit is 230cm long and 80cm wide. The coffin is 145cm under the surface sand. 180cm long, 28-48cm wide, 20cm high. The coffin top is composed of nine boards. One male body is found inside the coffin, supine straight, and the orientation is 100°. No textiles remained on the body anymore; only one wooden object remained inside the coffin.

79LQ2M32 (Fig. 5.3.1-33): M32 is situated southwest of the site, south of M9. There is no noticeable feature on the surface ground. The wooden coffin is in a sandpit; the pit length is 110cm, width is 50cm. The coffin is not preserved in good condition. The coffin is 80cm long, 35-38cm wide, and 30cm high. One infant body is found inside the coffin, supine straight, and the orientation is 90°. No grave goods remained.

79LQ2M33 (Fig. 5.3.1-34): M33 is situated west of M9, north to M17, south to M34. There is no noticeable feature on the surface ground. The wooden coffin is in a sandpit; the pit is 100cm long, 50cm wide, and 120cm wide. The coffin is rotted. One infant body is found inside the pit, with no grave goods remaining.

79LQ2M34 (Fig. 5.3.1-35): M34 is situated south of M33, northeast of M9. There is no obvious feature on the surface ground. The wooden pit is in the sandpit; the pit is 200cm long, 60cm wide, and 20cm high. The coffin top is composed of six boards. One female body remained found inside the coffin, supine straight. No grave goods remained.

79LQ2M35 (Fig. 5.3.1-36): M35 is situated in the southwestern site, west to M36, south to M22 & M21, north to M37, east to M38. There are five small standing sticks on the surface ground. The wooden coffin is found in the sandpit; the pit is 200cm long, 70cm wide, 145cm deep. The coffin is found 107cm under the surface sand. The coffin's length is 195cm, width is 48-60cm, the height is 25cm. The coffin top is composed of ten boards, above which are three leather pieces.

One male body is found inside the M35 coffin, supine straight, and the orientation is 75°. A woolen blanket covers the legs. There are some animal horns, one wooden object found in the filling sand, and no other grave goods.

79LQ2M36 (Fig. 5.3.1-37): M36 is situated in the southwestern site, east to M35 and west to M23. There are ten vertical sticks on the surface ground. The wooden coffin is in a sandpit; the pit is 130cm long, 60cm wide, and 40cm deep. The coffin is 130cm long and 15-42cm wide. The coffin is covered by sheep leather. One child's body is found inside the coffin, supine straight, the orientation is 90°. The body is 100cm high. There are no grave goods found together.

79LQ2M37 (Fig. 5.3.1-38): M37 is situated in the southern site, north to M10, south to M35, and east to M25. There is no noticeable feature on the surface ground. The wooden coffin is in the sandpit, and the pit is 100cm long and 25-35cm wide. The coffin is 90cm long, 25-35cm wide, and 70cm high. The coffin top is composed of 5 boards. One child's body is found inside the

coffin, supine straight, the orientation is 80°. The body is 80cm high, covered by a woolen blanket. There is one grass basket found on the body's chest.

79LQ2M38 (Fig. 5.3.1-39): M38 is situated in the southern site, south to M39, north to M26, west to M35, and northwest to M27. There are two standing sticks on the surface ground, in front, and behind the coffin. The coffin is in a sandpit; the pit is 240cm long, 90cm wide, and 85cm deep. The coffin is 55cm under the surface sand. The coffin length is 190cm, the width is 50cm, and the height is 20cm. Three pieces of sheep leather cover the coffin, the eastern leather is 90cm long, 50cm wide; the middle leather is 48cm long, 14cm wide; the western leather is 78cm long, 46cm wide. The coffin top is composed of 11 boards.

One old female body is found inside the M38 coffin, supine straight, and the orientation is 70°. The body is covered by a woolen blanket, fixed by six wooden/bone awls. She wears a felt hat, a lather scarf, and a pair of leather shoes; one grass basket is on the right shoulder. In addition, there are some *Ephedra* twigs, woolen, and felt ropes found around the body.

79LQ2M39 (Fig. 5.3.1-40): M39 is situated on the site's southern edge, north to M38 and south to M40. There are two standing sticks on the surface ground. The wooden coffin is in a sandpit; the pit is 190cm long and 70cm wide. The coffin is 60cm under the surface sand. The coffin is 160cm long, 14-30cm wide, and 18cm high. There is one body found inside the coffin, gender unknown, supine straight, the orientation is 86°. A woolen blanket covers the body; no other grave goods are found altogether.

79LQ2M40 (Fig. 5.3.1-41): M40 is situated in the southern site, north to M39, west to M21 & M22. There is one standing stick on the surface ground. The wooden coffin is in a sandpit, and the pit is 200cm long, 40-60cm wide. The coffin is 130cm under the surface sand. The coffin length is 200cm, 23-50cm wide, 10cm high. One male body is found inside the coffin, supine straight, the orientation is 85°. There is one jade bracelet on the right wrist.

79LQ2M41 (Fig. 5.3.1-42): M41 is situated in the southeastern of the site, south to M30, west to M10. There is no obvious feature on the surface ground. The coffin is in a sandpit; the pit is

226cm long, 110-119cm wide, and 132cm deep. The coffin is 220cm long and 80-160cm wide. The coffin top is composed of twelve boards. There are three male bodies found together in the coffin, supine straight, the orientation is 80°. All bodies wear felt hats; some bronze pieces, wooden objects, bone awls, and jade bracelets are found on the body side.

79LQ2M42 (Fig. 5.3.1-43): M42 is situated next to M41; there is no obvious feature on the surface ground. The coffin is in a sandpit, and the pit is 190cm long, 70cm wide, 120-130cm deep. The coffin is 180cm long and 20cm wide. One female body is found inside the coffin, supine straight, the orientation is 60°. The woolen blanket that covered the body has rotted. There is one grass basket on the right shoulder. Some woolen fabrics remained in the coffin.

Some wooden objects and one woolen fishing net are found in the filling sand.

4. Age

4.1 Relative Age

The two types of tombs in Gumugou site have the disturbing stratum, for example, M12, M13, M14, M16→M6→M1; M7, M31→M8; M11, M15, M18, M32, M33, M34→M9; M41, M42→M10→M3, M25, M37. Most of the tombs in the northern section, like M6, M9, M8, and M10, their radical timber piles are disturbed by other shaft pit tombs, so we may assume that some of the tombs with circular and radical timber piles were constructed earlier than the shaft pit tombs. However, two shaft pit tombs are found under the radical timber piles (Wang, 1983). The grave goods found in the northern and southern sections showed a significant similarity and contemporary features, so there is no noticeable time difference in the tomb construction.

Woolen objects are the most abundant goods found on the site, while several small pieces of bronze are also popular. The wooden objects have shown many percussion and production traces, leading to the development of lithic or metal tools. Pottery wares are rare in Gumugou Site, and no iron objects are found. So, the Gumugou people might still be in the Bronze Age.

4.2 Absolute Age

Various dating labs test nine samples, and the details can be seen in Table 4. Three samples are

taken from the same feature in the tested data: M38, so the dates can be much more accurate and typical. Therefore, we could narrow down the date range of Gumugou site between 2100-1770 BC.

5. Interpretation

5.1 Burial Tradition and Anthropological Feature

The tombs in Gumugou Site can be divided into two types: type I is situated in the northern section of the site, while type II is in the southern area. The most apparent feature of type I tomb is the seven circles of timber piles and several radical rows of timber piles outside the circles on the ground, while type II tombs have no surface mound. The coffins are all found in rectangular shaft pits, while some coffins are rotted into ashes.

Some of the radical timber piles of type I have been disturbed by type II tombs, which indicate the earlier time of type I burials than type II. All bodies found in the tomb are in the supine straight position, and the woolen blanket covers all. All type I tombs are male bodies found inside; the orientation is 90°. Only M30 and M41 in type II are multi-burial; the rest are single buried. The infant and child tomb are usually found close to female burial.

All textiles are used but not brand new. The grave goods are not so abundant, mostly are wooden and bone objects and grass baskets. Some tombs are also found with bead ornaments like jade necklaces or bracelets, small but beautiful stones, wooden figurines, dustpans, and animal horns. There is a noticeable difference in the goods number, indicating the difference in the individual property. In addition, there are no pottery objects found in this site.

The research on physical anthropology and mtDNA shows that the Gumugou people are classified as one group of the European populations that migrated eastward to southern Siberia and then to the Lop Nur region. The European element accounts for the most impact on the Gumugou people; while in the later period, the admixture of European, Mediterranean, Middle East, and a few Mongolian elements makes the Eastern Xinjiang, especially the Turfan-Hami Region population (Han, 1986; Cui et al., 2002, 2004). According to the physical study, type II tombs showed great similarity to the Afanasievo population, while type I tombs are more similar

to the Andronovo population (Han, 1986). Scholars used to take Gumugou people as part of the "Tochori," who started on the northern shores of the Caspian Sea and the Black Sea and then went to north Afghanistan prior to the second century BC (Mallory & Mair, 2000), while Wang Binghua argued that the current archaeological evidence could not be related simply to one specific ethnic group when there is no evidence about which language Gumugou people used (Wang, 2014). Therefore, it is still hard to tell the identification of the Gumugou people.

5.2 Subsistence and Social Life

According to the Holocene moisture evolution in arid central Asia (Chen et al., 2008) and the Northern Hemisphere temperature record (Marcott et al., 2013), the climate in the Lop Nur region could be drier and cooler during the time between early Gumugou and late Xiaohe site (Xie et al., 2016). Thus, climate change leads to the expansion of early settlement in the Lop Nur region and may lead to the vanish of the oasis culture.

Grass basket is the most common found in the Gumugou site, while in most of the baskets, there are either wheat grains or meat pieces remaining altogether. The ubiquity of wheat provides evidence of wheat cultivation and the intensification of wheat agriculture (Flad et al., 2010). Except for wheat, *Ephedra* is another common plant typically found in the small bag on the body. *Ephedra* is an ancient medicinal plant in China and usually be used for curing various diseases (Wang, 1983). Ancient Gumugou people may have taken *Ephedra* as a symbol of energy and life with magical powers, medicinal qualities, and vitality. They might have taken the *Ephedra* twigs as sacrificial offerings (Wang, 1983; Xia, 1997; Aimaiti, 2011; Zhang, 2015).

The finds of animal horns, meat pieces, leather pieces, and fishing nets indicate livestock husbandry development, especially cattle and sheep feeding. The study on the residue in the grass basket also shows that the basket could be used for sour milk strain and objects storage (Xie et al., 2016). Furthermore, the studies of carbon and nitrogen stable isotope ratios indicate that the diet of Gumugou people is dominated by meat products, including fish, along with other plants like wheat (Zhang et al., 2006; Zhang & Zhu, 2011; Qu et al., 2013). In addition, the grave goods found with production traces and the making of woolen textiles, leather shoes, grass baskets, and even the fishing net all suggest the well-development of the artifact industry.

Type I tombs are the most unique tombs in Gumugou Site. Seven circles and the radical timber piles might indicate the ancient worship. While some scholars suggest the general shape may lead to sun worship, the number "seven" may also indicate heaven's existence in Gumugou people's spiritual life (Wang, 2014). The abundant *Ephedra* twigs and the wooden figurine can also prove the worship phenomenon. In addition, one type II tomb, 79LQ2M12 provides some unique features: one wooden frame made of planks is found above the wooden coffin; there are some red triangular and parallel line patterns on the inside of the coffin board. The wooden female figurine is the most delicate one, and the grave goods are the most among other tombs; there is one row of the bone tube on the waist as an ornament, which is the most typical tool for Shaman action (Wang, 2014). Therefore, it is reliable to assume that the worship spirit and action is common in the Gumugou time.

5.3 Summary

Gumugou site exhibits a remarkable similarity with the Xiaohe site in the burial traditions and grave goods, which may all belong to the same Xiaohe Culture, while in the earlier Xiaohe Culture phase. In the same Lop Nur region, Gumugou experienced almost the same climate condition as the Xiaohe site, but earlier. Gumugou people may first come from East Europe, especially Siberian, and settled down in this oasis region. They keep communicating with the neighboring areas, reflecting on the admixture of the European, Middle East, and Mongolian elements in the mtDNA evidence.

The Gumugou people lived an admixture life with wheat agriculture and livestock husbandry when they mastered the well-developed artifact skill. In addition, they lived in an intense worship atmosphere, there may have been someone, especially for Shaman worship, and their sacrificial offering is basically from everyone.

Gumugou and Xiaohe, as one of the earliest Xinjiang Bronze Age cultures--Xiaohe Culture in the Lop Nur region, display the evidence of the first settlement in the Oasis area in the northern Taklamakan desert. Xiaohe culture provides essential evidence of the communication between Western China and other neighboring regions during the third millennium. However, there are no

clear explanations for the ongoing development. There are no pottery objects found in Gumugou Site. Also, a few red-painted pottery sherds are found in the Xiaohe site. There are no other sites with apparent painted pottery features nearby, so the further development of Xiaohe culture still needs more future research.

3.2 Xiaohe Site

1. Location

The Xiaohe site is in the Lop Nur Desert in the northern Tarim Basin, 60km from the south valley of the lower Kongque River (Peacock River) (Fig. 5: 33). The site occupies a critical position on the Peacock Valley channel from ancient Loulan City to Yanqi and Korla to the West; the Kurtuktag Mountain is located to the north, at a low altitude. The Xiaohe River (Small River) is a distributary of the Kongque River that flows from northwest to southeast ending in the desert, while today, all these rivers are dry up (Zhang, et al., 2017).

The Lop Nur Desert is the lowest area of the Tarim Basin, with an elevation of 790-810m (Zhang, et al., 2017). The Tarim Basin is situated in the Warm Arid Temperate Zone. In total, summer and winter represent a distinct wet and dry season; this area receives the lowest precipitation in all of China, mostly dropping to the annual total between 15 and 50 mm. Due to the extremely low totals of precipitation, usually all months are dry. The seasonal temperature amplitude is above 70°C (Domorös and Peng, 1988).

2. Research History

Ördek firstly discovered the Xiaohe site at the beginning of the 20th century, and then Folke Bergman investigated this area (Bergman, 1939). During his investigation, he named this site the “Small River” Site according to its riverbed, which is the same name as “Xiaohe” in Chinese. In his book published in 1939, he introduced Cemetery 5 and the grave goods in detail, bringing great attention from scholars. However, due to the World War II and afterward background, there is no further research on this area until the 1990s. At the end of 2000, a film company in Shenzhen is trying to make a documentary about Chinese western deserts; they found the Xiaohe Site successfully with the help of GPS, which aroused substantial repercussions.

In 2002, with the permission of the State Administration of Cultural Heritage, Xinjiang Institute of Cultural Relics & Archaeology established the Xiaohe Archaeology Team and started the preliminary field survey and excavation; the report was published in 2003(Xinjiang, 2003). The official excavation began from December 2003 to March 2004; the second excavation was carried out by Xinjiang Institute of Cultural Relics & Archaeology and Jilin University from September 2004 to March 2005. In total, there are one hundred and sixty-seven tombs excavated. The official excavation report was published in 2007 (Xinjiang, 2007). Two new comprehensive reports on Xiaohe Site were published in 2011 and 2019, respectively, which provide more detailed information (Baumer, 2011; Abuduresule, et al., 2019), while the complete report is still in progress.

Due to the location of Xiaohe Site, the grave goods, coffins, mummies are found in good conversation. After the excavation, the research on Xiaohe Site was done multidisciplinary. The studies include botanical and diet research (He, et al., 2014; Yang, et al., 2014; Qu, et al., 2018;), environmental research (Qiu, et al., 2014; Zhou, et al., 2017;), DNA and dietary research (Li, 2010; Li, et al., 2010; Li, et al., 2015; Zhang, et al., 2021), artifacts and the related industry research (Wu, 2013; Mei, et al., 2013; Li, 2014; Rao, et al., 2014; Mai, et al., 2015; He & Wang, 2017; Li, et al., 2017;), and comprehensive cultural research (Lin, 2002; Li, 2002; Li, 2009; Mai, et al., 2016). In addition, the Xiaohe Site is found close to the Gumugou site. The similar location and burial tradition make them belong to the same archaeological culture, so the research on these two sites also leads to a new page on the Tarim Basin prehistory culture.

3. Findings

In the 1930s, Bergman excavated twelve tombs. The Xinjiang Institute of Cultural Relics & Archaeology excavated four tombs during the field survey in 2002, the 2003 season excavated thirty-three tombs, and the 2004 season excavated one hundred and thirty tombs. In total, there are one hundred and sixty-seven tombs been excavated.

3.1 Bergman's Findings

During the expedition in Xinjiang, he took the route of Sven Hedin in 1933 into account but kept the doubt consideration of Hedin's findings. With the help of Ördek, they arrived at a yarding-bulaq in the Lop Nur Desert, where he had some early discoveries and named "Grave 10". And then they passed over one eroded clay ground near the river, where he named "The Small River". In this region, Bergman named five cultural features: *Cemetery 5*, *Watch Tower*, *Burial Place 7*, *Burial Place 6*, *Burial Place 4*. In the continued expedition, he named six cultural features on the Kongque River Delta: *Mass-Grave 1 (Nr. 34)*, *Grave 35*, *Grave 36*, "*Ruin II*" with *Grave (Nr. 37)*, *Mass-Grave 2 (Nr. 38)* and *Grave (?) near Hedin's Camp 80 (Nr. 39)*.

3.1.1 Cemetery 5

Cemetery 5 is located on a rounded hill about 4km to the Small River, and there are many curved planks, human bones, scattered skeletons found on the ground. There are two rows of the wooden barrier, which might correspond to the southern area of the 2003 season, with more than one hundred standing posts found on the hill.

Coffin 5A: Cemetery 5A is located to the east of the giant palisade; the eastern end of the coffin is quite near the ground surface. The orientation is 76°, the coffin is composed of 2 boards, covered with cow leather with the hair remaining, and the whole coffin is made in a boat shape. There is one male mummy found inside the coffin, covered by a yellow-white woolen cloak. The mummy is 170cm high. Near the head, the right edge of the cloak is tied to a small leather pouch with several grains contained. He has one woolen woven belt, one pair of leather boots, and one bracelet with opal on the right wrist. There are several wooden arrows, one grass blanket, several tamarisk branches, animal ears found around the body.

Coffin 5B: 5B is located southwest to 5A, while the coffin planks are relatively straight, the orientation is 65°, and the depth to the ground surface is about 100cm. There is one yellow woolen cloak, and parts of the woven belt left. At the same time, only a few wooden peg fragments, wooden teeth, *Ephedra twigs*, and the lower jaw remained in the coffin.

Coffin 5C: 5C is situated very close to 5B, about 30cm higher. The coffin is 196cm long. Near the eastern end of the coffin, one small polyhedric and red-painted pole wound spirally with a string of camel's wool. The only object found in the coffin is the lower part of some wooden object.

Coffin 5D: Coffin 5D is situated on the eastern side of the big palisade, the orientation is 55°, and the south-eastern end of the coffin is almost close to the ground surface. The coffin is 230cm long and 42cm wide, and the cow leather covers it. One grave object is found inside the coffin, and the body is located in the open end. The collections around 5D include one grass basket, several arrow shafts and *Ephedra* twigs, and some unknown wooden objects.

Coffin 5E: 5E is found near the western side and southern end of the big barrier. The coffin is made into a boat shape and found with a vertical pole. The coffin is 240cm long, 40cm wide, and 30cm high. There is one mummy found in the coffin, covered by a brown woolen cloak. There are some wheat grains, *Ephedra* twigs, one red-painted arrow, and some wooden objects inside the coffin.

Coffin 5F: 5F is located in the west of coffin 5E, the orientation is 60°. The length of the coffin is 260cm, width is 45cm, height is 35cm. This coffin had been damaged, while the head of the mummy is missing. The rest of the body is covered by a grey woolen cloak; near the upper end, the edge is tied into three small pouches, two of which contained *Ephedra* twigs while the third contained wheat and millet grains. The mummy has one woolen woven belt and a pair of leather boots, while under the body is another woolen cloak. Another grass basket near the right hip, with dried millet porridge(possible) found inside. There are some arrow shafts, *Ephedra* twigs, one bronze ring located around the body.

Localities 5G-5L: There are six further instances in which groups of objects could be gathered without an exact coffin. Hence, Bergman named these six features from G to L.

3.1.2 Watch Tower

According to Ördek's description, Bergman found the Watch Tower about 18km southwest of

Cemetery 5. It is situated on the dune, about 6-7m high. The tower is built of stamped clay. The tower base is square, the length is 190cm, and the width is 160cm. A low square enclosure surrounds the tower. There are some scattered red vessel pieces, iron fragments, and pottery sherds gathered from around areas.

3.1.3 Burial Place 7

About 11km to the north of the Watch Tower is the “Cemetery 7”, this burial place is 7.5km to the northeast of Cemetery 5, and it contains about 3 to 4 graves.

Grave 7A: 7A is the best-preserved grave while it has also been slightly damaged. The coffin is made of half a hollowed-out trunk, and it is composed of 2 boards, the length of the coffin is 200cm. There is one standing pole found in front of the coffin, which height is 200cm. One mummy is found inside the coffin, covered by a yellow-brown gown uniform, whose collar is sewn together from seven pieces of four different kinds of polychrome silks with bright colors.

Grave 7B: 7B has been half destroyed, and only one skeleton is found inside the coffin. Attached the skeleton are several felt fragments, red-patterned silk, grey woolen fabric, dark-red silk fabrics.

Grave 7C: To the east of grave 7A is a dismembered coffin, which is 225cm long, 40cm wide and 26cm high, the orientation is 70°. There are a few human bones found inside the coffin, without any objects. One 200cm tall pole is found standing in front of the coffin.

3.1.4 Burial Place 6

This place is situated on the western side of the Small River, only 1800m from Burial Place 7 and 6km southwest of Cemetery 5. It is surrounded by sand and dry tamarisk mounds.

Grave 6A: The coffin of 6A is exposed in the sand, and it is made of half a hollowed-out poplar trunk, the length is 210cm, and the width is 65cm, the orientation is 80°. There is one female mummy found inside the coffin, covered by silk dress from top to toe. Her cape is made by three parts, one back and two front. Both back and front parts have a broad border of lozenges of

sewn-on silks in green, red, violet, and brown colors. Below the cape is one skirt, both made by silk, while the partly damaged trousers are also found altogether. The length of the trousers is about 100cm, the wide legs are gathered and close-fitting round the ankles. In addition, there are some fragments from the sleeves of the under-garment, while the rest is unidentified.

There are some wooden spindle-whorls, one leather pouch, one bronze plate, one iron mirror found around the body, one simple necklace is strung with a few small white beads found on her neck.

Grave 6B: 6B is 3m to the north of Grave 6A. The coffin is composed of four-square boards, the length is 173cm, width is 44cm, and the height is 34cm. The coffin is lined with white felt, partly sticking to the boards. Attached the body in the coffin, a few textile fragments are placed, including fragments of silk coat and trousers, a coat made of cotton fabric. In addition, one bronze plate, an iron knife with a bone handle, and a small bundle of dark-brown hair are found in the coffin.

Grave 6C: 6C is situated 20m southwest of coffin 6A, the orientation is 70°. The coffin is made of a half hollowed-out trunk and covered by leather. The length of the coffin is 215cm. Only parts of the skeleton and of the garment remained inside, without any other grave objects.

Enclosure near grave 6B: About 20m to the north of Grave 6B, there are terraces of a rectangular enclosure, the length is 750cm, and the width is 600cm, and the height is 60cm, Bergman assumed this as a “wall”. There are some wooden cups in semi-globular shape, and with a ring handle found inside the enclosure.

3.1.5 Burial Place 4

On the 8km to the western side of the Small River is the Burial Place 4, while it has been destroyed. There might be four or six graves buried here, while only a few silk fabrics can be found.

3.1.6 Mass-Grave 1 (Nr. 34)

Nr. 34 is located in the Delta of the Kongque River. The terrace is 25m high, and the tomb is 17.5m above the water level. It is a collective grave consists of a shallow rectangular pit, with wooden boards roof and a couple of standing poles marking the edge. There are fifteen human skulls and some other human bones found in this grave, with various textile fabrics, wooden objects, bronze wares, and pottery vessels found altogether. At the same time, there is no coffin remained.

3.1.7 Grave 35 (Single grave a)

There is a smaller terrace on the eastern side of the big mesa, where a coffin is found opened. The coffin's length is 182cm, the width is 45-52cm, and the height is 29cm, and the coffin is in a canoe shape. There is a female body found inside the coffin, and she is 160cm high. She has a kerchief of a silk-wadding hat, a silk dress consists of the inner and outer garment, a pair of leather boots. There are some wooden cup, wooden plate, and silk pouch found in the coffin altogether.

3.1.8 Grave 36 (Single grave b)

Grave 36 is situated on the eastern side of the big terrace, and the coffin is 1m below the surface ground. The coffin is made by half a hollowed-out trunk, covered by leather. The coffin is 170cm long, 35-41cm wide. A female body is found inside, and she is 152cm high, covered by a dark-brown woolen cloak. She also has a woolen woven gelt and a pair of leather boots. There are some wooden and bone pins found on the cloak used to fix the cloth. In addition, there are one wooden comb, a small woolen doll, several woolen fabrics, a bunch of dark-brown hair found inside the coffin.

3.1.9 "Ruin II" with Grave (Nr. 37)

Ruin II is found by Sven Hedin, which is not far away from the mass-grave in the delta. There is a small wooden structure on the terrace and 1m below the surface ground. There are no proper coffins, with only two horizontal logs placed parallel to each other; the logs are about 39-40cm long. There are fragments of a pair of slippers and two baskets found from the ruin.

3.1.10 Mass-Grave 2 (Nr. 38)

This mass-grave is situated on the terrace to the east of Locality 5L/F, across the mound is a row of palisade running from southeast to northwest; the palisade is 390cm long. Four graves are found near the palisade. This cemetery contained eight skulls, together found with silk fragment, clay cup with handle, wooden comb, etc.

3.1.11 Grave (?) near Hedin's Camp 80 (Nr. 39)

Camp 80 is located on the Kongquehe River Delta, where they did not actually survey or excavated. The servants only collected some glass beads, cowry pieces, and carnelian on the ground.

3.2 2002 Season

The 2002 season discovered the cemetery on a sand mound, about 7.75m high, 74m long (east-west) and 35m wide (north-south). The overall scale is 2,500 m².

More than one hundred and forty vertical poles are found on the mounded ground, mainly between 2-4m high, and the diameter is around 20cm. Nr. 41 is 1.8m tall, 50cm diameter, which is the largest one among the poles. There are two rows of wooden palisades in the east and west of the cemetery, respectively. The western palisade comprises sixty-two rods, whose diameter is between 8-20cm; the eastern palisade is composed of sixty-seven poles whose diameter is between 20-25cm. Most of the poles have a red painting on the standing end. Despite the vertical bars, ten extensive-standing paddle-shaped wood is found in the cemetery, naming J1-J10; there are thirty-seven wooden sticks found on the slope. In addition, there are three wooden figures (naming MC:117-119) collected from the cemetery. The overall plan of Xiaohu site can be seen in Fig. 5.3.2-1. The excavation area is between Nr. 53 and 54 Pole in the western palisade, see Fig. 5.3.2-2, four tombs naming 02XHM1-M4.

02XHM1: M1 is located in the middle east, 1.2m to the western palisade, it has been robbed. The tomb is 88cm under the ground surface, the orientation is 90°. There are standing sticks in front and behind the coffin, with arrows placed close to it. There are ten coffin boards and cow leather remained. The coffin boards on two sides are made of complete wood, in a slightly arch shape. The coffin is 240cm long, 60cm wide and 38cm high. There are two gate plates in the front and

behind the coffin board; the front one is 46cm wide, 8.5cm wide, 4.5cm thick; while the behind one plate is 44cm high, 7.5cm wide, and 5cm thick. The plates are 10 and 8cm higher than the coffin board, respectively. Nothing remained inside the coffin, while there are few body parts found in the sand near the coffin.

02XHM2 (Fig. 5.3.2-3): M2 is located 20cm below M1, the depth to the surface ground is 130cm, the orientation is 81°. There are standing sticks in front and behind the coffin. The coffin is covered by three pieces of cow leather, above which are several tamarisk branches. The coffin is composed of ten shortboards. The length of the coffin is 192cm, width is 56cm, height is 36cm. The front gate plate is 62.5cm high, 11cm wide, 3.5cm thick; the behind gate plate is 59.5cm high, 8.5cm wide, 3.5cm thick. The gate plates are 10cm and 8cm higher than the coffin, respectively.

One wooden figurine is found inside the coffin; the figure is 135cm, covered by a grey-brown rectangular cloak, which is fixed by a thin wooden pin on the waist. The figure has a brown round felt hat, one leather pillow under the head, one grass basket on the right shoulder. There is one dark brown woven belt on the waist, a pair of leather boots on foot, two rows of woolen rope on the right wrist, one tamarisk branch in the right hand.

02XHM3: M3 is located 1m east to M1, robbed, the depth to the surface ground is 110cm, the orientation is 88°. There are standing sticks found in the front and behind the coffin. The coffin is 132cm long, 40cm wide, 24cm high. The front gate plate is 45cm high, 13cm wide, 2cm thick; the behind gate plate is 40.5cm high, 13.5cm wide, 2cm thick. There is only one child skeleton remained in the coffin.

02XHM4 (Fig. 5.3.2-4): M4 is located 50cm north of M2, while the northern plate of M1 covered the M4 plate. The depth to the ground surface is 140cm; there are standing sticks in front and behind the coffin. The coffin is 226cm long, 58cm wide, 40cm high. The front gate plate is 43.5cm high, 11cm wide, 3.5cm thick; the behind gate plate is 46.5cm high, 11.5cm wide, 3.3cm thick. There is one female mummy found inside the coffin, covered by one brown woolen cloak. The mummy is 158cm long.

Other than the grave goods found in M1-M4, more other collections are found in the cemetery without any feature, named MC. The details can be seen in Table 30 and Fig. 5.3.2-13.

3.3 2003 Season

2003 Season excavated thirty-three tombs between two southern palisades. The stratum in Xiaohe can be divided into five layers, while in this excavation season, the burials in the south belong to Layer 1 and Layer 2. However, the strong winds had damaged most tombs on the top layers, and only twenty-eight graves in the upper layer are preserved in relatively good condition. The distribution of different layer burials can be seen from Fig. 5.3.2-5. And the details can be seen from Table 31.

M11 (Layer 1) (Fig. 5.3.2-6): M11 is located in the east center of the Southern Area, between standing poles Z154 and Z155. The depth of the tomb pit to the surface ground is 40cm, the pit is 250cm, long, 120cm wide. There is one standing stick in front of the coffin (Z148). The coffin is 220cm long, 55cm wide, 24cm high. There are eleven pieces of coffin board, the coffin is covered by three pieces of cow leather, above which is one leather cloak, and then twelve tamarisk branches on the cloak. There is one female mummy inside the coffin, covered by one woolen cloak. The mummy is 152cm high; she has one white felt hat with two feathers for decoration; there is one woven belt around the waist, a pair of leather boots on foot; one red top necklace, and one jade bracelet are found on the wrist. In addition, there are several *Ephedra* twigs on the neck and chest, animal ears and several pieces of dairy products on the shoulder and chest, some grains on the belly, and one red wooden comb under the hip.

M13 (Layer 1) (Fig. 5.3.2-7): M13 is located on the sand slope in the southern area. The depth to the surface ground is 50cm, the pit is 295cm long, 140cm wide. There is one standing stick in front of the coffin (Z145), and the height is 187cm. The coffin is composed of 11 boards, the coffin is 225cm long, 84cm wide, 45cm high. The coffin is covered by three pieces of cow leather, 12 tamarisk branches above the central cow leather.

There is one female mummy found inside the coffin, covered by one white-red woolen cloak. She is 150cm high. Under the head of the mummy is one piece of white sheep leather. She has one white felt hat, one woolen woven belt, one pair of leather boots; she also wears one necklace made by red woolen rope, one woolen rope bracelet with jade bead. One small wooden figure on the left chest, one leather pouch, and three pieces of leather are found on the right belly. In addition, there is one wooden stick Zu on the left-hand side, and two small stones on the right-hand side; two tamarisk branches on the right side, and one wooden comb under the right hip. There are also some grains on the belly, several animal tendon ropes under both arms and left hip; in addition, there are several dairy products and animal ears on the shoulder area, a lot of *Ephedra* twigs under the whole body.

M24 (Layer 2) (Fig. 5.3.2-8): M24 is located in the middle of the southern area; it is broken by M6, M16, M9 and M21, and also breaks M28, and between two standing poles (Z78 and Z75). The depth to the surface ground is 170cm, the tomb pit is 440cm long, 235cm wide, two standing sticks in front of the coffin, one is 330cm high (naming Z90), and the other is 180 cm high (naming Z89). The coffin comprises ten boards, 181cm long, 49cm wide, 30cm tall. The coffin is covered by four pieces of cow leather pieces, above which are twelve tamarisk branches.

One male mummy is found inside the coffin, which is covered by one dark-brown woolen cloak; under the cloak is another grey-white woolen cloak. He is 164cm high. Under the mummy's head is one piece of sheep leather; he wears one dark brown felt hat, one brown woolen belt and one part of leather boots. He also wears the earrings and one bracelet on the right wrist. More than forty grave goods are found on the right side, including wooden figures, wooden arrows, and wooden sticks, and some *Ephedra* twigs, animal ears, and other wooden objects around the mummy.

M33 (Layer 2) (Fig. 5.3.2-9): M33 is located on the northern slope in the southern area, between two vertical poles (Z134 and Z133). The depth to the surface ground is 65cm, the pit is 225cm long, 110cm wide. The coffin is composed of ten boards, the coffin is 181cm long, 49cm wide, and 30cm high. The coffin is covered by two pieces of cow leather, above which are nine tamarisk branches.

One wooden mummy is found inside the coffin, 109cm high; the mummy is covered by one brown woolen cloak. Under the head is one piece of sheep leather. The mummy has one brown-grey felt hat, one grey-brown belt, and one pair of leather boots. It has one brown woolen rope bracelet on the right wrist, one branch of four feather arrows on the right side. Some *Ephedra* twigs are located on and beside the body, several grains are found between legs and on the belt, some dairy products are on the shoulder area, and more grains are found under the back and hip. This wooden mummy is also decorated with a fake beard and hair, which might represent a male.

M34 (Layer 2) (Fig. 5.3.2-10): M34 is located on the northern slope in the southern area, the depth to the surface ground is 60cm, the pit is 225cm long, 110cm wide. The coffin is composed of 12 boards, the coffin is 231cm long, 58cm wide, 25cm high. The coffin is covered by three pieces of cow leather, above which are twelve tamarisk branches.

One mummy is found inside the coffin, 137cm high, and it is covered by one brown woolen cloak; there is one grass basket on the right side, and one broken white blanket under the body. Under the mummy's head is one piece of sheep leather; it also has one brown felt hat, one brown woolen woven belt, one pair of felt socks, and leather boots. The mummy has one bracelet made of two rows of white woolen rope and one jade bead on the right wrist. There is one tamarisk branch on the right body side, a lot of *Ephedra* twigs on and around the body, millet grains on the belly and under the body, some dairy products on the chest, one small bronze piece on the neck, several animal ears around the neck, and several animal tendon ropes on the chest and around the body.

This mummy is made of a real human skeleton and arm and a wooden body and leg. The facial features are made of mud. The wooden body part is colored black. According to the body features and cloth, this might represent a male, and this type of burial approach may be the secondary bury.

4. Age

4.1 Relative Age

There are many vertical poles found on the surface ground in Xiaohe Site, which is always connected with the situation of the tombs. Conducting from the stratum, the poles are earlier than the tombs.

Xiaohe site can be divided into two phases based on stratum sequence and tomb types. The tombs in the southern area, which are excavated in layers 1, 2, and 3, show a remarkable similarity and consequence on the burial order, indicating that they belong to the same phase. In contrast, the tombs in the northern area excavated in 2002 might belong to an earlier stage.

4.2 Absolute Age

After the completion of 2003 excavation season, the Xinjiang Institute of Cultural Relics & Archaeology did the radiocarbon dating, which is tested by the Technology Archaeology Laboratory of the School of Archaeology and Museology of Peking University (Xinjiang, 2003; Flad, et al., 2010; Qiu, et al., 2014). There are several newly dated results published in 2019. The details can be seen in Table 4.

According to the radiocarbon dates, the absolute date of Layer 1 and Layer 2 in the southern area from Xiaohe Site could be between 1800-1500 BC, while the northern area could be between 1900-1500 BC (Abuduresule, et al., 2019).

Due to the five strata of Xiaohe site and three phases of this culture, Layer 4 and 5, which belong to Xiaohe Phase I could be dated to 2000-1700 BC; Layer 1-3 in the southern area could belong to Xiaohe phase II that dated between 1700-1450 BC.

5. Interpretation

5.1 Burial Type and Tradition

Based on the burial contexts, the tombs in Xiaohe Site can be divided into three types. The first type can be summarized as one coffin in the tomb pit and buried in the sand, with the standing stick in front or behind the wooden boat-shaped coffin (Fig. 5.3.2-12). Most coffins are found with individual bodies or figures inside, while the double burials are few. Felt hats and woolen

cloaks are the most common finds, usually with a grass basket. This type of burial accounts for the most.

The second type can be summarized as the clay shell coffin. Two tombs are found in the southern area Layer 4 and 5, and two more in the northern area, while the details have not been published yet (Abuduresule, et al., 2019).

The third type only has one example: BM28, found in the northern area (Abuduresule, et al., 2019). This tomb has a rectangular chamber, about 7 m² large and 150cm deep; the chamber entrance is made of wooden poles and planks, and there is one wooden wall inside the chamber which divided it into two rooms. The chamber is plastered with clay and painted with red or black "S" patterns. While there is no human body found inside the chamber, only a few wooden and bronze objects remained.

5.2 Subsistence and Spiritual Life

Today the Xiaohe Site is located in the arid desert area, while most of the findings indicate that Xiaohe experienced a relatively warm time and Xiaohe people lived in the well-developed oasis of deltas (Li, et al. 2013). The environmental studies suggested that the climatic conditions in eastern Xinjiang are relatively warm and humid in the early to middle Holocene due to the summer monsoon-associated moisture transport (Tarasov, et al., 2018), and Xiaohe environment is affected more by the native geomorphic conditions (Zhang, et al., 2017). During the local geomorphology change, the channel switch may decrease water flow from the Tarim-Kongque River. At the same time, the oases that were formed when the Tarim river keeps flowing through (around 4.8-3.5 ka BP), had to adjust their own living way due to the water decrease. The increasing aridity and gradual channel shift may lead to the final decline of Xiaohe Culture after ca. 3 ka BP (Wagner, et al, 2011; Zhang, et al., 2017; Tarasov, et al., 2018).

At the beginning phase of the oasis formation, the agricultural activities in the flat plain among the rivers and lakes of the alluvial fan are much possible for human habitation. A large number of grains and grass baskets also support the practice of oasis agriculture. Wheat (*Triticum aestivum*), millet (*Panicum miliaceum*), and barley are the most common grains found in the

tomb, which not only indicate the well-development of Xiaohe agriculture, but also represent the importance of the food grains in the sacrificial practice rather than as a daily staple food. The cultivation of wheat, barley, and millet is thought as the oldest direct evidence in Xinjiang (Tarasov, et al., 2018).

In addition, the finds of leather products, animal bones and ear, possible dairy products (Liang, et al., 2012), combining with the dietary analyses (Qu, et al., 2018), and together with the analysis on the adhesive products (Rao et al., 2015), all suggests that the Xiaohe people have started the initial animal husbandry, when cattle and sheep are the main livestock remains found in this site (Qiu, et al., 2014). The livestock provides meat and milk for food supply, and the leather products, including clothes, shoes and leather pieces covered the coffin, also indicate that Xiaohe people have taken over the animal husbandry skill in various approaches. As one of the transport options, cattle usage also played an essential role in further regional trade and connections.

The metal analysis studied the metal objects from Xiaohe and suggested that the significant manufacturing techniques that Xiaohe people used are hot-forging and cold working technology, while Sn-bronze accounts for the most. Among the nineteen metal samples found from Xiaohe Site, the Sn (Tin) and Au-Ag (Gold-Silver alloy) objects are the earliest findings so far in China (Mei, et al., 2013). There are not many bronze objects found in Xiaohe (at least not so much published yet), so the metal study should be kept working on more samples.

The most apparent feature from Xiaohe Site is the large numbers of standing poles on the desert ground. These poles are thought to represent the sexual organs: the paddle shape represents the female, while the straight one represents the male. In addition, the small wooden objects Zu are made into organ shapes are mainly found in the four female coffins. The four female coffins not only have wooden Zu found inside, but they also belong to the second type of burial—coffins with clay shell, and there are six vertical poles around the coffin, each with a cattle head hanging on it. In addition, the DNA study also shows that the genotype from these four coffins shares mostly in Xiaohe individuals, and the matrilineal lineage is among the most proportion (Li, 2010). Except for the four unique tombs, mostly female tombs are found with leather pouch and wooden comb, with red cosmetic sticks inside the pouch. The cosmetic sticks are suggested to

paint the mummy's face, and those sticks are made of cattle heart covered with hematite powers (Mai, et al., 2016). The unique burial tradition indicates their special identification without any doubt. And we may assume that in Xiaohe, females might receive more respect than males due to their possible reproductive worship. However, this worship did not last for a long time; in the upper layers' tomb, there are no more such burials anymore, indicating the transmission of the worship target.

5.3 Physical Features and Relationship with other regions

Genetic studies suggest that the first inhabitants in Xiaohe Site carried the West and East Eurasian mtDNA haplogroups, indicating that they might originated from an admixed population migrating from southern Siberia (Li, et al., 2010). Due to the different time phases in Xiaohe site, the Phase I correspond with the first admixed migration group from east Europe and southern Siberia. The later Xiaohe people carried more European maternal lineages, while the south Asian and east Asian percentage increased (Li, 2010).

The continued genes identified from Layer 4 and 5 showed more variation, which may indicate the Xiaohe people keep exchanging genes with their neighbors after moving into the Tarim River valley (Li, 2010; Li, et al., 2010; Li, et al., 2015; Abuduresule, et al., 2019). Furthermore, the biodistance dental non-metric traits study also shows that two more interaction spheres can be identified overall Xinjiang, one can correspond to the Liushui site, while the other one belongs to the Yanghai site (Zhu, et al., 2018). This indicates that Xiaohe people receive cultural exchange and physical migration outside the Xinjiang area, but they keep interacting with the neighboring regions.

Concerning on the origins of Tarim inhabitants, there are several major hypotheses. One point of view believed that the formation of Xiaohe culture is the results of the Yamnaya/Afanasievo cultural spread and then the further development of Andronovo culture, while some other scholars noticed the great connections with the Qiemu'erqieke culture in the Altai region (Lin, 2003; Thornton and Schurr, 2004; Shao, 2007; Jia and Betts, 2010; Qu, et al., 2018). The Bactrian oasis hypothesis suggested that the Tarim Basin was initially colonized by migrating farmers from the Bactria-Margiana Archaeological Complex (BMAC) around 2300-1800 BC, via

the mountain of Central Asian (Hemphill & Mallory, 2004). In addition, the IAMC island biogeography hypothesis also believed the origins of Xiaohe people comes from the west and north outland (Betts, et al., 2019; Li, 2021; Frachetti, 2012). While all hypotheses were objected by the newest results published in 2021, when the genomic studies from 13 individual mummies of Xiaohe exhibit genetically isolated local evidence, whose Asian origins can be traced to the early Holocene epoch (Zhang, et al., 2021). Therefore, the initial Xiaohe people may have longer existed before the northern and western migrants' arrival.

In addition, the hexaploid bread wheat is mainly considered domesticated around the Caucasus Mountains (Charmet, 2011), and transmitted to East Asia through Xinjiang (Nakamura, 2002). The appearance of this wheat in Xiaohe site may support this transmission theory. At the same time, the millet also shared the same features from eastern China, which may lead to two-way communication through Eurasian Steppe (Yang, et al., 2014).

5.4 Summary

Xiaohe Site is a unique archaeological site that represents an oasis culture in the desert area. The excavation has revealed the moving and assembling from different regions crossing the Eurasian Steppe, covering from the East European to western China.

With the relatively warm and humid environment, Xiaohe people lived in an admixed agro-pastoral economy (Tarasov, et al., 2018), with both animal husbandry and agriculture practice, while they also started the preliminary metal casting industry during the process of the migrations from the north and west, adopting the incomers' and neighbors' pastoralist and agriculturalist practices.

Wooden and plant products are more prevalent in Xiaohe than pottery objects. Female receives early respect in the beginning phase of the settlement when Xiaohe people have strong reproductive worship phenomenon. As time goes by, when the population increase seems to be not the first worship purpose, their sacrifice target started to transfer.

Xiaohe people keep interacting with the neighboring regions in every aspect while also

practicing their own cultural features. In all, Xiaohe culture is a well-developed Bronze Age culture. Climate change may lead to the decline of Xiaohe culture. The Xiaohe culture seems to demise after the third millennium BC, so the problems about where the Xiaohe people went after the demise, and the further development of Xiaohe culture, still need more future research.

3.3 Mohuchahan Site

1. Location

Mohuchahan site is in Hejing County, Bayingolin Mongol Autonomous Prefecture. The site is also situated in the Mohuchahan Wusun gully in the Yanqi Basin. The gully flows from the northeast to the southwest. The site is located on the third terrace of the Mohuchahan Wusun River (Fig. 5: 27). The Yanqi Basin lies at the entrance of a long valley running north-westwards into the Tianshan Mountain, to a watershed with the Ili River valley (Betts, 2019).

Mohuchahan site is situated on the southern slope of Tianshan mountain, in the Warm Arid Temperate Zone. In total, summer and winter represent a distinct wet and dry season; precipitation conditions may vary in each and for the different types. The precipitation shows slightly higher on the foothills towards the Tianshan than in the Taklamakan desert. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the tiny number of rainy days, which as a monthly figure reaches the most, and varies for the whole year, generally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

Hejing County has discovered a series of ancient tombs since the 1980s, while the significant finding is the Chawuhu site excavated between 1983 and 1992 (Xinjiang, 1999). During the excavation of Chawuhu site, the Xinjiang Institute of Cultural Relics & Archaeology carried out more followed-up archaeological surveys in Hejing County.

Between 2011 and 2012, before the construction work of Mohuchahan Reservoir, Xinjiang Institute of Cultural Relics & Archaeology and Hejing Institute of Cultural Relics carried out the salvage excavation in the related area and yielded about 250 tombs; the reports were published in

2014 and 2016 (Xinjiang, 2014, 2016). The Yanqi Basin has always been thought to be dominated by the Chawuhu Culture and Xintala Culture, and the excavation and study of Mohuchahan have completed the cultural elements in the Yanqi Basin in the southern slope of the mid-Tianshan region (Shang & Li, 2018; Long, 2013, 2018, 2019).

3. Findings

The tombs of Mohuchahan site are distributed on both sides of the gully and divided into Nr. I and Nr. II two sections (cemetery). Nr. I section is located on the south terrace, has one hundred and seventy tombs; Nr. II has seventy-eight tombs on the north terrace (Fig. 5.3.3-1).

3.1 Nr. I cemetery

The tombs mainly have surface stone mounds as tomb indicators, and the stone mound is usually in a round, oval, and irregular oval shape. The tomb chambers are mostly vertical shaft stone chambers, and a few examples are stone coffins exposed to the ground. Single-burial is the major burial position; side-flex, supine flex, and prone flex are the main body position. Some tombs are found with horse heads, goat/sheep heads, and bronze harnesses. The grave goods include pottery wares, bronze objects, bone objects, lithic tools, and golden and cowry objects. The tomb details can be seen in Table 32 and Fig. collection 5.3.3-2.

3.2 Nr. II Cemetery

The tombs mainly have irregular oval stone mounds/circles on the ground. All tombs are in vertical shaft stone chambers. The animal pit with horse heads and bronze/bone harness is usually found on the surface mound/circle south. Single-burial is the most common form, while double-burial and multi-burial amounts are more than the southern section; side-flex, supine-flex, and prone-flex are the primary body position. The tomb chamber of multi-burial is constructed of gravel stone, and the bodies are placed from early to late. The grave goods include bronze objects and pottery wares. The tomb details can be seen in Table 33 and Fig. collection 5.3.3-3.

4. Age

4.1 Relative Age

Most tombs in Nr. I cemetery has stone circles on the ground, and the grave goods have no iron

objects but a lot of pottery wares and bronze objects, which indicate its Bronze Age range. Some tombs from Nr. II also has the same time feature.

According to the burial tradition and tomb chamber, the excavator divided these Bronze Age tombs into two sub-phases. Phase I tombs are all distributed in Nr. I cemetery, with vertical shallow shaft stone pits and single-burial form. Flat-bases and single-handled Jar are the most popular pottery wares, with a few spouted Jar.

The representative tombs of phase I include IM3, IM5, IM10, IM11, IM15, IM16, IM18, IM21, IM22, IM23, IM24, IM25, IM26, IM28, IM29, IM30, IM40, IM42, IM43, IM44, IM45, IM46, IM48, IM49, IM50, IM53, IM54, IM56, IM59, IM61, IM62, IM64, IM65, IM68, IM69, IM71, IM76, IM77, IM79, IM81, IM82, IM86, IM87, IM89, IM90, IM94, IM99, IM101.

Phase II tombs can be found in both Nr. I and Nr. II cemetery, stirrup-shaped surface stone circles, and multi-burials are new in this phase. Spouted jars increase when single-handled and flat-based Jars are still popular. This pottery tradition corresponds with phase I of Chawuhu site.

The representative tombs of phase II include IM104, IM105, IM106, IM109, IM110, IM113, IM116, IM117, IM118, IM121, IM123, IM128, IM129, IM135, IM136, IM137, IM139, IM140, IM141, IM144, IM147, IM150, IM151, IM153, IM154, IM155, IM156, IM158, IM159, IM160, IM161, IM163, IM164, IM165, IIM1, IIM2, IIM3, IIM6, IIM7, IIM8, IIM10, IIM12, IIM13, IIM14, IIM15, IIM16, IIM17, IIM18, IIM19, IIM21, IIM23, IIM24, IIM27, IIM28, IIM30, IIM31, IIM32, IIM34, IIM35, IIM36, IIM37, IIM38, IIM39, IIM41, IIM42, IIM43, IIM44, IIM46, IIM50, IIM51, IIM53, IIM54, IIM55, IIM57, IIM58, IIM62, IIM67, IIM69, IIM70, IIM75.

Twelve tombs from Nr. II cemetery (IIM60, IIM61, IIM63, IIM65, IIM66, IIM68, IIM71, IIM72, IIM73, IIM74, IIM77, IIM78) are found with the bronze Mirror and bronze Ring that have shown a Han style, the surface stone circles and tomb chamber are also distinguished from the Bronze Age ground indicator. Therefore, the excavator believed that the twelve tombs on the northern Nr. II cemetery are Han & Sui tombs.

4.2 Absolute Age

There are twenty-one radiocarbon dating results from Mohuchahan samples, and the details can be seen in Table 4. According to the calibrated dates, the absolute date range of Mohuchahan is between 1000 BC-300 AD, and the Bronze Age (sub-phase I and II) date range is between 1000 BC-800 BC, the second phase of the twelve tombs are around 300 AD-500 AD, which is during Han & Jin period.

5. Interpretation

The tomb structure and spouted pottery wares exhibit remarkable similarity with Chawuhu cemetery in the same region, especially phase II corresponds with the early phase of the Chawuhu site. Therefore, the whole Bronze Age Mohuchahan site can be earlier than the Chawuhu site, and the pottery tradition is a followed-up relationship. In addition, the pottery Jar with a short neck, small bronze Sword, bronze Button, bronze ornament, and golden Earring are similar to the Karasuk culture in Minusinsk Basin (Long, 2018) which might suggest its early origin.

The similar bronze mirror from Nr. I cemetery can be seen at the Saensayi site, Tianshanbeilu site, and even in the Fuhao (妇好) tomb in Henan province. At the same time, the various type of bronze knives from Mohuchanhan can be seen not only in the Xinjiang cemeteries, e.g., Saensayi, Tianshanbeilu, Habuqihan also in the Inner Mongolian Bronze Age sites. Therefore, even though mountain rangers surround the location of Mohuchahan site, its cultural communication with other regions did not stop but got promoted by their mobile lifestyle (Xinjiang, 2016).

The vertical stone shaft tombs in Mohuchahan and Chawuhu sites contribute to the unique cultural tradition in Yanqi Basin, which dominates Yanqi Basin along the Ili River in the 1st millennium BC (Long, 2019).

3.4 Qunbake Site

1. Location

Qunbake site is located in Qunbake Town, Luntai County. There are three cemetery groups situated in the Gobi Desert of Tarim Basin (Fig. 5: 34).

Qunbake site is situated on the southern slope of Tianshan Mountain in the Tarim Basin, in the Warm Arid Temperate Zone. In total, summer and winter represent a distinct wet and dry season; precipitation conditions may vary in each and for the different types. The precipitation shows slightly higher on the foothills towards the Tianshan than in the Taklamakan desert. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the tiny number of rainy days as a monthly figure reaches the most and varies for the whole year, generally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

In 1985, the Xinjiang team of the Institute of Archaeology of the Chinese Academy of Social Science and Bayinguoleng Mongol Autonomous Prefecture Regional Institute of Cultural Relics carried out the first excavation season in Nr. I cemetery and yielded four tombs (IACASS et al., 1987). The second season was carried out in 1986, and the third season excavated the rest thirteen tombs; the excavation report was published in 1991 (IACASS et al., 1991). The excavation of the Qunbake site has provided more material for the Chawuhu cultural elements, which completed the Chawuhu Culture in the mid-southern Tianshan region (Ha, 2007; Guo, 2012; Festa, 2017; Li, 2020).

3. Findings

3.1 Nr. I cemetery

The cemetery is in the Gobi Desert, and the length is 800m, and the width is 200m. More than fifty tombs were found from the field survey, while the 1985 season only excavated four tombs. 1986 season excavated twenty-six tombs, while the 1987 season yielded thirteen tombs. Most tombs have surface soil mounds, and the tomb's vertical shaft pit is under the mound (Fig. 5.3.4-1).

M2 (Fig. 5.3.4-2): The mound diameter is 5m, height is 0.1m. No chamber passages. The tomb chamber is round; the length is 1.6-2.06m, the width is 1.02-1.44m, the depth is 0.9m, and the

orientation is 315°. No cover beam and no burnt marks.

There are four layers of the scattered human body in the tomb chamber, and who are sixteen kids. The oldest is about 10-year-old, while the youngest is only several months old. There are two horizontal wooden pillars under the body on the chamber bottom, and the length is 0.44-0.62m, diameter is 0.6-0.7m.

IM3 (Fig. 5.3.4-3): The Mound diameter is 11.5-12.45m, height is 0.55m. the chamber passage is in round-rectangular shape, and the length is 1.34m, width is 0.9-1.03m, depth is 0.63m-0.75m. There are two wooden pillars on two sides of the tomb entrance, and the diameter is 0.2-0.3m, height is 0.48-1.75m. There are five wooden pillars covered on top of the tomb entrance, and the pillar length is 0.9-1.75m, diameter is 0.1-0.22m; there are many tamarisk branches and grass shafts above the top pillar.

The tomb chamber is in round-square shape; the opening length is 5.1-5.8m, the bottom length is 4.66-4.9m, the depth is 1.44-1.5m, and the orientation is 318°. There is one standing burnt pillar in the chamber center; the height is 0.4m, diameter is 0.18m; a circle of small pebbles fixes the pillar. There are thirty-four wooden pillars alongside the chamber wall, all burnt; the height is 0.16-1.75m, diameter is 0.06-0.2m. Most pillars are built in the post hole; only a few stand directly on the ground. Some burnt wooden pieces are close to the tomb opening; the length is 0.2-1.75, diameter is 0.07-0.25m, which could be the beam cover of the tomb chamber. In addition, some grass mat, tamarisk branches, and grass shafts found in the burnt remains could be the cover mat above the beam.

There are six small tombs around the main tomb chamber (M3A-F); M3A is on the north, which is not covered by the surface mound.

IM3A: the chamber passage is triangular, the length is 0.9m, the width is 0.36-0.96m, the depth is 0.2-0.43m, and the orientation is 278°. There are two beam covers on the tomb opening; the length is 0.38-1.3m, the diameter is 0.04-0.05m, and the grass mat covers them. The tomb chamber is round, the diameter is 1-1.5m, and the depth is 0.6m.

IM3B: there are two layers of the human body in the tomb chamber; one layer of three bodies is above the beam cover, which includes one 30-year-old female in a side-flex position, while the other is one 10-year-old boy in side-flex. The lower layer contains three bodies; a 30-year-old supine straight female lies in the middle, with one pottery spouted jar and one ceramic shallow Bowl on the north of the head, and one wooden plate with a string of sheep/goat bones, and one iron knife in it. At the same time, the other two are young girls. One is 18-year-old, and the other is 12-year old; both skulls are found under the northern wall.

IM3C: no chamber passage. The chamber pit is a round rectangle; the length is 1.76m, the width is 1.04-1.3m, the depth is 0.5-0.74m. There are seventeen cover beams in four layers; the length is 0.26-1.62m, the diameter is 0.03-0.08m, with a layer of grass mat above it.

IM3E: there are two infant bodies found on the chamber bottom, supine straight. There is one pottery spouted jar in the northwestern chamber.

IM5 (Fig. 5.3.4-4): The mound diameter is 15-18.1m, height is 0.7-0.8m. There are four tomb chambers under the surface mound. The main chamber is in the middle, in the oval shape, the diameter is 1.39-4.12m, and the depth is 1.88m. There is one chamber passage on the east; the length is 2.6m, the width is 1.26-1.82m, and the depth is 1m. The chamber has four bodies, with pottery wares, iron objects, bone items, lithic tools, and golden pieces. Chamber A is on the north of the main chamber; the diameter is 1.4-2.75m, the depth is 1.34m, and the orientation is 75°. There is one body in the chamber, with one bone object. Chamber B is on the west of the main chamber; the diameter is 1.17-2.84m, the depth is 1.42m, and the orientation is 63°. There is one body with no grave goods in the chamber. Chamber C is on the south of the main chamber. The diameter is 1.22-2.5m, the depth is 1.18m, and the orientation is 120°. There is one body in the chamber, with five bronze objects and one golden piece.

IM7D (Fig. 5.3.4-5): No chamber passages. One adult female is found in the chamber, secondary burial, no grave goods.

IM8: The mound diameter is 6.4m, height is 0.3m. the tomb chamber is under the surface mound, the diameter is 1.1-3.04m, the depth is 1.32m, and the orientation is 65°. There are three layers of beam cover above the chamber opening. The top layer has sixteen wooden pillars; the length is 1.04-1.6m, the diameter is 0.04-0.22m; the second layer has two pillars, the length is 1.94-2.1m, diameter is 0.08-0.16m; the bottom layer has one pillar, the length is 1.48m, diameter is 0.14-0.2m. There are three pillars on the west of the chamber opening; the length is 1-2.2m, and the diameter is 0.08-0.1m. There is one layer of tamarisk mat and one layer of grass mat above the beam cover. There are sixteen individuals in the chamber, with pottery wares, bronze and iron objects, lithic tools, wooden objects, and woolen fabrics found altogether.

IM10 (Fig. 5.3.4-6): The mound diameter is 8m, height is 0.3m. the tomb chamber is under the surface mound, the length is 3-4m, width is 2.56-3.16m, depth is 0.8m. the chamber passage is on the south, the length is 1.84m, width is 0.4-1.4m, depth is 0.68m, the orientation is 147°. There is one layer of burnt beam cover above the chamber opening; the beam length is 0.2-1.2m, diameter is 0.05-0.2m. There are two wooden pillars in the middle and northern chamber; the diameter is 0.2m, and the height is 0.2-0.3m. There are seven post holes on the chamber bottom, with wood remains inside; the hole diameter is 0.12-0.22m, and the depth is 0.17-0.3m. Thirty-seven individuals with pottery wares, iron objects, lithic tools, bone items, and woolen fabrics are found in the chamber.

IM13 (Fig. 5.3.4-7): No surface mound and chamber passage. One 35/40-year-old female is found in the tomb chamber, and the orientation is 323°, supine flex. One pottery double-handled jar with one piece of sheep/goat bone inside the jar, one stone bead on the neck, and woolen textile fragments remained on her leg.

IM16 (Fig. 5.3.4-8): The mound diameter is 10.5m, height is 0.35-0.55m. the tomb chamber is under the surface mound; the length is 2.66-3.3m, the width is 1.6-2.66m, and the depth is 1.62m. The chamber passage is 1.48m long, 1.6m wide, and 0.4m deep. The orientation is 156°. There is one layer of beam cover above the chamber opening; the beam length is 0.31-1.78m, and the diameter is 0.16-0.24m. Ten individuals with pottery wares and bronze objects are found inside the chamber. There are three kids' chambers on the north of the tomb chamber. Chamber A

diameter is 0.4-0.8, depth is 0.3m, and the orientation is 324°, with only one kid's body and no grave goods. A wooden plate covers chamber B opening; the chamber diameter is 0.37-0.65m, the depth is 0.06m, and the orientation is 313°. The diameter of Chamber C is 0.6-1.25m; the depth is 0.36m, and the orientation is 300°, with one kid body and one pottery ware inside.

IM19 (Fig. 5.3.4-9): No surface mound; the chamber has one passage. One 45/50-year-old male and 22/24-year-old female are inside the chamber, one in supine flex and one in the side-flex position. There are two pottery wares, one bronze ornament, one iron object, one bone bead, and one bovine horn found inside the chamber.

IM27 (Fig. 5.3.4-10): No surface mound, only chamber passage and chamber pit remained. There are three layers of nineteen individuals inside the chamber. The first layer is one of the western and northern chambers, with twenty-three skulls, six pottery wares, six lithic tools, seven bronze objects, ten iron objects, and one wooden object. The second layer is on the east, with four skulls and scattered human bones, one pottery ware, one bronze object, one lithic tool, and three wooden objects. The third layer is north, with nine complete human skeletons, four iron objects, and nine lithic tools.

IM34 (Fig. 5.3.4-11): The mound diameter is 6.6m, height is 0.4m. there are two tomb chambers under the surface mound. Chamber A is on the east; the diameter is 1.26-1.96m, the depth is 1.02m, and the orientation is 238°. There is one body in the chamber, with one pottery spinning wheel. Chamber B is on the west; the diameter is 0.96-2.1m, the depth is 0.9m, and the orientation is 75°. There is one body in the chamber, with one bronze mirror.

IM43 (Fig. 5.3.4-12): The mound diameter is 5.66m, height is 0.28m. There are three tomb chambers under the surface mound. Chamber A is on the west; the diameter is 0.84-1.6m, the depth is 0.54m, and the orientation is 293°. There is one body in the chamber with five stone beads. Chamber B is in the middle; the diameter is 0.8-1.78m, the depth is 0.36m, and the orientation is 278°. There are a few human finger bones scattered in the chamber. Chamber C is on the east; the diameter is 0.64-1.6m, the depth is 0.24m, and the orientation is 293°. There are three human teeth with one millstone in the chamber.

3.2 Nr. II Cemetery

The 1987 season excavated thirteen tombs. Most of the tombs have a surface soil mound, and the single/double chamber is under the surface mound. Some of the tomb chambers have small burial pits, mostly buried horse head, camel head, dogs, or sheep/goats (Fig. 5.3.4-13).

IIM7 (Fig. 5.3.4-14): The mound diameter is 7.8m, height is 0.3-0.43m. The tomb chamber is in round-rectangular shape; the length is 2.2-2.78m, the width is 1.26-1.8m, the depth is 0.8m, and the orientation is 4°. A burnt wooden pillar covers the tomb opening; the length is 0.8m, diameter is 0.12-0.18m. There are seventeen individuals with pottery wares, iron objects, lithic tools, bone, wooden items, and sheep/goat bones found altogether.

There are five appending chambers on the east, west, and north of the main chamber. *Chamber A* is round; the diameter is 0.5-0.76m, the depth is 0.2m, and the orientation is 337°, with two pottery wares in the chamber. *Chamber B* is round; the diameter is 0.55-1.3m, the depth is 0.46m, and the orientation is 0°. There are seven wooden pillars above the tomb opening; the length is 0.4-1.43m, and the diameter is 0.02-0.04m. One wooden plate is in the southern chamber, with four sheep/goat bones, one iron knife, and three pottery wares remaining in the northern chamber. *Chamber C* is rectangular; the length is 1.68m, the width is 1.32m, the depth is 0.4m, and the orientation is 279°. There are two wooden pillars above the chamber opening; the length is 1-1.05m, and the width is 0.15-0.17m. There is one body with no grave goods inside the chamber. *Chamber D* is round; the diameter is 0.88m, the depth is 0.42m, and nothing is left in the chamber. *Chamber E* is round; the diameter is 0.62m, the width is 0.25m, and there is one horse leg bone inside the chamber. *Chamber F* is round; the diameter is 0.64m, depth is 0.5m. There is one horse head and several horse bones inside the chamber.

IIM10 (Fig. 5.3.4-15): The mound diameter is 19.1-22.6m, height is 1.4—1.6m. The tomb chamber is not under the mound, but inside the surface mound, with one passage on the southeast corner, and the orientation is 341°.

There are three post trenches in the northern, eastern, and western chambers. The north trench

length is 3.6m, the width is 0.28-0.4m, and the depth is 0.25m; there are nineteen pillars in the north trench, and the diameter is 0.09-0.19m. The eastern trench length is 4.46m, the width is 0.32-0.4m, and the depth is 0.41m; there are twenty-seven pillars in the trench, and the diameter is 0.1-0.2m. Finally, the western trench length is 4.1m, width is 0.28m, depth is 0.2m, there are 26 pillars in the trench, and the diameter is 0.07-0.17m.

There are four wooden pillars on each corner of the chamber; the diameter is 0.47-0.7m, the depth is 0.36-0.6m. There is one wooden pillar in the center; the diameter is 0.74m, and the depth is 0.68m. There are several other pillars in the chamber, and the depth is 0.16-0.39m. The chamber passage is rectangular; the length is 2m, the width is 1.15m. There are five wooden pillars on the eastern side and two on the west, and the diameter is 0.08-0.52m.

The human bones are scattered inside the chamber, mostly burnt; the bones are accounted for sixty-five individuals, with pottery wares, lithic tools, bronze and iron objects, bone and wooden items, woolen fabrics, and sheep/goat bones. There is one shallow pit in the southern chamber; the diameter is 0.83-1.08m, depth is 0.34m, with one kid buried inside. There is another rectangular shallow pit on the southeast corner; the length is 1m, the width is 0.7m, and the depth is 0.32m; one adult body is buried inside.

There is another tomb chamber under the passage. The tomb is framed by wooden pillars, with one rectangular shaft pit inside. The pit length is 2.1m, the width is 1.42m, and the depth is 0.52m. There are only a few finger bones remaining inside.

There are thirty-three small round/oval pits around the main chamber; the diameter is between 0.33-1.06m, and the depth is 0.15-0.5m. Five pits are found with children, infants, and adults; twenty-two pits are found with horse head, one pit with complete horse skeletons, two pits with complete dog skeletons, two pits with sheep/goat bones, one pit with dog bones and horse head (Fig. 5.3.4-16).

4. Age

4.1 Relative Age

The tomb structures and grave goods from Nr. I and Nr. II cemetery showed no time difference, which should belong to the same cultural range. Furthermore, the iron objects and their placement in the tomb (iron knife on the wooden plate with sheep/goat bones) indicate the common usage of the iron objects. Therefore, the Qunbake site could belong to the Iron Age.

The large numbers of spouted pottery wares and horse pits correspond with the Chawuhu burial tradition, especially Chawuhu Nr. I cemetery, the middle phase of Chawuhu culture, during the mid-Western Zhou and mid-Spring & Autumn periods.

4.2 Absolute Age

There are fourteen radiocarbon dating results from Qunbake site, and the details can be seen in Table 4. According to the calibrated data, the absolute age range of Qunbake site is between 900-500 BC.

5. Interpretation

The surface mound as the tomb indicator and the spouted pottery wares from the Qunbake site are connected with Chawuhu culture; the age also lies in the same date range, indicating the same cultural range of Qunbake and Chawuhu in the northern slope of the Tianshan Mountains region. Moreover, their cultural elements have shown similarities with the Chust culture in Fergana valley in Uzbekistan (Mei, 2003).

The usage of metal objects, including bronze and iron knives and ornaments, narrowed its Iron Age date range and provided evidence of the development of its handicraft industry. In addition, the tomb chambers are found with many wooden pillars and post holes, which might represent their house building that can still be seen in the modern southern Xinjiang area (CASS et al., 1987). The millstone, wheat remains, animal bones, and metal knives suggest that the Qunbake people may have already lived a sedentary life with animal husbandry and plant consumption. In addition, the camel bones found in the Qunbake site have provided the earliest evidence of the domesticated camel in Xinjiang, which can also explain their mobile lifestyle (Zhang & Luo, 2014).

3.5 Baileqi'er Site

1. Location

Baileqi'er site is located in the Baleqi'er village, Hejing County. The tombs are distributed in the Gobi Desert on the southern bank of the Kaidu River (Fig. 5: 45).

Baileqi'er site is situated on the southern slope of Tianshan mountain, in the Warm Arid Temperate Zone. In total, summer and winter represent distinct wet and dry seasons, and the precipitation conditions may vary considerably in each and for the different types. The precipitation shows a slightly higher on the foothills towards the Tianshan than in the Taklamakan desert. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the tiny number of rainy days as a monthly figure reaches the most and varies for the whole year, generally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

Baileqi'er site was excavated in 1991 by the Xinjiang Institute of Cultural Relics & Archaeology, Bayinguoleng Mongol Autonomous Prefecture Regional Institute of Cultural Relics, and Northwest University. This season yielded eight tombs, while the excavation report has not been published yet (Zhou, 2000). The second season was carried out in 1993, excavated another eight tombs. The reports were published in 1994 and 1999 (Wang, 1994; Xinjiang et al., 1999). The excavation of Baleqi'er site has provided more material for the Chuwuhu culture research in this region (Zhou, 2000; Guo, 2012).

3. Findings

The excavated Baileqi'er tombs (93HJBM201-208) include five stone circle tombs, one stone mound & circle tomb, and two stone mound tombs. The tomb chambers are found under the surface indicator, vertical shaft pit, and vertical shaft mudbrick pit.

M202 (Fig. 5.3.5-1): Stone circle vertical shaft mudbrick tomb. The circle length is 440cm, the width is 380cm, and the orientation is 240°. The chamber is oval; the size is 240-290cm, the width is 210-254cm, and the depth is 30-36cm. There is one secondary platform in the chamber;

the width is 24cm, the depth is 30-36cm, and one layer of mudbrick remains above the platform.

Forty-nine individuals in five layers remained in the tomb chamber. The first layer has eleven bodies, five males and six females, in the supine flex position. Twelve in the second layer, five males, one kid, and two males; the rest are in secondary burial. The third layer has ten individuals, seven males, one female, and one kid, mostly in secondary burial. The fourth layer has nine bodies, five males and five females, mostly in secondary burial but still straight or flex position. The fifth layer has seven bodies, two females, two kids, and the rest are illegible.

There are more than fifty grave goods, including pottery single-handled spouted cups, pottery single-handled spouted jars, pottery single-handled cups, pottery single-handled jugs, pottery jars, pottery shallow bowls, bronze knives, bronze needles, iron knives, iron objects, gravel stones, bovine-horn cups, wooden fire-making sticks, and sheep/goat bones.

M203 (Fig. 5.3.5-2): Stone mound & circle vertical shaft tomb. The diameter of the stone circle is 370-424cm, and the orientation is 300°. The stone mound's diameter is 192cm, and the height is 54cm. The chamber is oval; the length is 120-140cm, the width is 72-92cm, and the depth is 102cm. There is one individual found inside the chamber, secondary burial. There are some horse bones and one pottery ware located in the filling soil, and one pottery single-handled cup, one pottery jar, one bronze knife, and one bronze awl found between the human bones.

M205 (Fig. 5.3.5-3): Stone circle vertical shaft tomb. The diameter of the stone circle is 270cm, and the orientation is 254°. The chamber is round; the diameter is 146-164cm, and the depth is 132cm.

There are five layers of individuals found inside the M205 chamber. Three bodies are located on the first layer, including one female and two males, all supine. Four are found on the second layer, two females, one male, and one kid skull, all in the supine flex position. Four on the third layer, two males and two females, all in the supine flex position. Four on the fourth layer, one female, one male, and two secondary burials, which are illegible. There are four complete human skeletons on the fifth layer, all-male, in prone flex and supine flex position. There are four

pottery single-handled spouted cups, one ceramic single-handled spouted jar, one single-handled cup, one pottery jar, one bronze knife, one bronze needle, and one bone tube found altogether in the tomb chamber.

M206 (Fig. 5.3.5-4): Stone circle vertical shaft mudbrick tomb. The circle length is 432cm, the width is 404cm, and the orientation is 300°. The tomb chamber is constructed with mudbrick from the bottom to the top and plastered with mud; the mudbrick length is 45cm, the width is 25cm, and the thickness is 10cm. The chamber length is 223-282cm, the width is 204-270cm, and the depth is 160cm. There is one mudbrick secondary platform in the chamber, the mudbricks are in four layers, and the width of the platform is 16-24cm. There are four wooden pillars on each corner of the chamber, tied by wooden sticks, making a rectangular wooden couch on the chamber bottom. There are more than thirty sticks above the couch. The couch length is 154cm, width is 144cm.

Thirty-eight individuals in five layers remained in the M206 chamber. The first layer has ten individuals, while only four skulls remain, one male and one female body, all in the supine flex position. The second layer has five bodies, three males, all in the supine flex position. The third layer has ten bodies, six males and one female, in the supine flex position. The fourth layer has nine individuals, four males and three males, in the supine flex position. Finally, the fifth layer has four bodies but many scattered human bones, two males, one female, and one kid. Eighty-one grave goods are found inside the chamber, including pottery single-handled spouted cups, pottery single-handled spouted jars, pottery single-handled cups, pottery shallow bowls, pottery single-handled jars, pottery cups, pottery jars, bronze knives, bronze needles, gravel stones, eyebrow sticks, bone check pieces, iron knives, bone awls, cowry ornaments, and golden ornaments. In addition, plenty of horse and sheep/goat bones remained in the chamber.

M207 (Fig. 5.3.5-5): Stone circle vertical shaft mudbrick tomb, the circle length is 530cm, width is 470cm, the orientation is 252°. The chamber is oval; the length is 272-290cm, the width is 216-256cm, and the depth is 136cm. There is one secondary platform in the chamber; the width is 24cm, and the depth is 24cm. There is one layer of mudbrick above the platform and one layer of stones on the chamber bottom, and the thickness is 5cm.

Thirty-nine individuals in four layers remained in the M207 tomb chamber. The first layer has eleven bodies, nine males and two females, all in the supine flex position. The second layer has fourteen individuals, eight males, and four females, in the supine flex position. The third layer has six bodies, four males and two females, in supine flex and prone position. The fourth layer has eight bodies, three males and five females, in supine flex and side-flex position. Eighty-four grave goods are found inside the chamber, including pottery single-handled spouted cups, pottery single-handled cups, pottery shallow cowls, pottery cups, pottery jugs, pottery jars, pottery spinning wheels, eyebrow sticks, iron knives, bronze knives, bronze arrowheads, bronze needles, stone beads, and sheep/goat bones.

M208 (Fig. 5.3.5-6): Stone circle vertical shaft tomb. The diameter of the stone circle is 177cm, and the orientation is 239°. The chamber is round; the diameter is 104-120cm, and the depth is 90cm. Four kids' bodies are found inside the chamber, no older than seven-year-old, supine flex. Only a pottery jar and spouted cup are found altogether.

The multi-burial tomb details can be seen in Table 34.

4. Age

There are no radiocarbon dating results from Baileqi'er site; therefore, the time dating can only be conducted from the tomb structures and grave goods. Many iron objects indicate its Iron Age time range. The tomb surface indicators and the spouted pottery wares can be primarily seen in the close Chawuhu and Qunbake sites, especially the mid-late phase of Chawuhu from the multi-burial and painted pottery patterns perspective. Thus, the scholars assumed that the date range of Baileqi'er is between 750-500 BC (Xinjing et al., 1999; Zhou, 2000).

5. Interpretation

5.1 Burial Tradition

Tomb indicator is the most apparent feature of the Baileqi'er site, and the stone mound and stone circles are the primary types. At the same time, multi-burials and secondary burials are also common, and the grave goods vary according to the number of buried individuals. Multi-burial

may suggest their clan tradition when male, female, and kids are found in the same tomb. Still, there is no difference in the numbers and quality of grave goods, which indicates no hierarchy during Baileqi'er time (Xinjiang et al., 1999).

Single-handled spouted pottery wares are in the most significant proportion, while painted patterns are relatively rare. The pottery wares, metal objects, bone, and wooden items are mostly found with the daily usage marks, which could be used for the tomb individuals and buried with the dead. Many animal bones and metal knives/awl indicate their mainly meat consumption, while the spouted wares are thought to be used for milk drinking. The found of millstones and the cereal remains in the pottery wares also suggest the possible existence of early agricultural practice (Zhou, 2000).

Therefore, the inhabitants of Baileqi'er have developed their sedentary livelihood but not the pure herding mobility life anymore. The pottery production and metal casting also proved this assumption.

5.2 Summary

As one extension of Chawuhu culture, the Baileqi'er site has shown a strong cultural connection with Qunbake, Chawuhu, and other sites in the mid-southern Tianshan Yanqi Basin area. They developed their settlement life along the Kaidu River while also keeping animal herding and agricultural practicing at the same time. Clan tradition has been set in this small site for generations, which provided new material for researching the social complexity process.

3.6 Kezier (Kezi'ertu'er/Kiziltur) Site

1. Location

Kezier site is located in Kezier Town in Baicheng County. The Kezier Town lies between the southern slope of western Tianshan Kalake'er and the Queletage Mountain ranger; the Kezier River flows from north to south and meets the Muzhate River, flows from West to east Kezier Town, which makes a small oasis in this area (Fig. 5: 46). The tombs are distributed on the western terrace of the Kizil River.

Kezier site is in the Warm Arid Temperate Zone. Although summer and winter represent distinct wet and dry seasons, precipitation conditions may considerably vary in each and for the different types. Occupying the Taklamakan, the area receives the lowest precipitation in all of China which mainly drops to the annual total between 15 and 50 mm, showing slightly higher amounts on the foothills towards the Tianshan Mountain. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the tiny number of rainy days, which as a monthly figure reaches the most and varies for the whole year, generally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

Kezier site was firstly discovered in 1989 during the survey of Xinjiang cultural relics (Aksu, 1995); the site extends about 2km from the north to the south, the tombs are distributed at the southern end; an ancient city site and dwelling ruins were brought to the light in the middle. Between 1990 and 1992, before the construction work of Kezier Reservoir, the Xinjiang Institute of Cultural Relics & Archaeology carried out four times of salvage excavations and yielded one hundred and sixty tombs. The radiocarbon data was published in 1999 (Ruan & Liu, 1999), and the excavation report was published in 2002 (Xinjiang, 2002).

The excavation of the Kezier site has provided more material for the cultural research on the southern slope of Tianshan Mountain (IACASS et al., 2014). In addition, the detailed analysis of the physical features and grave goods provided more evidence for the past communication between the East and West (Zhang, 1999; Gan et al., 2003; Chen & Wang, 2005; Gan et al., 2006; Gan, 2009; Zhao et al., 2013).

3. Findings

Twenty-seven tombs were excavated in the 1990 season, named 90BKM1-27 (Fig. 5.3.6-1). All graves have a sand-gravel stone surface mound on a cone or round platform. The tomb chambers are all vertical shaft pits in oval or round-rectangular shapes. Single-burial, double-burial, and multi-burial are the primary burial type, and the first and secondary burials can be seen in these tombs. In addition, there are four tombs with a combination of first and secondary burial. Seven

tombs are found with no grave goods; the rest have yielded ninety-five goods in total, including sixty-seven pottery wares (forty-nine with painted patterns), eight bronze objects, thirteen lithic tools, six bone items, and four bead strings. The tomb details can be seen in Table 35 and Fig. 5.3.6-2~6.

4. Age

There are no iron objects found at the Kezier site, the bronze objects are few, and the quality is not that developed. Therefore, the relative date of the Kezier site is in the Bronze Age time. There are five radiocarbon dating results from Kezier samples, and the details can be seen in Table 4. According to the calibrated data, the absolute age of the Kezier site is between 1100 and 650 BC.

5. Interpretation

Surface indicators for tombs and grave objects are the typical features of the Kezier site, just like the Qunbake and Chawuhu sites in the nearby regions (CASS, 2014). The tomb traditions and pottery wares, especially the painted patterns, may indicate its early connection with Chust culture in Fergana Valley in Central Asia. The bronze objects from the Kezier site are mainly small items and could be made for daily usage (Zhang, 1999). In addition, several ancient mines remain along the southern slope of the Tianshan mountain range, which could provide the bronze metallurgy material for the inhabitants of Kezier.

The glass beads from the Kezier site are the earliest unearthed glass remains in China; the chemical composition is quite different from those unearthed from central and southwestern China. The single-colored glass beads without inlaid and chemical composition of Kezier samples are more similar to Mesopotamia glasses, but the glass quality is poor with many tiny bubbles. The chemical analysis suggests that the glass preparation technique is imported from the West, and the glass beads are made locally using local raw materials (Gan et al., 2006). The physical study reveals that the ancient Kezier population belonged to Caucasoid group when they had a close relationship with the Indo-Afghan racial type on the east branch of the Mediterranean (Chen & Wang, 2005). According to the analysis, scholars suggest a "Glass and Jade Road" that existed between Middle East-Western Asia and China through Xinjiang, even before the Han

"Silk Road." According to their suggestion, this glass and jade road originated carried out by one Aryan group, called Hurrian, who learned the bronze, iron, and glass-making techniques and moved to the Urartu of Northern Iran. After the Assyrian invasion in the 7th century BC, the Hurrians moved to Armenia; one branch, called "Scythian," came to Xinjiang, where they were called "Saka." The Saka group developed glass skills in Xinjiang during the 10-6th century BC (Gan et al., 2006; Gan, 2009).

There is one obvious boundary between the site area and the city settlement site; the bronze slag remains, lithic tools, and charcoal piles can be seen in the settlement area. In addition, the sheep/goat bones in the tombs indicate their herding strategy. Thus, the inhabitants of Kezier may have developed their mixed subsistence strategy in the small oasis of northern Tarim Basin.

3.7 Duogang Site

1. Location

Duogang site is located in Duogang village, Baicheng County, on the southern slope of Tianshan mountain in western Xinjiang, also on the northern edge of Tarim Basin (Fig. 5: 35). The site lies on the terrace of Kalasu River, which flows from north to south until the Muzhate River.

Duogang site is in the Warm Arid Temperate Zone. Although summer and winter represent distinct wet and dry seasons, precipitation conditions may considerably vary in each and for the different types. Occupying the Taklamakan, the area receives the lowest precipitation in all of China which mainly drops to the annual total between 15 and 50 mm, showing slightly higher amounts on the foothills towards the Tianshan Mountain. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the minimal number of rainy days, which as a monthly figure reaches the most and varies for the whole year, normally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

Duogang site was robbed in 1998; after the robbery, the Institute of Archaeology of the Chinese Academy of Social Sciences, Aksu Bureau of Cultural Relics, and Bureau of Cultural Relics of

Baicheng County carried out the salvage excavation in 1999. They yielded more than one hundred tombs in three sub-sections (IACASS et al., 2014). The Xinjiang Institute of Cultural Relics & Archaeology carried out a new excavation season in 2013, which yielded two hundred and ten tombs, and only one brief report was published (Tian & Wu, 2014).

The scholars have done multi-disciplinary research on Duogang material, and most are included in the 2014 report (IACASS et al., 2014). The excavation and study of Duogang material have provided more evidence of the settlements on the northern edge of Tarim Basin.

3. Findings

The one hundred tombs excavated in the 1999 season are distributed in three sub-sections. Except M275 is one stone circle Han tomb, the rest are all stone mound vertical shaft tombs, which belong to the same period.

Most tombs at Duogang site are in vertical or round pits. According to the mound size, the tombs can be divided into three types: Small, Medium, and Large, whose grave mounds measure less than 5m, 5-9m, and over 9m, respectively. The tomb chambers are also constructed in three sub-types: oval, oval-shaped with tomb passage, and irregular-round double chamber. In addition, some tombs have appending pits, and some have beam covers. Sub-Type A is the oval vertical shaft pit, Type B is the oval shaft pit with the passage, and Type C is the shaft pit with two chambers.

As for the burial form, both primary-burial and secondary-burial are common in the Duogang site, while side-flex, supine flex, and supine straight position are the mostly found. Single-burial and multi-burial can both be seen on the site. Some tombs are found with a grass mat under the body or the body above the wooden couch made of wooden sticks.

The tomb details can be seen in Table 36 and Fig. collection 5.3.7-1.

4. Age

4.1 Relative Age

According to the tomb structure and grave goods, the excavators divided Duogang site into four sub-phases (Fig. 5.3.7-2).

- Phase I*: mainly oval vertical shaft tombs, with beam cover and stone; some are found with one appending pit on the western wall; single-burial and secondary burial are both common, while all bodies are in the side-flex position. Pottery single-handled spouted pot *Fu* and single-handled shallow bowl are the typical pottery wares. The tombs of phase I include M201-203, M216, M102, and M236.

- Phase II*: composed of A and B two phases. The early phase A (M254, M260) has no new tomb structures; while the pottery single-handled spouted pot *Fu* increased, some lines appeared on *Fu* and shallow bowls. The later phase B (M203-210, M244-247, M251, M255-258, M276-278, M234, M103-105, M114, M280) has more stone circles and beam covers around the tomb opening, with some bodies found on the beam cover, and the buried bodies in the chamber are placed in several layers. The prone position is new; some adults and children are buried together. Pottery shallow bowls and spouted pot *Fu* are popular pottery combinations. Painted triangle patterns are mostly seen on *Fu*; small iron objects, stone spinning wheels, and cosmetic sticks became popular.

- Phase III*: also composed of early phase A and late phase B. Phase A (M211, M212, M220, M222, M224, M108, M283) has the independent children pit appeared under the surface mound. Pottery single-handled pot *Fu* is the central grave object; when spouted wares are rare in the medium-sized tombs, jugs and small cups are new in phase A. the large-sized tombs kept the pottery combination with spouted pot *Fu*, single-handled shallow bowl, and jug. Phase B (M213-215, M217-219, M225-233, M236, M237, M240, M283, M252, M253, M261-267, M270-274, M106, M107, M110) has a new form for children pit; usually, two kids are found in one chamber pit, some skulls are drilled with one hole. Single-handled spouted pot *Fu* is rare. Pottery jugs and the small single-handled jars are the popular pottery combination; the shallow bowls are increasing, while fewer painted patterns are seen in phase B.

- Phase IV*: the tomb structures are the same as in the previous phase, while the prone straight

position is new in this phase. No independent children pit anymore; the maximum of buried people is in two layers. The spouted wares no longer existed; jugs can only be seen in the large-sized tombs; double-handled pot *Fu* is new in this phase; most pottery wares are found with two small handles.

In the Duogang site, metal objects, especially iron ones, started from Phase II, indicating its Iron Age dates range. There are few tombs found with typical Han, Jin & Tang style, while the rest tombs showed a great early Iron Age feature distinguished from the later historical tombs.

4.2 Absolute Age

There are nine radiocarbon dating results from Duogang samples, and the details can be seen in Table 4. According to the calibrated data, the absolute age of the major Duogang site is between 1000 BC and 350 BC. As for the different phases, Phase I is around 1000-900 BC, Phase II is in 800 BC, Phase IIIA is during 700 BC, Phase IIIB is between 700-550 BC, and Phase IV is between 550-350 BC.

5. Interpretation

The surface stone indicators and grave goods, especially the pottery wares, showed remarkable similarities with Kezier site in the same region in Baicheng County and Qunbake site in Luntai County. Therefore, some scholars suggest that they all belong to the "Qunbake Culture" that lasted in the southern Tianshan regions between the 10th to 3rd century BC, with a similar surface tomb indicator and vertical shaft pit (IACASS et al., 2014). Furthermore, pottery spouted pot *Fu* is the most typical wares in their cultural element, which seems quite similar to the Chawuhu spouted ware, while Chawuhu has less pot *Fu* but more cups and jars. Thus, they all showed identical cultural elements on the northern edge of the Tarim Basin.

The analysis of the human bones reveals that meat consumption is their major diet, while millet also appeared in their daily life (Zhang et al., 2014). The co-existence of bronze knives and sheep/goat bones found inside the pottery wares also proved their meat-eating habit, while the spouted wares have always been linked with the milk-drinking of the nomadic inhabitants. The secondary burial is thought to be the reburial tradition after the move of the mobile group.

Therefore, the Duogang people may mainly rely on animal herding and husbandry, while they may also start their early agricultural practice.

3.8 Xintala Site

1. Location

Xintala site is situated in Heshuo County, Xinjiang. The site is located on the oval terrace of Kaidu River valley in the Yanqi Basin; the Bosten Lake is 10km to its south (Fig. 5:43).

Xintala site is situated on the northern edge of Tarim Basin, which is in the Warm Arid Temperate Zone. Although summer and winter represent distinct wet and dry seasons, precipitation conditions may considerably vary in each and for the different types. Occupying the Taklamakan, the area receives the lowest precipitation in all of China which mainly drops to the annual total between 15 and 50 mm, showing slightly higher amounts on the foothills towards the Tianshan Mountain. Due to the meager totals of precipitation, usually, all months are dry; evidence for this is also given by the tiny number of rainy days, which as a monthly figure reaches the most and varies for the whole year, generally between 15 and 40mm only (Domorös and Peng, 1988).

2. Research History

The Xintala site was discovered in 1979 (Qiu, 1988), and the Xinjiang Institute of Cultural Relics & Archaeology carried out the field survey and excavation in the same year. They collected plenty of pottery wares, bronze objects, and lithic tools and excavated four trial trenches (T1-4) on the terrace. The followed-up field survey was carried out by the Xinjiang Museum and Heshuo Institute of Cultural Relics in 1981 and 1984 (Xinjiang et al., 1986). The brief excavation report was published in 1988 (Xinjiang, 1988).

Even though no tombs are excavated, the sediment sequence and the collected material have provided new evidence of the ancient settlement in the Yanqi Basin. The so-called “Xintala Culture” is thought to be the dominant cultural group in the Yanqi Basin before the Chawuhu culture (Chen & Hiebert, 1995; Thornton et al., 2004; Høisæter, 2017). The new

archaeobotanical research provided a new absolute date range of Xintala and analyzed its economic strategies (Zhao et al., 2012, 2013; Li, 2020).

3. Findings

3.1 Stratum Sequence

There are four layers shown on the T1 trench profile:

- *T1* ①: Topsoil, the thickness is 15-25cm.
- *T1* ②: yellow-brown soil, the thickness is 60-75cm. There are charcoal pieces, animal bones, lithic tools, and pottery sherds that remain in the soil. In addition, there are scattered mudbricks on the bottom; the length is 41cm, the width is 21cm, and the height is 11cm.
- *T1* ③: grey-brown soil, the thickness is 190-210cm. There are plenty of animal bones with percussion and burnt marks, pottery sherds with painted patterns, one pottery jar with the red coating, a stone ball, stone pestle, gravel stone, stone spinning wheel, and stone hammer found inside this layer. In addition, there is one mudbrick with line patterns on it.
- *T1* ④: yellow solid soil, the thickness is 200-215cm. This layer might be the mudbrick house foundation; the surface still has burn marks. There are no lithic tools, only six pieces of pottery remains.

The other two trenches' stratum were all exposed on the edge of the terrace; only three layers remained, with charcoal, burnt soil pieces, pottery sherds, stone ball, and stone sickles inside.

3.2 Other Features

One stove pit (Z1), one mudbrick floor (K1), and one ash pit (H1) are found under the *Layer* ② in T4.

Z1: located in the T4 center, the lip diameter is 60cm. There is one pebble floor on the south of *Z1*; the length is 100cm, and the width is 60cm. The fire passage goes from the stove pit bottom to the north; the path is in a triangle shape, and the length is 100cm.

K1: constructed by nine mudbricks, the mudbrick length is 55cm, width is 30cm, and thickness is

12cm. K1 is rectangular; the length is 200cm, the width is 124cm. K1 is connected with the fire passage with Z1 by small pebbles.

The collected goods from T1-T4 include pottery wares, bronze objects, and lithic tools, and the details can be seen in Fig. 5.3.8-1.

4. Age

4.1 Relative Age

According to the pottery types from different layers, the excavator divided Xintala into two sub-phases. Phase I is the *Layer* ② from T3 and T4; the pottery wares are mainly double-handled jars with no painted patterns and dark coating, while the lithic tools only include stone sickle and stone balls with no drilled holes. Phase II is the *Layer* ② & ③ from T1 when painted pottery dark coating pottery wares and various types of lithic tools increased.

No iron objects, the coexistence of painted pottery wares, and bronze objects are the typical Xinjiang Bronze Age feature. The painted pottery patterns are similar to the Alagou site in the Turfan Basin, while the iron objects from Alagou may indicate it relatively later than Xintala. Therefore, the excavator suggests that Xintala is one Bronze Age site in the 3rd millennium BC.

4.2 Absolute Age

Two radiocarbon data were published in the 1988 report; however, the original data is missing (Xinjiang, 1988). There are five new radiocarbon dates published in 2012 (Zhao et al., 2012, 2013), providing a more accurate dates range for Xintala. The details can be seen in Table 4. According to the calibrated dates, the absolute age of Xintala is from 1950 to 1550 BC.

5. Interpretation

The botanical research reveals that wheat, naked barley, and broomcorn millet are cultivated in Xintala. The rising number of seed grains and the lithic tools like stone hammers and stone sickles more firmly suggest the intensity of agriculture practice at this site (Zhao et al., 2013). While in the meantime, the animal bones and bronze tools also suggest the meat consumption and herding of livestock might have been an essential part of the sustenance basis, which

provided a mixed diet for the inhabitants of Xintala (Høisæter, 2017).

Mei and Shell also proved that the bronze objects are crafted locally, as both copper and tin are available in the mountains near Yanqi Basin (Mei & Shell, 1998). Furthermore, the features constructed by mudbricks are similar to the mudbrick technique seen in early oasis settlements in western Central Asia and parallel to the Yanbulake site (Chen & Hiebert, 1995).

Scholars believe that Xintala represents a small sedentary cultural group that dominated the northern border of Tarim Basin during the second millennium BC, replaced by Chawuhu culture in the next millennium (Chen & Hiebert, 1995; Thornton et al., 2004; Høisæter, 2017). While during its development, Xintala people also interact with other periphery Tarim Basin sites (Høisæter, 2017). It is still hard to define this as a representative of “Xintala culture” since the mortuary information is a blank. Yet, it can be confirmed as a small settlement with abundant sediments and mixed dietary strategy in the oasis close to the Tarim Basin during 1950-1550 BC.

4. Southern Altai Region

4.1 Qiemu'erqieke site

1. Location

Qiemu'erqieke site is located in Altai City, and it used to belong to the Ke'ermuqi Brigade when it was first discovered in 1963. Thus, it was initially called the "Ke'ermuqi Site" in the excavation report. The name "Qiemu'erqieke" is the river that flows from north to south until the Ertix River. More and more scholars preferred to use "Qiemu'erqieke Site" as both the site and cultural name in recent years. The site lies on the southern slope of Altai Mountain, and the tombs are distributed on the mountain ranges and the Gobi Desert (Fig. 5: 36).

Qiemu'erqieke site is in the Middle Arid Temperate Zone, and the annual total precipitation drops typically to between 50 and 250 mm. The yearly precipitation variation shows a clear summer maximum that becomes weaker or nearly extinguished in Northwest China. As for the

temperature, January is around -10°C to -12°C , and July is 20 to 24°C . Winter and summer experience severe seasonal contrasts in temperature, which establish winter as a long and severe season, whereas summer is a comparably warm but short period. Further strengthening the climate extremities, a rapid change of climate occurs in the mountain. Besides the well-established seasons, extreme climate events, such as the severity of frost and snow and the long sunshine duration, create a particular climate (Domrös & Peng, 1988).

2. Research History

Qiemu'erqieke site was discovered in 1963 during the Altai regional field survey by the Xinjiang Institute of Cultural Relics & Archaeology. They carried out the excavation, and the brief report was published in 1981 (IACASS, 1981).

The excavation yielded thirty-two tombs and found the unique burial traditions and pottery wares distinguished from other Xinjiang sites, drawing scholars' attention to studying its cultural contents. Chen firstly suggested a "Qiemu'erqieke type" in 1985 and believed it should be an Iron Age site (Chen, 1985). Wang & Chang suggest that this site should represent the Bronze Age "Qiemu'erqieke Culture" (Wang & Chang, 1986).

This archaeological culture has been agreed upon by many scholars when they keep tracing its origins within and outside Xinjiang (Wang, 1985; Chen & Hiebert, 1995; Wang, 1996; Shui, 2001; Shui, 2001; Lin, 2002; Han, 2007; Lin, 2008; Shao, 2008; Kovalev et al., 2009; Kovalev, 2011, 2015; Chen, 2012; Wang, 2013; Han, 2017; Lu, 2017, Betts et al., 2018). Jia and other scholars re-analyzed the site data and reconstructed the Qiemu'erqieke chronological phase in the Eurasian Steppe sequence (Jia & Betts, 2010; Cong & Jia, 2014). At the same time, some other field survey results in the southern Altai region completed the content of "Qiemu'erqieke culture" (Li, 1962; Xu & Wang, 2002; Zhang, 2007).

3. Findings

The 1963 season excavated thirty-two tombs in the Qiemu'erqieke site, while according to Jia's re-examination, these tombs are distributed into three different sections, which can be divided into Nr. I-III cemetery. Nr. I cemetery has seven tombs, M1-M7, Nr II cemetery includes

M8-M17 and Nr. III has fourteen tombs, M18-M32 (Fig. 5.4.1-1).

The tombs are in the enclosed stone circle and single-burial shaft pit, two types. The enclosed stone circle tombs usually have multi burial pits inside, and the burial pits are named "m." Tombs without surface mounds all have stone coffins found in the tomb chamber, while the surface-mound tombs have two sub-types: stone coffin chamber and vertical shaft pit chamber. Supine flex, supine straight, prone straight, and secondary burial are the prominent burial position, among which secondary burial accounts for the most. The grave goods include pottery wares, bronze objects, lithic tools, bone items, and a few iron objects. In addition, some tombs are found with a large stone figurine stele standing in front of the graves.

The tomb details can be seen in Table 37 and Fig. 5.4.1-2.

4. Age

The tombs from three sub-cemeteries showed two groups in different time phases: one group is the Bronze Age tombs, which include M1, M2, M3, M5m2, M7m1, M7m2, M8, M11, M15, M16m2, M17m1, M17ma, M18m1, M18m2, M19, M20, M21, M24. The rest tombs belong to the Iron Age period. All Bronze Age tombs have a similar burial tradition; when the enclosed stone circles or stone coffins as the tomb indicator, stone figurine steles are found standing in front of the tombs, and pottery round-based jars are the primary grave goods. Jia suggests that the Bronze Age group should belong to the Qiemu'erqieke Phase I, whose cultural feature parallels the mid-late Okunevo culture (Jia & Betts, 2010).

Unfortunately, there are no radiocarbon dating results from the Qiemu'erqieke site samples. Combining with the parallel cultural groups in western Mongolian, eastern Kazakhstan, and Altai region in Russian, and considering the new excavation material, scholars assumed that the date of the Qiemu'erqieke Bronze Age group is between 2400-1700 BC (Jia & Betts, 2010; Cong & Jia, 2014; Lu, 2017). As for the Iron Age group, the iron harness may extend the latest time of Qiemu'erqieke into Jin & Tang periods (Wang, 2013).

5. Interpretation

The tomb tradition from Qiemu'erqieke site is distinguished from other Bronze-Iron Age sites in Xinjiang but showed more cultural connection with the Altai region in the north and eastern Kazakhstan. The round-based pottery jar, stone vessels, and stone coffin have remarkably similar to the Okunevo culture⁸. At the same time, the standing figurine stele from Qiemu'erqieke is quite close to the Yamnaya culture (3200-2600 BC) (Chen, 2012), which is explained by the native development from their early settlers (Cong & Jia, 2014). In addition, Kovalev also pointed out that the standing stele from Qiemu'erqieke was similar to what was found in European Neolithic sites. He further suggests that there might be a great migration from southern France to the Altai Mountain region in the 3rd millennium BC (Kovalev, 2011), which may provide a new perspective on the cultural communication study.

Qiemu'erqieke phase I group is one of the earliest Bronze Age assemblages in Xinjiang; the early settlers arrived in the southern Altai Mountain regions as an entry point Afanasievo-Okunevo cultural group and may spread its cultural influence southwards and eastwards through the time. This cultural tradition interacts with the native and other regions' influence from the east and south during this process, which may transform into other cultural elements.

4.2 Adunqiaolu site

1. Location

Aunqiaolu site is located in Turigen village in Wenquan County, Boertala Mongol Autonomous Prefecture. The site is situated on the western of Tianshan Mountain; its south is the Boertala River flows from west to east; the site is located in the upper reaches of the Boertala Valley, an open slope below the Altai Mountain range (Fig. 5: 37).

Aunqiaolu site is in the Middle Arid Temperate Zone, the annual total of precipitation drops typically to between 50 and 250mm. The yearly precipitation variation shows a clear summer maximum that becomes weaker or nearly extinguished in Northwest China. As for the temperature, January is around -10°C to -12°C, and July is 20 to 24°C. Winter and summer

⁸ Qiemu'erqieke culture used to be thought to be parallel to the Afanasievo culture (Lin, 2008). After a re-analysis of the chronological phase, this assumption has been replaced by more parallel to the relatively later Okunevo culture (Jia & Betts, 2010).

experience severe seasonal contrasts in temperature, which establish winter as a long and severe season, whereas summer is a comparably warm but short period. Further strengthening the climate extremities, a rapid change of climate occurs in the mountain. Besides the well-established seasons, extreme climate events, such as the severity of frost and snow and the long sunshine duration, create a particular climate (Domrös & Peng, 1988).

2. Research History

The field survey in 1988 at Boertala discovered the Adunqiaolu site (Li, 1988); the Xinjiang Institute of Cultural Relics & Archaeology carried out another field survey (Li & Lv, 2002). The field program at Adunqiaolu and nearby areas included the excavation of residential structures and cemeteries, an intensive field survey along the headwaters of the Boertala Valley, carried out by the collaboration team with the Archaeology Institute of the Chinese Academy of Social Science, and a team from the University of Sydney and Monash University, between 2011 and 2017 (IACASS et al., 2013; Jia et al., 2017a).

Four seasons of excavation provide abundant evidence for the repeated use of residential and mortuary sites over a long period. Meanwhile, more radiocarbon data and other analyses contribute to the understanding of southern Altai Bronze Age cultural development (Jia et al., 2011; Cong et al., 2017; Jia et al., 2017a, 2017b; Jia, 2018; Cong & Jia, 2019; Doumani et al., 2019; Shao et al., 2019; Chan & Cong, 2020; Cong, 2020; Jia et al., 2020; Wang et al., 2020).

3. Findings

3.1 House Site

Eleven house remains are found on the slope; one site has been excavated and named F1, the largest one among the eleven remains. F2 and F3 connecting F1 (Fig. 5.4.2-1).

It is in regular shape with a rectangular enclosure of about 425m². One doorway on the south is also framed with double lines of stones; the door length is 2.78m, the width is 3.15m, and the orientation is 152°. The double walls are 1.4-1.5m wide, forming a corridor surrounding the main structure. The outer length of the structure is 22m, the width is 18m, the inner length is 18m, and the internal width is 14.6m. The main structure is divided by stone walls into four independent

rooms, two in the north, which contain stone piles in circular or square shapes. The house is designed symmetrically, and the internal divisions may suggest different functional areas.

The stone piles found inside F1 post-date the occupation of the structure, some representing later burials. Some layers of stone are placed in rows in the northeast corner and a large circular stone pile in the northeast center. There are two square blocks of stones on the northeast and northwest corners, respectively, and several pits found inside the house.

F2 is located on the east of northern F1, in an irregular round shape; the length is 18.2m, width is 14m. The southern edge of F2 is connected with F1. There are no stone walls inside the house, only two larger stones in the center.

F3 is located on the west of northern F1, in an oval shape, and the diameter is 17.8cm. The southern part of the F3 eastern wall is the western wall of F2, and there is one doorway in the middle of the western wall. F3 also has two retaining walls, and several large stones remain in the northwestern section; some lithic tools and pottery sherds are found close to the eastern wall.

There is one self-enclosed structure on the northwest of F1, which is built during the first phase of the occupation of F1. It contained the highest concentration of animal remains, the length is 7.2m, width is 6m, occupying one-quarter of the surface area of F1. Its western and northern walls are later incorporated into the external wall of F1, while its eastern and southern walls are kept original; the wall height is 1.2m. There is one doorway on the south wall; the length is 0.85m, and the width is 2.9m. In the later period, two children's tombs are installed.

3.2 Cemetery

The cemetery section is located on the south of the house sites, about 1800m. The length of the cemetery is 500m, and the field survey discovered over sixty tombs, 2012 season yielded nine tombs. The slab tombs in Adunqiaolu are mainly square or rectangular; some have square enclosures (Fig. 5.4.2-2).

SM4 (Fig. 5.4.2-3): Located on the north of the cemetery section, with one square enclosure on

the surface; the length is 7m, 7-9 stone slabs constructed on each side, the slab width is 0.8-1.1m. There are two tomb chambers (SM4-1, SM4-1), all found with stone coffins inside the chamber pit.

SM4-1: in an oval shape, the pit length is 3.67m, the width is 2.2m, and the depth is 2m. The stone coffin is found at a depth of 1.5m, with four slabs, no coffin bottom, construct the coffin cover. One kid's body, with a tiny pottery jar buried altogether.

SM4-2: in a rectangular shape, the pit length is 2.6m, the width is 2.4m, and the depth is 2.1m. The coffin cover is constructed of several thin slabs, plaster with a layer of mud. There is one wooden couch in the coffin, made of small wooden sticks, and the diameter is 0.13-0.15m. One male is in a side-flex position on the couch, with one pair of bronze Earring with golden coating, one pottery jar, and sheep/goat bones.

SM50 (Fig. 5.4.2-4): Located on the south of the cemetery, with one stone enclosure on the surface; the length is 7.1m, width is 2.8-3m, height is 0.3m. There are two chamber pits (*SM50-1*, *SM50-2*).

SM50-1: irregular rectangle, the pit length is 2.3-2.4m. There are two stone coffins in the tomb chamber, sharing one cover slab. Two individuals are in the coffin, with burnt marks on the bones; each coffin has one small pottery jar on the western end.

SM50-2: in an irregular rectangular shape, the pit length is 2.2m. One stone coffin in the pit is constructed of stone slabs with one cover. One 25/30-year-old female is inside the coffin, with several infant skulls and bone pieces on her north side. There is one small pottery jar on the western end.

Some other tombs and pottery sherds were found during the 2011-2017 excavation, and the details can be seen in Fig. 5.4.2-5.

4. Age

The slab burials and stone structures from Adunqiaolu indicate that this is a prominent early Bronze Age site in the southern Altai region, which might directly contact the Andronovo culture in the Eurasian Steppe. There are twenty-seven radiocarbon dating results from Adunqiaolu samples, and the details can be seen in Table 4. according to the calibrated date, the absolute age of Adunqiaolu is between 1700 BC and 1300 BC.

5. Interpretation

The artifacts, domestic and ritual architectural forms from Adunqiaolu all suggest the cultural connection with Andronovo culture. The tombs are characterized by large rectangular or sub-square stone slab enclosures containing one or more than one tomb chamber, mainly corresponding with the Fedorovo and Semirech'ye groups (Kuz'mina, 2007; Jia et al., 2017). The cremation burial and clay coating tradition are paralleled with the Tasbas tradition in the mid 3rd millennium BC (Doumani et al., 2015; Jia et al., 2017). Except for the burial tradition, the house remains in large rectangular semi-subterranean buildings of stone slabs, with a narrow corridor entrance showing a strong Andronovo type (Jia et al., 2017).

The house's location, the division of different rooms, botanical analysis, and the anthropological survey in the modern areas made the scholars suggest that herding is their primary subsistence strategy. At the same time, the seasonal transhumant had appeared in the 2nd millennium BC in the western Tianshan, and Adunqiaolu was used for the pastoral groups as a winter encampment (Cong et al., 2017; Jia, 2018; Jia et al., 2020). A modern winter camp located close to the house remains F1, which takes advantage of the shelter provided by a low hillock just behind F1. The pollen analysis of sheep dung from the house exhibits a much more limited variety of species than modern sheep dung collected near summer. In addition, the phytoliths present in the contemporary summer sheep dung come from less mature plants than those in the Bronze Age dung, suggesting that the animals are very likely raised in the house during autumn or winter, when the early agricultural practice may haven't started yet (Shao et al., 2019; Li, 2020).

The faience beads found from Adunqiaolu are the earliest form of faience found in China so far; the compositional analysis indicates the plant ash is possibly used as a raw material. Its type is distinguished from those beads found in the Yellow River region in central China but showed

remarkable similarity with the faience beads from Eurasian Steppe and Europe, thus revealing an early cultural exchange between Xinjiang and Central Asia (Wang et al., 2020). On the other hand, the pottery analysis suggests a more regional stylistic tradition, along with localized traditions upheld by non-specialist potters consisting of various community members (Doumani et al., 2019), indicating the local admixture of the outside culture and native inhabitants.

The Andronovo influence appears within the local development at Begash. In the case of Adunqiaolu, it seems to arrive without antecedents; this may lead to the regional connection between the Bronze Age of Semirech'ye and western Tianshan (Jia et al., 2017). Mei and Shell proposed that northwest Xinjiang may represent an entry point for spreading steppe cultural influence into China during the Bronze Age (Mei & Shell, 1999). Adunqiaolu may be one of the early settlers' options.

5. Northern Kunlun Mountain

5.1 Liushui Site

1. Location

Liushui site is in the Liushui village, Yutian County. It is situated on the Akebulake terrace by the Liushui River and Keriya Upper River in the foothill of Kunlun Mountain (Fig. 5: 38). The Liushui site is located at an altitude of 2850m above sea level (Wu et al., 2006; Xinjiang, 2006).

The northern slope of Kunlun Mountain is in southern Xinjiang, one of the aridest mountain ranges due to the far reach of the ocean current. The Liushui site's terrace is located on the third terrace of the Keriya River, the south is the upper Keriya River, and the west is the Kashitashi River. This terrace was sediment by dust, and the thickness can be as thick as more than 10 meters, while the terraces are built of rocky ground, a layer of river gravel, and accumulated Aeolian loess. Initially, this terrace was probably connected to the north mountainside before it was demolished because of the earthquakes or erosion and stopped as a nearly isolated block. In the cleft between the slope and the terrace, groundwater emerges in several places nowadays.

The southern and eastern terraces are cliffs, about 16.8m higher than the modern riverbed. The surface of the terrace is slightly smooth, the east-west length is 131m, and the north-south width is 35m.

Situated in the southern Tarim Basin and the northern slope of Kunlun Mountain, Liushui site is in the Arid Warm Temperate Zone. In total, summer and winter represent distinct wet and dry seasons; the precipitation conditions may vary considerably between the different types. Occupying the southern Taklamakan Desert, this zone received the lowest precipitation in all of China which mainly drops to the annual total between 15 and 50mm, showing a slightly higher amount on the foothills toward the Tianshan Mountain as the northern boundary and the Kunlun Mountain (Domrös & Peng, 1988).

2. Research History

Between July and August 2002, the Xinjiang Team of the Institute of Archaeology of the Chinese Academy of Social Science surveyed this region's ancient jade and stone road. They found several burials on the southern terrace, and the pottery types are similar to Taklamakan pottery. The Xinjiang team then did the radiocarbon dating test, and the results indicate that there used to be an ancient group of people who existed here. Because the modern villagers keep using the river water, the site terrace has been flooded and destroyed gradually, and the exposure of the burials is the result. The Xinjiang team immediately carried out the rescue excavation to protect these burials.

In July and August 2003, the Xinjiang team first excavated eight burials on the southern terrace and primarily researched the tomb tradition and date. In July and August 2004, they yielded twenty tombs on the central and south terraces, and the excavation scale is 600m². By this season's excavation, the scale of this site is almost clear. Between May and July 2005, the Xinjiang team excavated the rest terrace; this season yielded twenty-three tombs. The whole site has been excavated fully; fifty-two tombs cover about 4000 m² (Xinjiang, 2006).

The brief excavation report was published in 2006 (Xinjiang, 2006), in which it released the detailed tomb information from M9, M10, M16, M24, M26, M40, M46, and M55, and it also

discussed the tomb tradition, pottery type, bronze object, and other object types. The excavation report also discussed the cultural element of Liushui site and their life patterns, while not so detailed. Another German report was published in the same year, especially analyzing the metal objects and wooden samples found in the Liushui site (Wu et al. 2006).

From 2006 and 2008, the Institute of Archaeology of the Chinese Academy of Social Science (IACASS) and the Deutsches Archäologische Institut carried out a joint paleoanthropological and paleo-pathological project on the human skeleton from tomb M26. This project studied the six skeletons from the remained material. It reconstructed the possible living conditions of the Liushui site, including their diet, dwelling, labor, geographical and climate circumstances, hygienic conditions, and health protection (Schultz et al., 2007; Gresky et al., 2008; Schultz et al., 2008). In 2011, a new radiocarbon date report on Liushui was published (Wagner et al., 2011). This report provided detailed dates on eleven samples, including wood, tar pitch, and charcoal. This report also summarized the paleoanthropological results and Liushui characteristics and the results from the comparison with southern Siberia, Mongolia, China, and Kazakhstan. In the same year, Chinese scholars also studied the Discontinuous traits of the Liushui site and tried to explain the moving patterns of different culture groups (Zhang et al., 2011). In 2016, the German Archaeological Institute and Chinese archaeologists carried out another musculoskeletal analysis for the skeletons in Liushui (Gresky et al., 2016), including the sex estimation, age-at-death estimation, Enteseal Changes, Spine fractures, etc., which provided more evidence on the health condition of ancient Liushui people.

3. Findings

3.1 Stratigraphy

In this site, except for the southern burials are exposed on the southern cliff, the rest tombs are buried deep in the sand, the deepest can be four meters. The Topsoil is light grey or brown sand; under the top layer is the sandy soil with white Aeolian loess, the thickness is 0.5-2m. The tombs are found under the second layer. The shallowest tomb is M3; it is 0.66m under the Topsoil, while the deepest tomb is 3.4m under the Topsoil.

3.2 Tombs

There are fifty-two tombs excavated in total, laid out at irregular intervals (Fig. 5.5.1-1), thirteen of which are found with surface stone Cairns.

M9: Stone Barrow Burial. The orientation is 76° . The stone barrow is oval, and the long diameter is 3.4m, the short diameter is 2.9m, 2.4m under the surface. The surface of stone barrows is uneven; the western part is arc-shaped and densely arranged, while the stones in the central and eastern regions are loose and disturbed.

The tomb chamber is a shaft pit, and the pit is rectangular; the length is 1.5m, the width is 0.94m, and the depth is 1.3m. There are some large flat boulders and small gravels found under the surface of this tomb.

There are six skeletons found in *M9*; only body Nr. 2 remains entirely. Nr. 2 is a male between 35 to 45 years old, side-flexed, the direction of the head is northeast, whose face is downwards. The rest skeletons are disturbed and in disorder.

There are six pottery wares found in the central north and south of the tomb chamber. In addition, there are several bronze arrowheads, bronze knives, bronze beads, gravel stones (Fig. 5.5.1-2), stone eyebrow pencils, stone ornaments, and carbon blocks found in the tomb chamber.

M10: Stone Enclosure Burial. The orientation is 87° . The stone enclosure is oval; the long diameter is 6.6m, the short diameter is 6m, 2.7m under the surface; one-three layers make up the boulder, and the diameter of the boulder is between 20-40 cm.

The tomb chamber is a shaft pit situated in the central-eastern of the stone enclosure. The pit is round-rectangular, the length is 2.25m, the width is 1.12m, and the depth is 2.4m. There are some boulders, gravels, charcoal pieces, and goat bones found under the surface of this tomb. One skeleton found in *M10*, which belongs to a 60-year-old male, is side-flexed, the direction of the head is east, and the face is turned to the south.

Some grey ashes of wooden sticks are found on the bottom of the tomb chamber, indicating the

funerary couch. One bronze chain is located in the eastern chamber, some golden beads are found on the body's neck, one square bronze ornament is found on the left side of the skull, and two pairs of golden earrings (Fig. 5.5.1-3) are located next to each ear respectively. There are more than ten bronze buttons found near the waist area. One bronze gag bit and harness are found under the horse's skull in the northwest chamber. In addition, there is one iron piece found on the bottom of the chamber, which might be an iron knife.

M16: Stone Enclosure Burial. The orientation is 180°. The stone enclosure is round, and the diameter is 5.5-5.6m; there are two layers of stone on the southwest side, while the rest are one layer. A small stone circle is found next to the east stone enclosure; the diameter is 0.6-0.8m. There is a line of the boulder to the southeast, and the length is 1.4m.

The tomb chamber is in the central stone enclosure; the pit is a rounded square, the length is 2m, the width is 1.08m, and the depth is 2.2m. One skeleton is found in the central west of M16, which belongs to a 25-30-year-old male, side-flexed, whose femur is separated from the tibia and fibula.

There is a wooden couch found at the bottom of the chamber, the length is 1.4m, and the width is 0.8m. It is made of six south-north wooden sticks and two east-west wooden sticks; the south-north stick is 140cm long, 5cm in diameter, the east-west stick is 70-80cm long, and the space between each other is 30-40cm. There are four stand sticks on four corners, with several sticks binding on the stand sticks.

Several bronze harnesses, gag bits, bronze knives, bronze arrowheads, pottery jars, and golden belt are found in tomb M16. The golden belt is located on the left side of the skeleton. The bronze knife is under the rib. The pottery jar and bronze arrowhead are found in the central east of the tomb couch, and the bronze harness is located in the southeast corner of the tomb chamber.

M24: Stone Enclosure Burial. The orientation is 68°. The stone enclosure is oval, the diameter is between 2.4 and 2.9m, and the height is 0.35m. The tomb chamber is rounded rectangular; the

length is 2m, the width is 1.18m, and the depth is 1.45m.

There are four skeletons found in M24; only body Nr. 1 is remained entirely, which belongs to a 35-year-old male, the direction of the head is east, and the face is turned to the north, supine flexed. The skull of body Nr. 2 is found north of Nr. 1, which belongs to a 20-year-old male. Body Nr. 3 and Nr. 4 are found under the west tomb wall; they are one 30/35-year-old male and 25/30-year-old female. The skeletons of Nr. 2, 3, and 4 are placed randomly. Bronze knives, gravel, string beads, iron knife pieces, pottery jars, and pottery shallow bowls (Fig. 5.5.1-4) are found in this tomb.

M26: Stone Enclosure Burial. The orientation is 93°. The stone enclosure is oval, made of three layers of the boulder, and the space is filled with sand and small cobble; there are pottery sherds, bones, and charcoal found in the sand filling. The enclosure diameter is 2.7-3.6m, the height is 0.4-0.6m, and there is a small gap on the east side. The tomb chamber is in the central north of the enclosure, rectangular, the length is 1.76m, width is 0.92m, and the depth is 1.2m.

There are three layers of skeletons found in tomb M26. The first layer is 0.15-0.4m under the tomb surface. Body Nr. 1 is a boy; the skeleton is located near the west tomb wall; Nr. 2 is a 25/30-year-old female, the direction of the head is north, the face turned to the east, side-flexed. The second layer of skeletons is 0.9m under the tomb surface, body Nr. 3 is a 15-20-year-old female, the direction is east, and the face turned to the south, right supine flexed, there is one stone under the left leg, and the hands are on the belly. Nr. 4 is a 25-35-year-old male; the skull is found in the belly area. The third layer of skeletons is found with two complete bodies. Nr. 5 is a 35-40-year-old male, left supine flexed, two hands are on the belly. Nr. 6 is a 25-30-year-old female, the face turned to Nr. 5, the left hand is on the chest, while the right hand is on the belly; the legs are under the legs of Nr. 5.

There are one pottery shallow bowl, stone eyebrow pencil, and several charcoal pieces found in the first layer; bronze button and gravel from the second layer; beads found on the chest and face of Nr. 5, and one double-handled pottery jar located next to Nr. 6.

M40: Stone Enclosure Burial. The orientation is 180°. The stone enclosure is oval, the east-west diameter is 3m, the north-south diameter is 3.3m, and the height is 0.6m. The tomb chamber is in the central enclosure, a rounded rectangle, the length is 1.7m, the width is 0.8m, and the width is 1.2m.

There are two layers of skeletons found in this tomb; both layers have boulders above. The upper layer is 1m under the tomb surface, body Nr. 1 is complete, and the direction of the head is east, whose face is turned to the southeast, side-flexed. Nr. 2 is found in the west; the bones are disordered, which might be a secondary burial. The second layer is located at the bottom of the chamber. Nr. 3 is complete, while the head and body are separated, supine flexed, and the legs turned to the right. Nr. 4 is found in the central west, and the bones are disordered without rule, which might be a secondary burial.

There are one pottery jar and one pottery cup found next to the neck and arm of Nr. 1, two hundred and sixty-nine beads on the neck. One eyebrow pencil and eyebrow stone are found next to the left shoulder of Nr. 3, one pottery jar near the arm, and nineteen bronze buttons (Fig. 5.5.1-5) from the right chest and belly. In addition, there is one pottery jar next to the head of Nr. 4, and under the body are eyebrow stone and bronze beads.

M46: Stone Enclosure Burial. The orientation is 180°. Nine layers of boulders make up the stone enclosure, and the diameter is 3.7m; there is a small stone circle to the east of the enclosure, and the diameter is 0.5-0.6m. The tomb chamber is under the enclosure, oval, the length is 1.95m, the width is 1.25m, and the depth is 1.5m. The filling material of the chamber is sand, with boulders and gravel stones inside. There are some large cobbles under the tomb surface.

Four skeletons are found in *M46*, two complete bodies in the east chamber and two in the west. Body Nr. 1 is supine flexed, Nr. 2 is left flexed, the direction of the head is east, and the hands are on the belly. Nr. 3 and 4 are found disordered without rules. Two pottery shallow bowls, four bronze knives, two gravel, and one bronze arrowhead are found in *M46*.

M55: Stone Enclosure Burial. The orientation is 180°. The diameter is 4-4.8m, and there is a

cairn to the south of the enclosure, whose length is 2.3m and the width is 0.9m. Four layers make the west of the enclosure of the boulder. The tomb chamber is oval, and the orientation is 180°. The length is 2.67m, the width is 1.3m, and the depth is 1.5m.

A horsehead is found in the filling sand, 0.8m under the tomb surface. One skeleton is found in the chamber, and all bones are disordered without rule. The tomb chamber is covered by a layer of grey stones and grey sand. Several bronze axes (Fig. 5.5.1-6), bronze knives, bronze spears (Fig. 5.5.1-7), bone hair ornaments, gravel stones, and beads are found in M55.

In addition, there are pottery jars, bronze buttons, bronze arrowheads, bronze ornaments, stone beads, agate beads, jade ornaments, golden belts, cowrie ornaments, bone arrowheads, and iron pieces found in other tombs; the details see Table 38 and Fig. 5.5.1-8~10.

4. Age

There is no clear stratigraphic feature in Liushui site. Some of the tombs have been exposed by modern construction and natural ruin. Therefore, the sub-phase cannot be classified from the tombs.

According to the excavation report, the radiocarbon dating result of Liushui Site is around 1000 BC (IACASS, 2006). The original excavation report provided four samples and the radiocarbon dates. Meanwhile, the Radiocarbon Dating Report in 2005 only provided one result, and there is a big gap between these two date ranges.

According to the excavation plan, M4 has never been excavated; M5 and M15 are located on the southern slope of the site slope, which has been exposed earlier, so the date of M5 might be disturbed. Therefore, the age from M12 and M17 on the central terrace seems more reliable.

In 2011, more dating results were released (Wagner et al., 2011). Eleven samples from nine tombs were taken and tested, including wood samples, tar pitch, and charcoal. The new results have provided the starting and end date range of Liushui site. Hence, combining with other studies, the exact time range of Liushui could be between 1250-700 BC. The detailed data can be seen in

Table 4.

5. Interpretation

5.1 Burial Tradition

The most apparent feature of Liushui site is the stone enclosure/barrow tomb structure. These stones are not purely piled up by boulder; the construction procedure firstly builds a circle of rocks, piles the soil up, and finally builds up the stones circle by circle. Considering this site is located next to the river, the boulder is not a scarce resource; hence the construction of the stone piles can be seen as a fixed tomb identification. The stone enclosures might be the base of the stones, while the top is the stone barrow; as time goes by, the top has been taken or destroyed, leaving the stone enclosure above the tomb chamber.

Some tombs connect to a small stone circle; the average diameter is between 0.4 and 0.6m, while some have burnt ashes left. So, the small stone circles may indicate sacrificial behavior.

In most tombs, the primary and secondary burials are found together. The complete skeletons are primary burial, while the secondary burials have no complete skeletons. The excavator assumes that the primary burials may be vital in the local community when in the multi-burials, while the secondary burials are normal residents who died earlier (Xinjiang, 2006).

According to the excavation report, there are one hundred and sixty-four human skeletons found in the Liushui site; seventy-five have been statistics, including thirty-three male, thirty-eight female, and five children. The average age at death is thirty-five years old. The tombs are placed in lines; for example, M10, M27, M45, and M44 are in one north-south line, M1, M20, M21, M24, M26, and M43 a north-east line, which may indicate this cemetery has been pre-planned when burying. Liushui site could be a public cemetery for the whole community nearby; however, no settlements are found nearby.

5.2 Metal Analysis

The 2006 report (Wu et al., 2006) also analyzed the metal objects from Liushui site. It shows that even though copper is the main element in the tin bronzes, other alloys such as lead, arsenic, and

gold-silver. Especially the gold-silver alloy is the first and earliest finding in Xinjiang, while in the silver earrings, the lead is absent. In addition, besides the metal material, the analysis also shows that the casting technique was used to make the metal objects, including the forging and hardening techniques. However, the copper elements have shown a difference between Liushui and other sites using arsenic copper.

Therefore, as the earliest site with apparent bronze objects in Kunlun Mountain, Liushui site may have collected separate groups who had the production technique or brought the copper material.

5.3 Cultural Interaction

The grave goods and tomb traditions have shown remarkable similarities with other cultures. The tomb construction is similar to the Timargarha Grave culture in Pakistan (Dani & Masson, 1996, pp. 407), while the pottery jar and cup are similar to Chust Culture (Xinjiang, 2006). The patterns are unique in Xinjiang, while the pottery types are identical to the Zhagunluke site, later than Liushui. The bronze knife has shown significant similarity with Chawighul and Yanbulaq cultures. The golden and bronze earrings are close to early Scythia culture, while the bronze harness and arrowhead are close to Arzan objects. (Xinjiang, 2006).

5.4 Paleopathological Analysis

In 2006, six complete human skeletons from tomb M26 were examined, and the body length was calculated from the sizes of the long bones (Schultz., 2007; Gresky et al., 2008). The six buried in the same tomb have shown suspicion of kinship. Furthermore, the exam results indicate that horse riding is a common atmosphere in Liushui; especially, people from M26 may not be farmers but rather belong to a population that consumes meat more frequently (Schultz, 2007).

The musculoskeletal analysis has also shown that the Liushui population has high physical activity levels (e.g., running and jumping with loads) with serious injury (Gresky et al., 2016). The results may indicate that the Liushui people have had a predominately nomadic life. In addition, the population admixture was examined (Tan et al., 2012). And the results indicate that the population admixture in ancient Xinjiang might be much broader.

5.5 Summary

In all, the time of Liushui site can be narrowed to 1250-700 BC. This site is found with evident stone barrow/enclosure burials; the tomb traditions are primary and secondary burials buried together. As for the grave goods, most goods are pottery jars, while most of the pottery is made from red sandy clay and handmade. The patterns include triangle, line, net, wave, and rhombus patterns, and most of them are stamped or carved; mud sticks make few. Bronze objects are also found in most tombs, including knives, buttons, beads, arrowheads, and harnesses. The stone eyebrow pencil and charcoals are found together, which may be the complete makeup setting, especially for females with particular identities; the jade and golden ornaments also suggest that society's status may have been formed by this time.

Liushui site is a pre-planned public cemetery. The distinction between the primary and secondary burials and the difference in the grave goods indicate that this cemetery is provided for a local community. The paleopathological investigation has shown that Liushui people may have developed the horse-riding life; the horse bone and metal harness found in other tombs also prove this. The difference between the grave goods and human skeleton may indicate they have developed certain groups doing a different job. However, it is hard to define the Liushui people already set the nomadic living pattern. The exact living pattern and cultural interaction cannot be entirely made due to the lack of published information.

Liushui site is the first and earliest cultural remains archaeologists discovered on the northern foot of the Kunlun Mountains. It provides scientific data for research from the cultural aspect of the local inhabitants in the first millennium BC; it also shows a mixture of different cultural elements in and out of Xinjiang.

5.2 Zaghunluq Site

1. Location

Zaghunluq site is located in the Zaghunluq Village, Qiemo (Charchan) County, Xinjiang. The site includes five different tomb sections near Zaghunluq village, and the major is located on the terrace of Cherchen (Qarqan) River. It also lies on the border of the Gobi region beyond the oasis

(Fig. 5: 39).

The east side of this site is on the ancient riverbed. The terrace is 6m higher than the modern riverbed, and the south side is the bay of the ancient Cherchen river; while the west and south side are both slightly higher than the contemporary riverbed, which makes this site located on the rectangular terrace, the scale is about 35,000 m².

Situated on the southern Tarim Basin and the northern slope of Kunlun Mountain, Zahunluq site is in the Arid Warm Temperate Zone. Although summer and winter represent distinct wet and dry seasons, the precipitation conditions may vary considerably in each and for the different types. Occupying the southern Taklamakan Desert, this zone received the lowest precipitation in all of China which mainly drops to the annual total between 15 and 50mm, showing a slightly higher amount on the foothills toward the Tianshan Mountain as the northern boundary and the Kunlun Mountain (Domrös & Peng, 1988).

2. Research History

Zaghunluq tombs are distributed in five different groups around the Zaghunluq village oasis, and the investigation started in the 1920s when Bergman investigated this region and excavated several tombs. In 1983, when the Culture Relics Institute of Bayingolin Mongol Autonomous Prefecture and the Xinjiang Team of the Chinese Academy of Social Sciences investigated the cultural relics in Qiemo County. According to the ground objects, they assumed that there might have existed one ancient tomb site. In the next two years, the villagers kept finding tombs from this terrace; the Relics Team of Bayingolin Museum started the excavation in May 1985, and they yielded five graves. The physical anthropological feature of two corpses is studied (Shao & Wang, 1989). In addition, there was one English report on the tombs published in 1994 (Kamberi et al., 1994).

In May 1989, more tombs were exposed; after the villagers reported to the Xinjiang Museum, they made a second rescue excavation, which yielded two tombs; the excavation report was published in 1992 (Bayingolin, 1992). In the winter of 1989, the Taklamakan Desert expedition did another field investigation in Qiemo County, and they collected several pottery sherds from

the Zaghunluq site; their report was published in 1990 (Taklamakan, 1990). In October 1996, Xinjiang Museum, Bayingolin Cultural Relics Institute, and Qiemo Cultural Relics Institute conducted a joint rescue excavation. Their excavation scale is over 1,025 m², yielded one hundred and two tombs, and their report was published in 2003 (Xinjiang Museum et al., 2003). In this excavation report, the excavators named the largest tomb group Zaghunluq Nr. 1 Cemetery, located to the southwest of Zaghunluq village, about 2km away. Then they introduced the basic information on this site and divided the Zaghunluq site into three sub-phases.

To distinguish with Nr. 1 Cemetery, the tomb section located in the northeast of Zaghunluq village was named Zaghunluq Nr. 2 Cemetery, which is on the northeast border of Zaghunluq village and Langan village of Tuogelakeleke County. This cemetery was newly exposed in 1996. The Xinjiang Team of the Institute of Archaeology of the Chinese Academy of Social Science carried out the rescue excavation after the villagers exposed it. Then the official excavation was carried out by Xinjiang Museum, Bayingolin Cultural Relics Institute, and Qiemo Cultural Relics Institute. They excavated two tombs, and the report was published in 2002 (Xinjiang et al., 2002).

After the excavation of Zaghunluq, the discussion on the cemetery characters never stops. The grave goods of Zaghunluq site suggest a long-term development, while it also indicates various cultural interactions between other regions. In 1994, Chen suggested that the Zaghunluq site represents a unique cultural element in southern Xinjiang and can be named as one culture stereotype (Chen, 1994). By the time Chen analyzed Zaghunluq in 1988, this site had just started its excavation; Chen had made his suggestion according to four tomb information. In 2001, Chen re-assumed that the Zaghunluq site should be part of the Chawuhu Culture after the excavation had finished. Han agreed with Chen's suggestion, and his judgment was basically from the surface tomb structure and grave goods (Han, 2007).

On the contrary, Yang believed there should be a "Zaghunluq Culture" based on the first and second sub-phase of the Zaghunluq site (Yang, 1999). Shao pointed out that Zaghunluq has no apparent surface tomb structure. Moreover, the pottery features cannot correspond to each other; therefore, Shao suggested Zaghunluq should be one independent archaeological culture in the

southern Tarim Basin (Shao, 2008). The concept of "Zaghunluq Culture" received more agreements. In 2011, Guo analyzed the Late Prehistoric Xinjiang society, in which he used the "Zaghunluq Culture" term to describe the Northern Kunlun Mountain culture groups, which are chronologically after the Liushui site (Guo, 2012).

Except for the discussion on cultural classification, the study on the grave goods was also carried out after the excavation. Textile is one significant finding in southern Tarim Basin; as for Zaghunluq site, four hundred and seventy-four textile fragments are found from this site, including hats, boots, trousers, leather coats, blankets, etc. The analysis of the textile includes the patterns on the woolen fabrics (Tuolahazi, 1998; Wang & Wang, 2009), woven techniques (Wu, 1994; Jia et al., 2008; Wang & Wang, 2010), woolen belts (He & Wang, 2016), trousers technique (He & Adili, 2005), dye technique (Chen et al., 2000; Zhang et al., 2007). At the same time, the comparison between Zaghunluq textiles between other sites in Xinjiang were studied by Chinese scholars and international cooperation, e.g., Niya, Sampula, Yanghai, and Yingpan site (Wagner et al., 2009; Liu et al., 2011; Liu et al., 2013; Beck et al., 2014). In addition, Barber and Good were the first non-Chinese textile specialists who made a detailed record and examined the Zaghunluq textile (Barber, 1998; Good, 1998; Beck, U. et al., 2014).

In addition to the textile study, the research on the glass (Cheng et al., 2007; Zhao, 2014), harp (Wang, 2003), skeleton (Fu & Wang, 2018), DNA (Ge et al., 2008), and the community interactions (Festa et al., 2018) have started in recent decades. They all provided good information for interpreting Zaghunluq Site.

3. Findings

3.1 Nr. 1 Cemetery

3.1.1 1985 Season

85QZYM1: Oval. The length is 1.75m, the width is 0.8m, and the depth is 0.3m. There is a layer of reeds covered on the tomb surface; the reeds layers are 50cm in depth; underneath is a 1.3m long cover slab of Poplar *diversifolia* wood.

One infant body is found in this tomb, which is less than three months old at death. The body is

wrapped in purple wool, and the head is covered with a hat of blue wool. The eyes are covered with two small flat uncharted stones, whose size is 2×3×0.3 cm. The body had been placed on a white felt blanket, whose size is 0.4×0.15m, while the head is on a pillow of raw wool wrapped in woolen fabric.

There is a small bovid-horn cup next to the head and a bottle made of sheep goat. In addition, a sheep head is found in the associated hole, about 0.8m to the northwest of this tomb.

85QZM2: The length is 5.35m, and the width is 3m on the surface, while below the surface is 3.1m long and 1.55m wide, the depth is 2.4m. The tomb is covered with a 50cm layer of sandy soil, beneath which is a layer of scattered reeds containing a sheep head and two bovine-horn cups, the thickness of the reeds layer is 30cm. Below the reeds layer are two layers of reeds mats; the size is 3.8×2.4m; beneath are three pieces of animal skins, underneath which are two layers of tamarisk mats. The floor of this tomb is also covered with tamarisk mats, below which is the gutter, whose size is 2.6×0.6×0.3m.

Four bodies were found in *85QZM2*, including three adult females and one adult male, all legs flexed. Two female bodies are not well preserved, but the flexed position is still identifiable. The other females and males are preserved in good condition; even the makeup can be seen on their faces. The male's head hair is yellowish-brown, half gone to white, and the hair is dressed in two 30cm braids, and the final 15cm of the braid is wrapped in red wool yarn dark purple wool. The female's head hair is also yellowish brown, in four braids, two of which are her hair while the other two are artificial.

There are multicolored felt socks and knee-high boots found on the male. Besides, there are several black pottery sherds, some wooden objects found in this tomb, including combs, milking pails, knitting needles, arrows, and yarn; the bone objects include combs and drinking cups. In addition, there are one horn hook, one felt blanket, and several animal skins found in this tomb.

3.1.2 1989 Season

89QZM1: Rectangular. The tomb surface is about 0.1m under cover of sandy soil. Beneath

which is a wooden rectangular tomb frame, the length is 8cm, and the width is 4.6m. 0.2m below the Topsoil are the filling goods, including a horsehead, a human skull with two braids, woolen fabric, and goatskin. Beneath the filling goods is a layer of reeds, whose thickness is 0.15m, under which is a layer of animal skins. And then, it is a layer of tamarisk mats, each tamarisk branch is 0.5cm, and every five branches is one group, making a "人" pattern, the edge of the mat is cut clearly. There are wooden plates, woolen hats, 3kg of wool, pottery sherds, and horse leg found on the mat. Below the mat is the round-rectangular shaft pit; the length is 1.35m, the width is 1.1m, the depth is 1m, and the orientation is 15°.

There are five human skulls and one corpse placed without order, including four adult males and one adult female. There are two round holes on the forehead of one male skull. There are two purple woolen clothes found in 89QZM1.

89QZM2: Rectangular. The first body is found 0.2m underneath the surface of sandy soil, and one infant is located about 1m away to the north of the body. The body belongs to an adult female who wears a yellow woolen cloth; her head is brown, with no braids, the arms and feet are missing, and her cloth has several blood traces. There are no textile remains found on the infant; only one bovid-horn cup is located next to the infant, and two woolen fabrics are under the infant. There is one half-gourd found 0.5m to the north of the baby. Below the two bodies is a layer of reed mat; there are two sheepskin pockets on the northwest corner, one pottery jar, and several woolen fabrics. There is one hole on the mat where the stood foot from the third body is placed in the tomb upside down.

The body is a two-year-old boy, the head hair is brown, and there is one small braid on the top of the head, dressed in red yarn. He is also wearing a yellowish woolen band around his head. Below the mats are four poplar *diversifolia* wood that covers the surface of the shaft pit. The pit length is 1.2m, the width is 0.6cm, and the depth is 0.9m.

One human skeleton is found in the tomb chamber, which belongs to an old female. Her body is separated into three places in the chamber. Her head hair is white-grey, with two braids dressed in red yarn at the braid end. There is one black dot in the middle of her forehead and two dyed

pieces of wool in her nostril. Her left arm is bent to the chest; two legs are flexed to the east side of the tomb wall.

One purple woolen dress is found on the body, and one pair of knee-high boots made by deerskin, with felt inside. The body is wrapped in a woolen blanket. In addition, there are one wooden comb, one spinning wheel, one reed pole, one wooden spoon, one bovine-horn cup, one white woolen blanket, and one felt fabric remained.

3.1.3 1996 Season

M2 (Fig. 5.5.2-1): Round-rectangular shaft pit, the orientation is 85°. The Topsoil is Gobi gravel, and the thickness is 7cm; then is the filling sand soil in two layers. The first layer is the disturbed soil, in which three human skulls and several broken skeletons are found; the bottom layer is the small gravel sand. The two layers of filling soil indicate that this tomb has been robbed. The tomb surface is oval, the longer diameter is 3.34m, and the shorter is 2.98m; the bottom of the pit is round-rectangular, the length is 1.95m, and the width is 0.86m. The depth of the pit is 0.95m.

There are two human skeletons found in *M2*, and both are adults. They are placed opposite, supine leg flexed, and two hands on the belly. Body A is a male, the direction of the head is north; while Body B is a female, her head is missing, but according to the body direction, we could know her head pointed east.

There are two tamarisk mats under each body respectively; under the mat are felt fabrics and branches. In addition, there are one bone comb, one single-handled pottery cup, one wooden spinning wheel, and one group of sheep ribs found in *M2*. The bone comb is placed near the head of body A; the sheep ribs are near the right shoulder, and the wooden spinning wheel is found on the left shoulder side of body B.

M5 (Fig. 5.5.2-2): Round-rectangular shaft pit, the orientation is 55°. The Topsoil is the Gobi gravel, and the thickness is 10cm; then is the filling sand soil in two layers. The first layer is the natural sand; some extends to the bottom of the tomb pit; the second layer is the small gravel sand, which could be the initial filling of sand soil. This also indicates that tomb *M5* has been

robbed. The surface of M2 is round; the longer diameter is 3.4m, the shorter is 3.14m; there is a secondary platform in the pit, the length of the form is 0.22-0.82m, and the height is 0.08-0.18m. There are reed remains on the platform, which might be a reed cover that used to be here. The bottom of the pit is round-rectangular, the length is 1.7m, and the width is 0.88m. The depth of the pit is 1.38m.

One human skeleton is found in M5, which is an adult male, supine legs flexed, two hands on the belly. The textile fragments had been decayed, the trousers are broken, the legs are wrapped with thin woolen yarns, and he wears a pair of felt boots. There is a layer of sheepskin under the skeleton, one pottery shallow bowl next to the right feet, and one wooden whip-cudgel on the belly.

M11 (Fig. 5.5.2-3): Round-rectangular shaft pit, the orientation is 47°. The Topsoil is the Gobi gravel, and the thickness is 8cm, and then is the filling soil. The tomb's surface is oval; the longer diameter is 3.28m, and the shorter is 2.92m. There is a secondary platform in the pit; the width is 0.5-0.82m, the height is 0.12-0.32m, and there are some reed traces on the platform. The bottom of the pit is round-rectangular, the length is 1.72m, and the width is 1.15m. The depth of the pit is 1.38m.

There are five human skeletons found in two layers. The first layer had two skeletons: Body A and B, while the rest C, D, and E are on the bottom layer. The two layers are placed in a cross position. Body A is an adult female in a supine kneel position, with two arms missing; the rest four bodies are all supine flexed, hands on the belly or at body sides. One shallow pottery bowl, one wooden comb, one horn spoon, and one group of sheep ribs are found in M11.

M12 (Fig. 5.5.2-4): Round-rectangular pit, the orientation is 62°. The Topsoil is the Gobi gravel; the thickness is 10cm, and then is the filling sandy soil. The tomb's surface is oval, the longer diameter is 2.7m, and the shorter is 2.68m. There is a secondary platform in the pit, and the width is 1.06-1.6m. the bottom of the tomb is round-rectangular, the length is 1.26, and the width is 0.84m. The depth of this pit is 1.2m.

There are two skeletons found in M12, and both are children. Supine flexed, two hands on the belly, and opposite head direction. Body A is in the north, and the head is pointed to the northeast; while body B is in the south, the head turned toward to southwest.

Two bodies are wrapped in the felt blanket. With one wooden spinning wheel, one wooden bucket, one wooden bottle, two shallow pottery bowls, one string of bone necklace, and one group of sheep ribs. One of the shallow bowls is on the right leg of Body B, with one wooden bottle remaining inside; the wooden bucket is on the left side of B, with the spinning wheel inside. The necklace is found on the neck of Body A.

M14 (Fig. 5.5.2-5): Round-rectangular pit, the orientation is 288°. The Topsoil is the Gobi gravel; the thickness is 0.8m, and then is the yellowish filling sandy soil, in which several woolen fabrics and reeds are found. There is one tomb passage to the northwest connecting to the pit surface, whose length is 3m and 0.8m wide; the passage had two stairs, the first stair is the slope, 0.7m long, and the second start is 2.3m long. There is one secondary platform in the pit. The width and height of the platform are 0.8m. There are several beams on the surface of the platform, which might be a tomb cover. The cover is made of reeds, wrapped by woolen rope, below which is the tamarisk mat, whose thickness is 3cm. The tomb's surface is round-rectangular, the length is 7m, the width is 5.6m, the pit is 5m long and 3.6m wide, and the pit's depth is 1.4m. There is one stand pole in the middle of the pit; the height is 2m, the pole's diameter is 0.2m, and the top of the pole is a cross design.

There are nineteen skeletons found in M14. Four are adult males, eleven are adult females, two are kids, and the rest are unknown. Six skeletons are in the south and east chamber, six in the north, one in the north, and three are moved without any rules. All are supine flexed, with two hands on the belly.

One shallow pottery bowl, one pottery single-handled jar, two gravel tools, one wooden bow, one wooden woven knife, two wooden harps, one wooden bow ornament, three wooden combs, two wooden boards, five wooden spinning wheels, three wooden walking sticks, one wooden bowl, one wooden jar, one wooden box, one wooden harness, one wooden stick with lacquer,

one stone bead, six bead material, one bronze loop, one hat, one woolen pocket, one branch of reed pole remained inside.

M18: Single-Catacomb, the orientation is 305°. The Topsoil is the Gobi gravel; the thickness is 20cm, and then is the yellowish filling sandy soil and sand brick, in which the human skeletons are found. The catacomb is to the southwest of the tomb pit and tomb passage, rectangular, the length is 2.1m, and the width is 0.7m. The tomb pit is rectangular; the length is 3.28m, the width is 1.54m, and the pit's depth is 1.94m. Two human skeletons were found in M18, with one bronze spoon and one pottery jug neckpiece.

M24 (Fig. 5.5.2-6): Rectangular pit, the orientation is 79°. The Topsoil is the Gobi gravel, and then is the yellowish sandy soil, in which the human skeleton pieces, braids, charcoals, and wooden pieces are found. There is a tomb passage on the northwest connecting the tomb surface. There is a secondary platform in the pit. The width is 0.56-1.1m, and the height is 0.7m. A layer of branch remained on the surface of the platform, 0.2m thick. The cover beam is found on the branch layer; the diameter of the shaft is 10cm. Above the beam are two tamarisk mat layers; the thickness is 4-5cm. A layer of reed mat is on the surface of the tamarisk mat. The length of the tomb surface is 8.5m, and the width is 6m.

The tomb pit is round-rectangular, the length is 5m, and the width is 3.6m. The depth of the pit is 1.4m. There is one standing pole in the middle of the pit, the height is 2m, and the diameter is 0.2m; the top of the pole has a crotch. Another beam is in the west of the pit, whose diameter is 20cm.

There are fourteen skeletons found in M24. Body A, B, C, and D are found in the filling soil, and ten are found in the pit bottom. Body E, F, G, H, and I are located northwest of the pit, all well preserved. Except for the head of Body H is moved and then turned to the southwest, the rest four heads are pointed to the northwest. Of these five skeletons, four are adult males, and one is a child. Another group of three skeletons is found in the northeast of the pit; body J, K, and L are all adult, L is supine flexed, and the head is turned to the southeast; K is supine right flexed, J is supine flexed, both K and J's head are pointed to the southwest. Two skeletons are disturbed, one

only has the skull remaining, and the resting skeleton is not complete.

There are two wooden boxes, two wooden spinning wheels, two artificial wooden materials, one wooden single-handled cup, one gravel, one wooden plate, one wooden double cup, one wooden arrow, one wooden bow ornament, one pottery single-handled cup, one pottery pie, one iron rivet, one stone millstone.

M27 (Fig. 5.5.2-7): Oval shaft pit, the orientation is 60° . The Topsoil is the Gobi gravel; the thickness is 15cm, and then is the filling sand of the tomb. The longer surface diameter is 1.8m, and the shorter is 1m; while the bottom longer diameter is 1.14m, the shorter one is 0.48m. The depth of the pit is 0.86m.

Two infants are found in *M27*; they are wrapped in the same blanket in opposite directions, connected by one red yarn. Infant A heads towards the northeast, while B is pointing to the northwest. One half poplar coffin remained above the infants, the length is 0.92m, and the width is 0.26m. There are two bovine-horn cups, one pottery jar with a peak, and one felt piece found in *M27*.

M40: Double catacomb, the orientation is 8° . The Topsoil is the Gobi gravel; the thickness is 18cm, and then is the yellowish filling sandy soil. The tomb passage is between two catacombs. The surface of the tomb pit is 2.62m long and 1.14m wide. The west chamber is rectangular, the length is 1.03m, and the width is 0.34m. The east chamber is irregular, the length is 1.22m, and the width is 0.12-0.38m. The depth of the pit is 1.32m. There is one horse hoof found in *M40*.

M49: Square shaft pit, the orientation is 78° . The Topsoil is the Gobi gravel; the thickness is 6cm, and then is the yellowish sandy soil, in which the human shoulder blade, human rib, wooden plate, and embroid products are found. The tomb surface is a round square, the east-west length is 3.82m, and the south-north width is 3.8m. There is one rectangular trench on the east and west side of the tomb surface; the length is 24cm, the width is 16-22cm, and the depth is 22cm. The pit bottom is a round square, the south-north length is 2.22m, the east-west width is 1.82m, and the pit's depth is 1.6m.

There is one rectangular broken wooden coffin in the north-south direction, joined by the tenon-and mortise work by artificial wooden boards. In addition, there are one wooden spade, one wooden plate, one glass cup, one wooden plate with lacquer, one cup with lacquer, one dagger with lacquer, and one pottery jar found in M49.

M60: Round-rectangular shaft pit, the orientation is 78°. The Topsoil is the Gobi gravel, and then the filling soil is yellowish sandy soil. The tomb's surface is oval, the longer diameter is 4.3m, and the shorter is 2.4m. The bottom of the pit is round-rectangular, the length is 2.3m, and the width is 0.92m. The depth is 1.62m. One incomplete human skeleton is found in M60, and one wooden bowl and several woolen fabrics.

M61 (Fig. 5.5.2-8): Round-rectangular shaft pit, the orientation is 40°. The Topsoil is the Gobi gravel; the thickness is 2-6cm, and then is the filling sand of the tomb. The length of the pit surface is 2.5m, and the width is 1.84m, while the bottom length is 1.74m, and the width is 0.96m. The depth of the pit is 0.9m.

One human skeleton is found in M61, which belongs to an adult female. The bones are placed without any order, but the supine position can still be seen. One pottery jug, one wooden spinning wheel, one wooden pestle, and one wooden zone object are found in M61.

M67 (Fig. 5.5.2-9): Round-rectangular pit. The orientation is 110°. The Topsoil is the Gobi gravel; the thickness is 10cm, and then is the filling sand soil, in which the scattered human skeletons are found. The pit surface is oval, the longer diameter is 3.06m, and the shorter is 2.04m. The bottom of the pit is round-rectangular, the length is 2.6m, and the width is 0.88m. The pit depth is 1.42m.

There are four human skeletons found in M67 in three layers. The first layer had two skeletons. Body A is in the southwest corner, while B is northeast. The second layer had one adult male skeleton C; his head has been moved while the body remains good. Left flexed, two hands on the belly. The third layer had one adult female skeleton D, supine straight, two hands on the belly,

and the head direction towards the northeast.

One pottery shallow bowl is found in the southern first layer, with several woolen fabrics on the second layer. On the third layer, there is one sheepskin under the female body D; she wears the woolen robe and trousers, one felt hat, one pair of leather shoes, and her legs are wrapped by woolen felt; there are one sheepskin and woolen rope under her head. In addition, there are one bone comb and one bone spoon near her head.

M102 (Fig. 5.5.2-10): Round-rectangular shaft pit, the orientation is 82°. The Topsoil is the Gobi gravel, and then is the filling soil in two layers; the first layer is the natural sandy soil, and the second layer is small gravel sandy soil. The tomb surface is round-rectangular, the length is 3.85m, and the width is 2.65m. There is a secondary platform in the tomb, the width is 0.34-0.7m, and the height is 0.5m; reed traces are remaining on the platform. The bottom of the pit is round-rectangular, the length is 2.02m, and the width is 1.22m. The depth of this pit is 1.41m.

Four skeletons are found in *M102*. Body An is in the middle, belongs to an adult male, and his head turns to the west. Body B is a middle-aged male, C is a child, and D is an adult female, all their head pointed toward the east; B and D are supine flexed, two hands on the belly; C is left flexed.

One wooden spinning wheel, one horn spoon, one wooden bucket, one pottery single-handled cup, three pottery shallow bowls, two strings of sheep ribs, and one wooden branch remained in the tomb. The wooden branch is next to the head of Body D, and the rest goods are placed in the arm and foot area of Body A and D; the wooden spinning wheel and horn spoon are in the wooden bucket.

3.1.4 1998 Season

M105: Rectangular catacomb, the orientation is 290°. The tomb surface is an irregular oval; the length is 2.5m, and the width is 1.72m. There is one 1.9m deep tomb passage connecting the surface. The catacomb is on the north side of the pit; the chamber is 1.96m long, 1-1.16m wide, and 1m high.

One human skeleton is found in M105, which belongs to an adult female. Her head is pointed to the east. One broken bow piece, two wooden arrows, one wooden check piece, one woven band, and one woolen pocket are found in M105.

M106: Round-rectangular shaft pit, the orientation is 77° . The tomb surface is 4.15m long and 1.7m wide; the bottom of the tomb is rectangular, the length is 2.6cm, and the width is 0.8m. The depth of the pit is 1.7m. There is one niche on the east tomb wall, whose height is 20cm, width is 40cm, and the depth is 25cm, in which a wooden jar is found.

One broken wooden coffin in the pit; only two bottom poplar boards and four corner poles have remained. Several human bones are left on the board; on the skeleton pieces, several woolen fabrics remain. In addition, there are some skeleton pieces, one human jaw, and woolen fabrics found in the filling soil.

M109: Oval catacomb, the orientation is 57° . The tomb surface is oval, the length is 3.65m, and the width is 1.8m. One 2.2m deep tomb passage connects to the tomb, and the catacomb is on the southeast tomb wall. The length is 2.1m, and the width is 1.2m. The catacomb entrance is covered by one 1.5m high shed made of wooden sticks and reed mats.

One trapezoid wooden couch frame is found in the chamber; above the couch is the human skull, an adult female. One wooden comb, a pair of sheep-horn harnesses, and several woolen fabrics are found on the chamber couch. In addition, there are several skeleton pieces, one goat skull, and several goat spines found in the filling soil.

M110: Round-rectangular catacomb, the orientation is 63° . There is one shaft tomb passage; the passage surface is 2.7m long, 1.58m wide, and 1.9m deep. The catacomb is found on the south of the tomb passage, and there are five small trenches on the passage wall. The chamber is rectangular, the length is 2.38m, the width is 0.6m, and the height is 0.9m.

One trapezoid wooden couch frame, several felt pieces, and one wooden material left on the

couch. Some stone balls and one claw wrapped in gold foil are found in the filling soil.

M115: Catacomb, the orientation is 48°. There is one tomb passage, and the surface is oval; the length is 3.9m, the width is 2.1m, and the depth is 2.2m. The bottom of the passage is rectangular, the length is 2.3m, and the width is 0.4m. The catacomb is on the southeast of the tomb passage, rectangular, the length is 2.3m, width is 1.2m, and the height is 1.56m.

There is a wooden coffin made of poplar boards in the chamber, in which is an adult male's skeleton, supine flexed. His head towards to northeast. One bone button, one iron knife, and one bronze button are found in the chamber. In addition, one broken bow, one wooden arrow handle, one wooden button, one wooden whip-cudgel, one horn button, one bone button, one set of check pieces, and five plaster spinning wheels are found in the filling soil.

M117: Catacomb, the orientation is 57°. There is one tomb passage, the surface is oval, whose length is 3m, width is 1.7m, and depth is 1.7m. The chamber is on the south of the tomb passage, whose length is 2.5m, width is 0.78m, and height is 0.66m.

There is one wooden couch frame found in the chamber, on which is one female skeleton, supine straight, and the head is placed on the chest by the robbers. There are few decayed woolen fabrics found on the skeleton.

M122: Oval shaft pit, the orientation is 63°. The tomb surface is 3.6m long, 1.8m wide; the pit bottom is also oval, the length is 2.1m, and the width is 1.1m. The depth of the pit is 2-2.2m.

One human skeleton is found in M122, which belongs to an adult male, supine flexed. The body is in the broken wooden coffin. There is one wooden check piece, and three wooden arrows are found under the coffin. The bronze belt button and button ornaments are found on the waist of the body. In addition, there are one set of wooden check pieces, one broken wooden bow, one wooden harness, one wooden button, and several woolen fabrics found in the filling soil.

M131: Rectangular shaft pit, the orientation is 80°. The tomb surface is irregular, the length is

3m, and the width is 2.1m; the tomb bottom is rectangular, the length is 2m, and the width is 0.8m. The depth of the pit is 2-2.2m. Two rectangular trenches on the east and west end of the pit, respectively: the east trench is 0.78m long, 0.34m wide, and 0.16m deep; the west trench is 0.82m long, 0.32m wide, and 0.14m deep. There is one niche on the east tomb wall; the height is 0.28m, the width is 0.48m, and the depth is 0.26m.

There are two coffin poles found in the eastern trench. And there are several human ribs and legs found in the filling soil.

M133: Catacomb, the orientation is 56°. There is one tomb passage, the surface is oval, whose length is 3m, the width is 1.3m, and the depth is 1.3m. The chamber is on the southeast of the passage; a wooden fence covers the entrance. The chamber is rectangular, the length is 2.16m, the width is 0.64-0.72m, and the height is 0.64m.

One human skeleton is found in the chamber; the head direction is northeast, while the face is turned southeast, supine straight. One pottery jar, one wooden box with lacquer, one bronze mirror, one wooden spinning wheel, and one set of check pieces are found in the chamber. The wooden lacquer object is found with two glass beads and a white cotton pouch inside. In addition, there are several broken reed mat pieces, two human bones, several human spines, and one white band with an iron needle found in the filling soil.

M135: Catacomb, the orientation is 63°. There is one tomb passage, the surface is oval, whose length is 2.8m, the width is 2.1m, and the depth is 1.6m. The chamber is on the southern passage, lang oval, whose length is 2.42m and the width is 0.6-1.3m.

One wooden couch is found in the chamber, several human skeleton pieces, and one goat skull are found in the filling soil.

M137: Rectangular shaft pit, the orientation is 53°. The tomb surface is arc rectangular, the length is 2.9m, and the width is 1.3m. the pit bottom is rectangular, the length is 2m, and the width is 0.7m. The depth of the pit is 2m. There is one niche on the east tomb wall, and the

height is 0.36m. Several broken skeletons, woolen fabrics, and one goat head are found in the filling soil.

MI38: Rectangular shaft pit, the orientation is 53°. The tomb surface is arch rectangular, the length is 3.6m, and the width is 1.9m; the pit bottom is rectangular, the length is 2.6m, and the width is 0.9m. the depth of the tomb is 2-2.2m. There is a niche on the east corner of the pit, round, and the diameter is 30-50cm. There is one trench on the bottom of the southwest corner, the width is 0.4m, and the depth is 0.12cm. One wooden harness, one set of wooden check pieces, and one whip-cudgel are found in the filling soil.

MI41: Catacomb, the orientation is 53°. There is a tomb passage, the surface is lang oval, whose length is 3.9m, the width is 2.1m, and the depth is 2.6m. In arc rectangular, the chamber is on the southern passage, the length is 2.42m, and the width is 0.6-1.3m. There is one wooden couch frame found in the chamber. In addition, the reed branches, broken wooden bow, wooden button, dress pieces, and human bones are in the filling soil.

MI42: Catacomb, the orientation is 51°. There is one tomb passage, the surface is rectangular, whose length is 3.8m, the width is 1.7m, and the depth is 1.7m. The chamber is on the southeast of the passage, in arc rectangular, the length is 2.2m, and the width is 0.84m. The chamber had one arc roof, and the height is 0.64m. There are several cotton pieces found in the filling soil.

MI45: Rectangular shaft pit, the orientation is 56°. The tomb surface is arc rectangular, and the length is 4.2m, the width is 2.2m; the pit bottom is rectangular, the length is 2.4m, the width is 1m, and the depth is 2.4m. There is one niche on the east tomb wall, and the depth is 0.46m. There are three wooden coffin poles, one broken wooden spinning wheel, and several cloth fabrics found in the filling soil.

MI49: Catacomb, the orientation is 47°. There is one tomb passage, the surface is lang oval, whose length is 3.2m, the width is 1.9m, and the depth is 2.5m. The chamber is on the southern passage. The chamber had an arc roof; the height is 0.7m, the length is 2.28m, and the width is 0.84m.

There is one wooden trapezoid couch frame found in the chamber. One set of check pieces and one whip with a wooden handle are on the couch. The bridge is decorated with woolen yarn, leather pockets, colored woolen pockets, a woolen woven band with horn buttons, and one sheepshank. In addition, there are several reed-mat pieces and a felt hat found in the filling soil.

M155: Catacomb, the orientation is 51° . There is one tomb passage, the surface is lang oval, whose length is 3.1m, the width is 1.9m, and the depth is 2.1m. The chamber is on the southeast of the passage. The chamber had one arc roof; the height is 0.5m, the length is 2.14m, and the width is 0.44-0.5m.

There is one kid's body found in the chamber, supine straight. The textile pieces have been decayed and broken, while a wooden whip-cudgel is found in the chamber. In addition, there is one goat skull found in the filling soil.

M156: Round-rectangular shaft pit, the orientation is 56° . The tomb surface is oval, the length is 3.2m, and the width is 1.9m; the bottom pit is round-rectangular, the length is 2.4m, and the width is 0.8m. The depth of the pit is 2.4m. Two trenches are on the northeast and southwest sides of the pit bottom, respectively. The northeast trench is 0.3m wide and 0.2m deep; the southwest trench is 0.23m wide and 0.14m deep. There is a niche on the northeast wall; the depth is 0.44m, the width is 0.4m, and the height is 0.34m.

One pottery jar in the southwest trench and some wooden coffin board in the northeast trench. In addition, one pottery jar, one wooden plate, one wooden harness, and cotton cloth fabrics are found in the filling soil.

M157: Catacomb, the orientation is 54° . There is one tomb passage; the surface is oval, whose length is 3.5m, the width is 1.85m, and the depth is 2.3m. The chamber is on the southeast of the passage. The chamber had one arc roof, whose height is 0.74m, the length is 2.32m, and the width is 1.1m.

One wooden trapezoid couch frame is found in the chamber, and one lamp is on the northeast of the couch. In addition, there are one wooden whip-cudgel, one wooden spinning stick, one wooden pocket stick, one set of check pieces, and several reed mat pieces found from the filling soil.

3.2 Nr. 2 Cemetery

96QZIIM1: Rectangular shaft pit, the orientation is 32°. The filling soil is yellowish sandy soil, in which the broken wooden comb and human skull pieces are found. A tomb passage is located on the northeast corner of the tomb pit, connecting to the northern tomb surface. The passage is rectangular, and the depth is 60cm. The passage had two long stairs, and the first stair was 3.5m long, 1.36m wide; the second stair is 1.8m long, 0.9m wide. There are two layers of reed mats; in between is the tamarisk mat. There is a secondary platform in the tomb pit connecting with the passage, which has two stairs. The first stair is 24-62cm wide, 16cm high, and the second is 18-62cm wide, 14cm high. Two layers of reed mats cover the platform; in between is the tamarisk mat, with the "人" pattern. The tomb surface is 5m long, 3.7m wide, while the length of the pit bottom is 4.5m, and the width is 3.5m. There is one small beam cover in the southwest corner of the tomb pit; the length is 2.1m, the width is 1.3m, and the height is 0.75m. The beam cover is supported by four vertical poles, 6-8cm in diameter. A layer of tamarisk mat covers the beam, with one broken bow and several child bones found on it.

There are twenty-eight human skeletons found in this tomb, located southwest of the pit. Fourteen are male, eight are female, and six are unknown. Seventeen skeletons are well preserved, including twelve males and five females. Nine are pointed to the northwest, nine are pointed to the southwest, two are pointed to the southeast, and one is pointed to the northeast. Most of the bodies are supine flexed; their hands are on the body side.

There are one pottery single-handled jar, one iron knife, one wooden bow, two wooden bow ornaments, two wooden boxes, one wooden plate, and one wooden comb found in *96QZIIM1*.

96QZIIM2: Rectangular shaft pit. The Topsoil is a saline-alkaline shell layer, and then the filling soil is disturbed, in which the human skeletons, woolen fabrics, horse head, horse jaws, wooden

objects, pottery sherds, stone and bone ornaments are found. One tomb passage is on the south corner of the tomb pit, connecting to the tomb surface. The passage is rectangular, having two long stairs in 4m and three beams on the passage entrance. The height of the passage is 70cm. There is a secondary platform in the tomb pit, the length is 10.3m, and the width is 7.8m. There are three layers of reed and tamarisk mats covering the platform: the first layer is made of reed and cattail, wrapped by grass rope, and the thickness is 10cm; the second layer is made of tamarisk branches, with the "人" pattern, and the thickness is 6cm; the third layer is made by cattail and wild jute, wrapped by hemp rope every 50cm, and the thickness is 15cm. There are four stand poles in the axle wire of the pit; the height is between 1.22-1.94m, the diameter is 20-34cm, and the space between each other is 0.7-1.8m. There are also two lines of slim poles in the northern corner, the height is 90cm, and the diameter is 4-5cm. There is a tomb couch found in the middle of the pit, the length is 3m, and the width is 1.3m. Six stand poles are placed on the couch, joint the beam board by the tenon-and mortise work; there are rope holes at the end of the poles.

There are twenty-seven human skeletons found in 96QZIIM2, nine from the filling soil and eighteen buried in the pit. Eleven are adults, and seven are children; the rest are unknown. Most of them are supine flexed, and their head direction is randomly placed.

There are one hundred and ninety-two grave goods found in this tomb, including: two stone eyebrow pencils, three eyebrow stones, two gravel, two pottery jar with peak, three pottery single-handled jar, one pottery shallow bowl, three wooden bows, seven wooden arrows, three bow ornaments, seven wooden spinning wheel, one wooden knife, four wooden whip-cudgels, one wooden walking stick, twelve wooden boards, four wooden lighters, two wooden buttons, two wooden lids, one wooden belt board, one wooden harp, one wooden box, four wooden ornaments, one wooden scoop, three wooden jar, two wooden plates with four foot, three wooden cup, one wooden bucket, two wooden basins, four wooden plates, four wooden bowls, one wooden shallow bowl, five wooden combs, one tamarisk jar, three bone comb, three bone board, one sheep shoulder blade with colored patterns, one bovine-horn cup, one bronze mirror, one bronze dagger, five iron knives, five stone beads, two cowry ornaments, fifteen bone beads, three glass beads, one golden ornament, and one dyed material. One pair of woolen trousers, one

woolen sleeve, two woolen blankets, one felt fabric, and one cotton dress are found in the tomb.

4. Age

4.1 Relative Age

Due to the modern robbery and villagers' disturbing activities, most of the tombs are exposed 10-20cm beneath the ground, and according to the excavation plan, there is no tomb disturb relationship; it seems that all tombs are built on the same stratigraphic level. Therefore, the relative age can only be seen from the tomb types and grave goods.

A large number of tombs have provided enough information on the tomb classification. According to the tomb description, there are three major tomb types in Nr. 1 Cemetery:

- Type I*: Rectangular shaft pit tomb (M3, 9, 16, 17, 19-23, 27, 32, 36, 39, 43, 46, 56, 58-63, 68-70, 72-75, 77, 79, 80, 84, 85, 87-89, 93-99, 106, 122, 131, 137, 138, 145, 156).

- Type II*: Pit tomb with shed cover (M1, 2, 5, 6-8, 10-15, 24, 25, 28, 29, 30, 31, 33, 34, 35, 38, 42, 44, 45, 47-50, 53, 54, 55, 57, 64, 65, 66, 78, 81-83, 86, 91, 92, 100-102).

- Type III*: Catacomb tomb (M4, 18, 26, 37, 40, 51, 52, 105, 109, 110, 115, 117, 133, 135, 141, 142, 149, 155, 157).

According to the excavation report, the excavators divided Nr. 1 Cemetery into three sub-phases (Xinjiang, 2003):

- Sub-phase I* only includes M61, which yields the pottery with a red coating. The red coating is unique in the Zaghunluq site, when most of the tombs have a black coating but not red.

- Sub-phase II* is the most important period for the whole cemetery. Most of the tomb type II belong to sub-phase II; the tomb pit with shed cover is the most distinguishing feature; multi burials are also quite popular in phase II. Wooden objects are the most grave goods when bronze objects are not so abundant.

•*Sub-phase III* is also defined by the tomb type, as in this group, Catacomb tombs are unique, and it has no evidence in the last two groups. In addition, the patterns on the fabrics and glass cups are also different from the other two groups.

Considering the tomb structure type, pottery with red coating might belong to some craftsman or immigrants with particular identifications. Hence, the main feature of M61 still belongs to tomb type I—shaft pit tomb type. In 2011, Guo pointed out that there is no need to separate M61 from the second sub-phase (Guo, 2012). In addition, there are two tombs from Nr. 2 Cemetery that are all shaft pit tombs with shed cover, so they also belong to sub-phase I.

Therefore, combining several aspects, we may define the Zaghunluq Nr. 1 Cemetery into two sub-phases. The past division subphase I and II are the new subphase I now, and the old subphase III is the new subphases II.

4.2 Absolute Age

After the 1985 excavation, Xinjiang Museum made the radiocarbon dating of M2 (Shao & Wang, 1989). The poplar wood sample from M2 is dated by the ^{14}C Laboratory of the Institute for Cultural Relics Conservation Science of the Chinese National Bureau of Cultural Relics and published in 2002 (Rashid & Hes, 2002). The 2003 excavation report provided several dates tested by the ^{14}C Laboratory of the Seismological Bureau of Xinjiang Uyghur Autonomous Region (Xinjiang Museum et al., 2003). The exact details can be seen in Table 4.

Judging from the calibrated data, the time of Zaghunluq site is long-lasting; the earliest date can be as early as 1880-1680 BC and maybe ended around 300 BC. According to our sub-phase division, M1,2, 14, 24, and 61 belong to sub-phase I, while M4 belongs to phase II. Combining with the comparison with other neighboring sites and the other similar grave goods in Xinjiang and Mongolian (Zhongguo, 1997; Xinjiang Museum, 2003), we may define the sub-phase I between 1800-800 BC, and the second phase between 800 to 300 BC.

5. Interpretation

5.1 Textile Analysis

The textile has been a significant finding in Zaghunluq site. The types include hats, robes, trousers, leather coats, boots, bindings, blankets, belts (He & Wang, 2016), and woolen pockets; several silk products and cotton fabrics are also found in this site.

The 2003 report has made a preliminary introduction to the production techniques (Xinjiang Museum et al., 2003). Most of the producing techniques are woven, sewing, folding, embroidery (Wang & Wang, 2010), and knitting. The colors are also variable.

Among these textile remains, the appearance of the trousers seems unique (He & Adili, 2005). There are two types of trousers; one is sewed separately, and the other is cut from one whole cloth. The first type has forty-eight pairs of trousers, and the procedure is: firstly, the legs and the crotch part are woven separately and then sewed together as complete trousers. The crotch from M14 trousers is shaped as a stepped diamond piece. This kind of crotch is also found in the trousers made by cutting. The crotch design from the Yanghai site in the Turfan basin has been researched in a more detailed way (Beck et al., 2014) when they reconstructed the complete producing process, dated the time of the trousers precisely, and compared it with other similar trousers. However, the trousers in the Yanghai site are unique, its crotch piece is a stepped cross, and it is purely woven; there are no cutting traces, which means it is particularly made for someone, especially according to the body feature. The Yanghai trousers are also suggested to be specially made for horse riding due to the crotch design. As for the trousers in Zaghunluq, the amounts of trousers are more than in Yanghai. The cutting technique is also more common, and the time is later than in Yanghai, so the trousers may not be someone's special cloth but have already populated the horse-riding population. Still, the crotch piece may firstly be designed for horse riding and may help explain the subsistence patterns of Zaghunluq.

The various patterns also reveal its cultural interaction with neighbor regions (Tuolahazi, 1998; Wang & Wang, 2009). The tiger, camel, pig, fish, spiral, water wave, and triangle patterns are most common in woven woolen products with artificial designs. It also indicates that ancient Zaghunluq people had developed the dye technique.

In 2000, Chen analyzed the blue color from the textile (Chen et al., 2000), and it turned out that some of the grass green colors on the woolen fabrics are dyed with two different yellow colors and indigo blue color. In 2008, Zhang studied the dyestuff from the textile (Zhang et al., 2008), and their study showed that the red color is most likely derived from a madder species, which is common in Xinjiang. The yellow color may be derived from luteolin and another new unknown dyestuff while "its profile does not match anything in the collection of over two hundred yellow dyestuffs or anything published to date" (Zhang et al., 2008, pp. 1102). This may indicate that ancient Zaghunluq people received the dyeing technique and invented their dyestuff and color techniques.

The study of the material is also essential. In 2008, Jia examined the fabric of the woolen textiles from Zaghunluq and Sampula. It reveals that most woolen textiles (98%) are made from native wool, while few clothes, such as the woolen coat from M2, the material wool showed its origin from Angola sheep.

Besides the clothes, the ropes used to wrap stuff should also be paid more attention to. For instance, the hemp rope found in M2 could also prove the use of cannabis in the Tarim Basin beside the Yanghai, Xiaohe, and Gumugou sites (Long et al., 2017).

5.2 Other Objects

The glass cup from M49 has been studied due to its unique characteristic and the similarity to Roman style. It belongs to the 5-6th century AD (Wang & Lu, 2004). In 2008, the Chinese Cultural Heritage Institute and Xinjiang Museum analyzed the material of the glass cup. The result shows that this cup corresponds with the Roman Empire glass style; the production time is between 100-400 AD, and it is made in the Syria-Pakistan Bay on the Mediterranean eastern coast (Cheng et al., 2011). In 2014, Zhao reanalyzed this glass cup again. When he compared this glass and glass cup from Yingpan considering their grave features and date, combining with other similar cups made between 200-399 AD, he suggested that this glass cup should be dated between the 3-4th century AD. (Zhao, 2014).

Three harps found in M2 and M14 have drawn significant attention because of the date. In 2003,

Wang pointed out that the harps in Zaghunluq have significant similarities with the harps recorded in Mesopotamia (Wang, 2003), which is also the original form of the Tang harp.

5.3 Physical Anthropological Analysis

Mitochondrial DNA is used to examine the physical anthropology feature. In 2008, Ge examined fifteen tooth samples from Zaghunluq Nr. 1 Cemetery. It turned out that the Zaghunluq people have more central Asian origins (Ge et al., 2008). The matrilineal genetic structure in Zaghunluq was examined in 2009 (Cui et al., 2009). The result showed that the Zaghunluq people's physical characteristics belong to the Eastern Mediterranean type of European type. The ancient Tarim Basin and Central Asian populations, including Kazak and Uyghur in Kazakhstan, Kirghizia, Uzbek, and Turkoman, are close together. In particular, the mtDNA of Zaghunluq and Chawuhu site have shown remarkable similarities, reflecting on the cultural classification.

5.4 Summary

Zaghunluq site is a vast tomb collection with a long-lasting period. Shaft-pit tombs and catacomb tombs are the most apparent feature. The burial traditions include single-burial and multi-burial. The amounts of buried bodies can be more than twenty people in one tomb. This may indicate that Zaghunluq is a public cemetery for the local communities. Some skeletons are placed without any order among the tombs, while some infants are well preserved in woolen fabrics and with good quality grave goods. Hence, we may suggest that the hierarchy and sacrificial atmosphere may have developed here.

The rich amounts of the clothes and fabrics indicate that the Zaghunluq people had developed the cloth woven and dyeing technique. On the other hand, the woolen products' material also suggests that the sheep/goat husbandry has been well developed.

A highly developed artificial and animal husbandry industry, long-term lasting, and possible hierarchy all might connect Zaghunluq to the Qiyemo Kingdom. The contemporary date of Zaghunluq also parallels to West Han Dynasty. Zaghunluq has shown its outside elements from central Asia, Mesopotamia, and even Roman; the development could also be one promotion of the opening of the Han Silk Road.

5. 3 Xiangbaobao Site

1. Location

Xiangbaobao site is located in Tashkurgan Tajik Autonomous County. The tombs are distributed on the mountain terrace in the southwestern of the Pamir Plateau, and its east is the Tashkurgan River (Fig. 5: 42).

Located on the northern slope of Kunlun Mountain and western of Pamir Plateau, Xiangbaobao is in a typical Plateau Arid subalpine zone. It is one of China's most spectacular and remote high mountains, being glaciated at a higher elevation, i.e., above 4,500m above sea level. The temperatures can be expected at an extremely low level, both the mean monthly temperatures and the annual mean. As a thermal characteristic, the daily minimum temperature year-round is below 0°C; for the high mountain areas, even the monthly standards of temperature remain below 0°C in all months. Only the lower and min-mountains record positive monthly means in summer. In terms of precipitation, the Alpine Plateau Zone has mostly snow. Still, in all, the total precipitation remains very low, so the climate is called "arid" from the viewpoint of precipitation. The annual total may drop <100mm, mainly in winter. Then the occurring westerlies are often reported to have strong velocities (Domorös and Peng, 1988).

2. Research History

The field survey by the Institute of Archaeology of the Chinese Academy of Social Sciences in 1976 discovered a series of ancient tombs in the river valley, and then the excavation was carried out on the terrace; the second season was conducted in 1977. Two seasons yielded forty tombs in general (Fig. 5.5.3-1) (IACASS, 1981).

As one of the few early excavated cemeteries in the Pamir Plateau, Xiangbaobao site has provided new material for the cultural groups' movements according to the burial tradition and grave goods. As one of the excavators, Chen believed that Xiangbaobao belonged to the early Saka group, which was agreed by other scholars from the cremation aspect (Wang, 1985; Xiao, 2016). Xiangbaobao site is thought to be one representative culture in southwestern Xinjiang (An, 1996). The followed-up excavations in Xiabandi and Ji'erzankale sites completed an understanding of the cultural elements in the Pamir Plateau (Xinjiang, 2012; IACASS, 2015).

3. Findings

In the excavated forty tombs, except M14, all the rest tombs have surface stone indicators in mound or stone enclosed circles. There are seventeen stone mounds and twenty-two enclosed stone circles. The tomb chambers are under the surface indicator in a vertical shaft pit. M19 and M20, M25, and M26 shared the same enclosed circle; the rest have their surface indicators.

Eleven tomb chambers are found with beam cover; all cremation tombs have no beam cover. There are nineteen cremation tombs directly burnt inside the chamber pit, while the rest are first burnt, and then the bone ash was buried in the chamber. The side-flex position is the most common burial form in the rest tombs, while supine straight, prone flex, and secondary burial can also be seen.

Four shallow sacrificial pits are found close to the main burial chamber, especially in the double tomb M19, and M20 share the same stone enclosed circle. There are three individuals from M19 and one male in M20, and all the human bones have been burnt and scattered randomly; they might be the sacrificial individuals. At the same time, the sacrificial bones are found in both tomb chambers. These two tombs are thought to be constructed and buried simultaneously, all in cremation tradition.

The grave goods include pottery wares, bronze objects, iron objects, golden ornament, wooden items, stones, bone beads, and woolen felt fabrics. Among these grave goods, ornaments account for the most, and then is the daily vessel; the production tool is relatively few. The tomb details can be seen in Table 39 and Fig. 5.5.3-2~5.

4. Age

4.1 Relative Age

The frequent appearance of iron pieces and bronze objects indicates the skilled techniques of the Xiangbaobao metal casting industry, which can narrow the absolute age of Xiangbaobao between the late Bronze Age to early Iron Age, and parallel to the Spring & Autumn of Warring states time. According to the tomb structure and grave goods, the period of Xiangbaobao can be

divided into three sub-phases:

- Phase I* (M5) have the surface stone mound, with an oval shaft chamber pit; the bead cover is north-south, while the body head towards the west, side supine, with flat-based pottery jar, bronze objects, bone, and stone items.

- Phase II* (M4, M9, M11, M13, M17, M33, M37, M40) has surface stone mounds or enclosed circles with oval or round shaft chamber pit. Some tombs have beam covers, and the directions are not united; supine side position, iron objects appeared in Phase II tombs, while flat-based pottery wares are rare.

- Phase III* (M7, M10, M14, M15, M19, M20, M21, M22, M28, M29, M39) has the surface stone mounds or enclosed circles oval round shaft chamber pit. Some tombs have beam cover on top, while most directions are southwest/northwest; secondary-burial is new in this phase, with iron objects and round-based pottery wares.

Phase II and III are the major cultural types in the Xiangbaobao site, which is considered the central part of Xiangbaobao culture on the Pamir plateau (Xinjiang, 2012).

4.2 Absolute Age

There are four radiocarbon dating results from Xiangbaobao tomb samples, and the datils can be seen in Table 66 and Fig. 5.5.3-6. Among these four tested samples, the data of M40 is way much different from the other three samples; the rest of the tomb samples all lie between 950-400 BC; combined with the usage of iron objects, the result from M40 seems unreliable. In addition, none of the data comes from any cremation tombs, and the data from cremation tombs is different to identify. Therefore, the absolute age of the Xiangbaobao site could be between 950 and 400 BC.

5. Interpretation

Cremation and sacrificial pits are the most apparent feature of Xiangbaobao site, which, combined with the grave goods, exhibit the Andronovo cultural style and are later assumed by scholars that correspond to the Saka cultural group (IACASS, 1981; Wang, 1985; Guo, 2012;

Xiao, 2016). The anthropological physical analysis reveals that the inhabitants of Xiangbaobao have several Indo-Afghan physical features, which are similar to the features of the Alagou site in the eastern Tianshan region (Tan & Han, 2007).

The metal ornaments account for the most proportion of the grave goods, while the production tools are rare. No agricultural tools and cereal grains, while sheep/goat bones and bird bones are commonly seen in the tombs, may indicate that the primary subsistence strategy of Xiangbaobao people is hunting and herding. The agricultural practice may haven't started yet in the first millennium BC in the Pamir Plateau. The cremation tradition from the Xiangbaobao site may reflect one particular form of spiritual worship of the dead, which is unique in the Xinjiang early Iron Age sites.

5.4 Xiabandi Site

1. Location

Xiabandi site is located between the Xindi village and Xiabandi village in Tashkurgan Tajik Autonomous County on the eastern Pamir Plateau. The tombs are distributed on the southern and northern terraces of the Tashkurgan River (Fig. 5: 41).

Located on the northern slope of Kunlun Mountain and western of Pamir Plateau, Xiabandi is in a typical Plateau Arid subalpine zone. It is one of China's most spectacular and remote high mountains, being glaciated at a higher elevation, i.e., above 4,500m above sea level. The temperatures can be expected at an extremely low level, both the mean monthly temperatures and the annual mean. As a thermal characteristic, the daily minimum temperature year-round is below 0°C; for the high mountain areas, even the monthly standards of temperature remain below 0°C in all months. Only the lower and min-mountains record positive monthly means in summer. In terms of precipitation, the Alpine Plateau Zone has mostly snow. Still, in all, the total precipitation remains very low, so the climate is called "arid" from the viewpoint of precipitation. The annual total may drop <100mm, mainly in winter. Then the occurring westerlies are often reported to have strong velocities (Domorös and Peng, 1988).

2. Research History

In 1989, the Xinjiang field survey discovered the Afasiliugou site in this region and named Nr. BIV cemetery of Xiabandi site group. In 2001, the Xinjiang Institute of Cultural Relics & Archaeology and Kashi regional Institute of Cultural Relics carried out a field survey before constructing the Xiabandi reservoir project and discovered thirteen tombs (Guo, 2002). During the 2003 excavation season, Nr. AID cemetery was found. The second season began from May to June 2004. In general, more than one hundred and fifty tombs were excavated; the date of the tombs lasted from Bronze Age to Ming & Qing periods.

The excavation of Xiandi site provides essential material for the Bronze Age & Iron Age material in the Pamir plateau in southwestern Xinjiang and completed the cultural chronology and elements. In addition, the anthropological and physical studies also suggest new possibilities for the mobilization of different cultural groups between East and West (Tan, 2011; Wu, 2012; Ning et al., 2016; Xiao, 2016; Zhang et al., 2016; Wang et al., 2019; Yang et al., 2020).

3. Findings

The tombs on the northern terrace are named Nr. A cemetery (AID, AI-AVI) and tombs on the southern terrace are named Nr. B cemetery (BI-BVII) (Fig. 5.5.4-1). The time of the 150 graves lasted from Bronze Age to Ming & Qing periods. Most of the Bronze Age tombs are distributed in Nr. AII cemetery, and one in Nr. AID cemetery; Han & Tang tombs are found in Nr. AI, AII, and AV cemeteries, while the Ming & Qing tombs are located in AIII, BI, BIV, BV, BVI, and BVII cemeteries.

The tombs in Nr. AI and Nr. AID cemeteries are mainly cremation and soil-buried tombs, mostly with surface indicators, i.e., stone/soil mound, enclosed stone circles, and stone mound & circles. The tomb chambers are rectangular, round-rectangular, oval, and round. Some surface indicators have multi chambers underneath; side-flex and prone flex are common burial positions, and only a few tombs are found with beam cover, stone, wooden frame couch, or grass layer. The grave goods are not so much, usually one ware from each tomb, the grave goods include pottery wares, wooden items, bronze ornaments, leather, and silk fabric. Only a few cremation tombs are found with unburnt grave goods, including pottery wares and bronze objects. At the same time, some

cremation tombs are found with one complete sheep/goat skeleton or a piece of lamb on the tomb cover.

The Han & Tang tombs include cremation and soil-buried tombs, mainly with stone indicators; the tomb chambers include rectangular, round-rectangular, oval, round, and shaft pits with side chambers. The burial forms are in supine straight, supine flex position; some human bones are uncompleted. Most tombs have no tomb furnishing; only a few tombs have beam covers, wooden coffins, and stone chambers. Pottery wares, wooden items, iron objects, and silk fabrics are found as grave goods.

There are thirty-one Ming & Qing tombs, with stone mounds or enclosed stone circles, in a vertical shaft pit, vertical stone chamber pit, and vertical shaft mud-brick pit. No grave goods are found.

The tomb details can be seen in Table 40 and Fig. collection 5.5.4-2.

4. Age

4.1 Relative Age

The grave goods of Xiabandi site have shown varied time phase characters and can be divided into three main sub-phases: Bronze Age, Han & Tang, Ming & Qing phase.

Mostly Bronze Age tombs are found in Nr. AII cemetery can be divided into two subphases (Fig. 5.5.4-3). Phase I is mainly found in the east of Nr. AII, including AIDM1, AIIM1, AIIM4-12, AIIM14-17, AIIM19-59, AIIM61-63, AIIM84-106, AIIM108, AIIM110-114, AIIM116. Phase I tombs mainly have stone indicators. The chamber pit is a round-rectangular shaft pit. Most tombs have no tomb furnishing; only a few are found with beam cover, wooden frame couch, or stone coffin; single-burial and multi-burial are common. Some cremation chamber pits are found with the soil-buried tombs altogether. Flat-based pottery wares and bronze ornaments are popular.

Phase II tombs are mainly found west of phase I tombs, including AIIM18 and AIIM107. All these tombs are in a vertical shaft pit, with no cremation at all. The pits are round-rectangular,

with a simple wooden frame couch found inside the chamber pit. Two single-burial and one multi-burial with three bodies, all in a side-flex position. Round-based pottery wares replaced the flat-based pottery wares from the last phase.

The Han & Tang tombs can also be divided into two time-phase groups, primarily found in the Nr. AI cemetery and western AII cemetery: Phase III (AIM9-10, AIM12-17, AIIM68, AIIM70, AIIM72-74, AIIM77-83, AIIM115, AIIM117, AVM1, AVM4, AVM6) and Phase IV (AIIM13), wooden objects, iron objects, and harness, silk fabrics are mainly found in the Han & Tang tombs.

The Ming & Qing tombs usually have no surface indicator; the tomb chambers are covered by wooden sticks or slabs, stones, and mud-brick constructed in some tomb pits. Most graves are buried with the adult; the teenagers are buried in the pit, no grave goods are found inside the chamber pit, and only a few pottery sherds are located in the filling soil.

4.2 Absolute Age

There are eleven radiocarbon results from Xiabandi samples, and the details can be seen in Table 4. According to the calibrated data, the absolute age of the Xiabandi is between 2000 BC-700 AD. To be more specific, Phase I of the Bronze Age is between 2000-1450 BC, Phase II of the Bronze Age is between 900-760 BC, and the Han & Tang tombs are between 50 AD-650 AD, while the Ming & Qing time is about 1300-1400 AD.

5. Interpretation

5.1 Burial tradition and grave goods

The tomb structure and grave goods from Phase I of Xiabandi site are similar to the Xiangbaobao site in the same region. All indicate the early cultural connection with Andronovo cultural elements. The stone surface indicators, soil-buried and cremation tombs, mostly single-burial, are both popular. The pottery jar with a thin neck and trumpet-shaped cup handles is unique in Xiabandi, similar to the Andronovo pottery jar but smaller. In addition, the pottery bowl and wide bracelet are also quite similar; the silver and bronze Earrings, identical in design to Eurasian Steppe burials, are found in some graves and the remains of goats.

Cremation tradition is rare in Bronze Age Xinjiang sites and other Chinese Northwest cultures but more frequent in Central Asian and South Asian cultures (Xinjiang, 2012), representing the old worship actions of the dead. The procedure is first to burn the body outside the tomb chamber and then bury the bone ash and unburnt bones altogether, and the last step is to seal the tomb. Therefore, the tomb chamber may only provide a place for the ash. In AVM01, there are no tomb chambers; the burnt traces and bone ash are found on the ground, which forms a square burnt mark, which could be the evidence of the procedure mentioned above; this processing tradition is also popular in Andronovo culture (Xiao, 2016).

No archaeobotanical remains are discovered from Xiabandi Bronze Age tombs. At the same time, the isotopic results indicate that millet might be one of their plant resources, while their primary subsistence strategy could be herding and hunting due to the findings of sheep/goat and horse bones. In addition, the majority of Xiabandi human isotope values overlap with the data of individuals found at sites in Kazakhstan and the Minusinsk Basin, and the most extreme outlier is similar to the Karasuk population (Zhang et al., 2016; Wang et al., 2019).

The anthropological studies reveal that the physical features observed from the Iron Age Tashkurgan and other sites on the Pamir plateau are a mix of Eastern Mediterranean and Mongolian features (Han, 1993). At the same time, the genetic studies suggest that the Xiabandi population could be the residual evidence for prehistoric immigration by pastoralists. Yet, they also exhibit the Andronovo ancestry features; the ancient nomad lineage continued in the eastern Pamir region (Ning et al., 2016), proving their early connection with Eurasian Steppe.

5.2 Summary

Xiabandi site is one long-lasting archaeological culture in the Pamir plateau on the southwestern edge of Xinjiang. Its Bronze Age phase, combining with the later phase of the Xiangbaobao site, contributes to one unique cultural group that may originate from the Andronovo culture in the Eurasian Steppe and developed its cultural feature. They provide more evidence on the ancient migration from central Asia and might also keep reacting with South Asia.

5.5 Ji'ertzankale (Jirzankal) Site

1. Location

Ji'ertzankale site is located in Quman village of Tizinafu Town, Tashkurgan Tajik Autonomous County. The tombs are distributed on the Ji'ertzankalan terrace on the western bank of Tashkurgan River, eastern Pamir Plateau. The site is approximately 10km away from the Tashkurgan City to the south and 180km away from Kashgar, the prefecture's capital where the site is situated (Fig. 5: 47).

Located on the northern slope of Kunlun Mountain and western of Pamir Plateau, Ji'ertzankale site is in a typical Plateau Arid subalpine zone. It is one of China's most specularly and remote high mountains, being glaciated at a higher elevation, i.e., above 4,500m above sea level. The temperatures can be expected at an extremely low level, both the mean monthly temperatures and the annual mean. As a thermal characteristic, the daily minimum temperature year-round is below 0°C; for the high mountain areas, even the monthly standards of temperature remain below 0°C in all months—only the lower and mid-mountains record positive monthly means in summer. The Alpine Plateau Zone has mostly snow in terms of precipitation, but the total precipitation remains very low in all. The annual total may drop <100mm, mainly in winter. Then the occurring westerlies are often reported to have strong velocities (Domorös and Peng, 1988).

2. Research History

Ji'ertzankale site was firstly excavated in 2013 by the Institute of Archaeology of the Chinese Academy of Social Sciences, Kashi regional Institute of Cultural Relics, Tashkurgan County Institute of Cultural Relics; this season yielded ten tombs (Wu, 2014; IACASS, 2015). The second excavation season was in 2014, which yielded twenty-nine tombs (IACASS et al., 2017).

The tomb structure and grave goods have shown unique features among the unearthed sites on the Pamir plateau, and the anthropological and radiocarbon dating results indicate the possible cultural connection with Zoroastrianism (Shen et al., 2015; Wang et al., 2016; Shen, H., 2017; Wu, 2018).

3. Findings

The distribution of Ji'erzankale tombs is divided into four zones: Zone A is located on the bedrock of the third terrace, Zone B is on the second terrace, Zone C is in between A and B, while Zone D is on the north of A, B and C (Fig. 5.5.5-1).

3.1 Zone A

There are seven tombs unearthed in Zone A; all tombs are in the vertical shaft pit with enclosed stone/soil indicators on the ground, all in secondary burial, with few grave goods (Fig. 5.5.5-2).

AMI: The surface soil mound is round, the diameter is 8.7-9m, height is 0.6m. Under the surface mound are two enclosed stone circles; the outer circle is oval, whose diameter is 7.2-8.35m. The tomb chamber opening is right next to the inner circle, and the diameter is 1.6-2.3m. Several boulders, wooden branches, and three burnt remain with charcoal and bones left inside.

The burnt remain Nr. 1 is located on the northeast of the tomb chamber, in an oval shape, the length is 50cm, enclosed by pebbles, and several charcoal pieces remain in the ash. Nr. 2 is on the southeast of the chamber, oval, the length is 10cm, with many charcoal pieces. Nr. 3 is on the southeast of chamber, oval, the length is 20cm, with few charcoal pieces and several burnt bones remaining inside.

The tomb chamber is constructed from the bedrock and filled with grey-yellow soil. There is one female head in the depth of 10cm, with many maggot shells remaining inside but not in the filling soil, which indicates that when burying this head, no muscular tissue remains outside; only the inside muscular tissue is kept with the maggot. One small pinch of hair is 5cm to the head skull, which indicates the separate bury. There is one bamboo comb and a small piece of silk fabric fragment under the skull. The separate burials of hair and no outer muscular tissue skull may indicate one specific burial tradition. There is another female skull at a depth of 25cm in the southwestern of the chamber; the condition is the same as the previous skull.

There are two skulls at a depth of 50cm on the northwestern of the chamber, one male and one female; the conditions are the same as the previous two skulls. There is one wooden plank on the

north of the skulls; the length is 52cm, the width is 19cm; one agate bead and a row of sheep/goat ribs on the west wall, three glazed beads on the southwestern wall. There are several scattered bones in the northern and southern filling soil. There is no obvious sequence on the filling soil layer. The three different depths of human skulls are buried simultaneously, a unique secondary burial tradition (Fig. 5.5.5- 3).

AM2 (Fig. 5.5.5-4): Located southwest of AM1. There is one round soil mound on the surface, and the diameter is 5.8m. There are two enclosed stone circles under the soil mound. The outer diameter is 5-5.3m, and the inner diameter is 2.8-3.15m. The chamber is filled with grey-yellow soil accompanied by sand, small stones, and wooden branches. The vertical shaft chamber pit is constructed on the bedrock in an oval shape; the length is 2.3-3m, depth is 0.6m. Several scattered human bones and animal bones are on the chamber pit, including three adult individuals and one teenager. The grave goods include a few wooden pillars, wooden objects, lithic tools, and bronze objects.

AM4 (Fig. 5.5.5-5): Located northeast of AM1. One oval soil mound is on the surface; the length is 4.5-5m, with no enclosed stone circles. The tomb chamber opening is constructed of black & white pebbles/blocks, so as the northeastern tomb chamber. The tomb chamber is oval; the length is 1.1-1.8m, depth is 0.3-0.45m. Several scattered human bones, wooden branches, human hair, pottery sherds, animal bones, and silk fabric fragments are found in the filling soil and on the chamber bottom. In addition, there is one hawk skull inside the chamber.

3.2 Zone B

There are thirty-four tombs found in Zone B. The tombs are distributed on the second terrace, and black & white stone blocks construct this small cemetery area. All tombs are vertical shaft pits with stone-enclosed circles and tomb passages. The chamber pits are built on the bedrock (Fig. 5.5.5-6).

BM9 (Fig. 5.5.5-7): Located east of Zone B. There is one oval soil mound on the surface ground; the length is 7.3m, width is 7.1m, height is 0.12m; several seeds are found in the mound filling soil. The enclosed stone circle is 10cm below the surface mound, in a round shape, and the

diameter is 6.7m. There are three piles of burnt pottery sherds and charcoal pieces on the northwest of the stone circle; several woolen felt fabrics, grass mat, and wooden pieces on the southern circle, some woolen felt pieces and wooden branches on the northern circle.

The tomb chamber is in the middle of the stone circle. The rectangular passage is on the northeast of the chamber; the length is 1.5m, the width is 1m, and the depth is 0.14-0.34m. The passage beam cover comprises seven wooden pillars; one length is 1m, and the diameter is 0.12m, with some charcoal pieces and burnt ash remaining on the northern and eastern pillars. Woolen felt fabric fragments and grass mat pieces above the beam cover and north of the passage. The tomb chamber is oval; the length is 2.5m, the width is 2.04m, depth is 1.05m. There are some wooden branches, wooden pieces, grass mat, and pebble stone in the chamber filling soil, one rectangular black woolen felt on the northern wall, the length is 2m. One wooden couch on the bottom is composed of wooden pillars whose length is 1-1.2m diameter is 0.04-0.07m. there is one 25-30-year-old male skull on the wooden couch, with scattered human bones and animal bones surrounding it. The grave goods included a wooden fire altar, wooden items, bronze ornament, and glazed beads.

BM10 (Fig. 5.5.5-8): Located on the eastern side of Zone B. There is one round soil mound on the ground surface, the diameter is 8.2m, height is 0.1-0.15m. One enclosed stone circle under the soil mound, in an oval shape, the length is 7-7.6m. There is a slab square in the western circles, made of four pieces of small slabs; the length is 0.5m, the width is 0.3m, with a few charcoal pieces inside.

The tomb chamber is under the soil mound, in a round shape, the diameter is 4.2m, and the depth is 1-1.15m. There is one rectangular slope passage in the southeastern chamber; the length is 1.5m, the width is 1.5-1.8m, and the depth is 0.25-0.6m. There is one layer of grass mat on the passage entrance; the length is 75cm, and the width is 30cm. Several wooden branches are covered in the passage, whose diameter is 2cm and length is 40cm. One sheep/goat skull and one pottery sherd are found in the passage, and several bird bones are located in the filling soil of the connection between chamber and passage. The human bones are scattered in the chamber, while animal bones are found altogether. These human bones can be identified as three adult

individuals, including one male and one female; some infant's bones are also found on the chamber bottom. There is one bronze bell and one bronze ball found in the tomb chamber.

BM11 (Fig. 5.5.5-9): Located in the mid-eastern of Zone B, south of BM10. There is no obvious surface indicator on the ground, while the middle part is slightly 20cm lower than the ground level. The stone enclosed circle is 15-20cm under the Topsoil, in a round shape, and the diameter is 6.8m. The stone circles are made of small pebbles whose diameter is 15-30cm. There is one slab square in the northeastern circle; the length is 0.42m, with two pieces of rotted wood remaining inside.

The tomb chamber is round; the diameter is 3.2m, depth is 1.3-1.6m. There is one chamber passage in the southeast of the chamber; the length is 1m, the width is 2m, and the depth is 0.13-1.8m. The tomb opening and passage are covered by eighteen beams, whose length is 1.45m and the diameter is 0.05-0.1m. Three complete human skeletons are found inside the chamber (A-C); A and B are in the side-flex position, while C is supine straight. Twenty-six pillars on the chamber bottom make one wooden couch. One broken sheep/goat bone and one pottery jar were found on the northwestern wall, with one sheep/goat shoulder blade inside the jar; the other grave goods include bronze objects, iron objects, and wooden items.

BM12 (Fig. 5.5.5-10): Located in the southwestern of Zone B. There is no obvious surface indicator on the ground, while the middle part is 10-15cm lower than the ground level. There are two enclosed stone circles 20-30cm under the Topsoil, in an oval shape; the length of the outer circle is 5.9-6.6m, and the length of the inner circle is 4-4.5m. The outer circle breaks the stone circle of BM11.

The tomb chamber is in the middle of the stone circles, in an oval shape, and the length is 3.4m. Some sheep/goat jawbones and rotted wooden pieces in the filling soil. One layer of beam cover at a depth of 35-55cm from the tomb opening, and the beam cover layer is supported by one standing pillar whole length is 2.2m, diameter is 0.2m. One individual can be identified from the scattered hum bones; the skull condition is the same as AM1, with additional animal gnawing marks. The wooden couch is found under the human bones, made of twenty-four wooden pillars

whose diameter is 0.12m and the length is 1.5m. One fire altar, two pottery jars, and one wooden plate on the east of the skull are placed on the wooden couch.

BM13 (Fig. 5.5.5-11): Located on the eastern edge of the terrace in Zone B, northeast to BM12. There is no obvious surface indicator on the ground, while the middle part is 10-15cm under the ground level. The enclosed stone circle is 20cm below the Topsoil, and the diameter is 7.2m.

The tomb chamber is in the middle of the stone circle, in an oval shape, the length is 3.7-3.9m, depth to the ground is 0.4-0.5m. The chamber passage is in the southeast of the chamber; the length is 1.05m, the width is 0.75m, and the depth is 0.35m. There is one wooden branch on the connection between chamber and passage and one layer of woolen felt on the branch and passage. The felt size is about 2.5m², with burnt marks. There are two layers of human bones inside the chamber. The first layer has one complete human skull, while two individuals are in the second layer, one male and one female. There is one wooden couch on the bottom. The grave goods include wooden objects, iron objects, and lithic tools.

BM14 (Fig. 5.5.5-12): Located in the southern part of Zone B. There is one round soil mound on the surface ground, and the height is 20-30cm. There are two enclosed stone circles under the mound; the outer circle diameter is 7.2m, the depth to the Topsoil is 7-10cm; while the inner circle diameter is 4.25m. There is one wooden branch in the northwestern circle, and the length is 2.7m; one piece of woolen felt with burnt marks is found under the northern circle stones.

The tomb chamber is in the inner stone circle, and the diameter is 3.3-3.7m. Several pottery sherds, animal bones, and seeds are found in the chamber's filling soil. There is one rectangular chamber passage in the southeast of the chamber; the length is 1.5m, the width is 1.25m, depth is 0.5m. Three males and two females in supine straight position are found in the chamber, with hair and woolen fabric fragments left on the body. The grave goods include wooden objects, pottery wares, and bronze objects.

BM15 (Fig. 5.5.5-13): Located southwest of BM14. There is one round soil mound on the surface ground, and the height is 10-15cm. One enclosed stone circle is 8-12cm below the

mound; the circle is round, and the diameter is 5.9m.

The tomb chamber is in the middle of the stone circle, round, and the diameter is 2.75m. There is one rectangular passage in the southeast of the chamber; the length is 1.15m, the width is 1.1m, and the depth is 0.2-0.45m. A few wooden pieces, pottery sherds, and human bones are found in the chamber's filling soil. Three complete human skeletons are found inside the chamber, two males and one female, all in the supine straight position. One fire altar with a burnt charcoal layer and eight small pebbles on it. Other grave goods include bronze objects, pottery wares, and wooden objects.

BM16 (Fig. 5.5.5-14): Located on the southern edge of the terrace in Zone B, there is one round soil mound, the diameter is 6.6m, height is 0.13m. The two enclosed stone circles are 10cm below the surface mound. The outer circle length is 5.5m, composed of small pebbles whose diameter is 5-10cm; the inner circle is not complete but composed of large stone slabs.

The tombs chamber is in the inner stone circle. The passage is in the southeast of the chamber, in round-rectangular shape; the length is 1.5m, the width is 1.2m, and the depth is 0.35m. There are three rotted wooden pillars in the chamber passage; the length is 0.4-0.7m, and the diameter is 0.15m. The tomb chamber is oval; the length is 3.6m, the width is 3.4m, and the depth is 1.3m. There is one complete female skeleton on the chamber bottom, twenty-year-old, in the supine straight position. The grave goods are found on two sides of the body; one wooden harp, "Konghou," is placed on the right side of the head, and one wooden plate with an iron knife and sheep/goat bones inside is found altogether. There is one pottery jar between the wooden plate and harp, one bronze mirror, three cowry ornaments, one gravel stone, twenty-three jade beads found on top of the forehead, and two bronze bracelets on each wrist. There is one complete sheep/goat skeleton on the right side of the body.

BM24 (Fig. 5.5.5-15): Located in the southwestern part of Zone B. There is one round soil mound on the surface ground, and the height is 40-50cm. There are two enclosed stone circles under the surface mound, the outer diameter is 8.25m, and the inner diameter is 4.7m. There is one stone square on the southwest of the outer circle, constructed by four pieces of stone slabs,

whose length is 0.55m and the width is 0.5m.

The tomb chamber is in the middle of the stone circle, in an oval shape, and the length is 4.8m. There is one rectangular passage in the southeast of the chamber; the length is 2.1m, the width is 1.4-1.5m, and the depth is 0.3-0.7m. The tomb cover is found 50-60cm from the tomb opening, composed of 18 black pillars; the whole length is 4m, diameter is 0.18m. Four individuals are buried in the chamber, three males and one female, well preserved and supine straight position. One rotted wooden couch is found under the human body. The grave goods include pottery wares, iron objects, and wooden items.

BM25 (Fig. 5.5.5-16): Located in the southwestern of Zone B, with one round soil mound on the surface ground, the diameter is 6.5m, and height is 0.1m. Two enclosed stone circles are 7-10cm below the surface mound, there are some pottery sherds, and burnt ash marks remain on the ground.

The tomb chamber is in the middle of the stone circle, in an oval shape; the length is 3.35m, the width is 3.25m, and the depth is 0.75m. The passage is in the southeast of the chamber, in a "U" shape; the length is 0.75m, the width is 0.75m, and the depth is 0.3m. The tomb beam cover is 50cm below the Topsoil, filled with small stones. The beam cover scale is 2.5×1.8m, composed of several pillars whose length is 0.5-1.8m and the diameter is 0.07-0.12m. There are more than 20 wooden branches on the western chamber wall, whose diameter is 0.01m. Three individuals are buried in the chamber, two males and one female, in the supine straight position, while most human bones are scattered randomly. Two drilled holes on one skull. The wooden couch under the body has rotted, while the composed wooden pillar diameter is 0.08m, length is 1.4m. The grave goods include two wooden fire altars with burnt charcoal layers, pottery wares, wooden objects, iron objects, bronze objects, and glazed beads.

BM28 (Fig. 5.5.5-17): Located on the southwestern edge of the terrace. There is one round soil mound on the surface ground, and the diameter is 5.9m. Two enclosed stone circles are 15cm below the soil mound, the outer circle diameter is 5m, and the inner circle length is 1.9m.

The tomb chamber opening is close to the edge of the inner circle. The tomb chamber is round, and its diameter is 2.4m. There is one small passage in the southeast, and the length is 0.4m. The beam cover is 45cm below the tomb opening, composed of eight wooden pillars, whose diameter is 0.06-0.12cm and the length is 0.7-1.4m. With more than 50 wooden branches standing next to the beam cover, the general width is 0.6m. The tomb chamber is oval; the length is 1.67m, the width is 1.15m, depth is 0.9m. One 25-35-year-old male is buried on the bottom, supine, left leg straight, right leg slightly flexed. His head is placed on one wooden pillar whose length is 0.95m and diameter is 0.05cm. The grave goods are mostly found around the upper body, including wooden objects, pottery wares, lithic tools, bronze, and iron objects.

BM29 (Fig. 5.5.5-18): Located on the southwestern edge of Zone B. There is one round soil mound on the surface ground; the diameter is 3.5m, and the height is 0.06m. The stone enclosure is under the surface mound, in an uncomplete rectangular shape; the length is 1.7-2.6m, and the width is 0.3-0.6m.

The tomb chamber is in the middle of the stone enclosure; its opening length is 1.84m, and the width is 1.7m. The chamber is filled with grey sand soil and small pebble stones. The tomb chamber is oval; the length is 1.26m, the width is 1.15m, depth is 0.75m. One teenage body is placed in the middle of the chamber, in a side-flex position; only a few teeth remain. Several wooden sticks, wooden pillars, wooden objects, iron objects, and sheep/goat bones are found in the chamber, while the iron knife and sheep/goat bones are found inside the wooden plate.

BM32 (Fig. 5.5.5-19): Located on the western edge of Zone B, there is one round soil mound on the surface ground; the diameter is 5.9m, height is 0.13m. One enclosed stone circle is 10cm below the surface mound, in a round shape, and the diameter is 5.1m.

The tomb chamber is in the middle of the circle. The passage is on the southwest of the chamber, in round-rectangular shape, the length is 0.88m, the width is 1.46m, and the depth is 0.2m. There is one layer of grass mat in the middle of the tomb passage; the length is 1.4m, width is 0.53m. A layer of woolen felt and a layer of reed mat are under the grass mat. The tomb beam cover is 50cm below the tomb opening, composed of thirteen wooden pillars, whose length is 0.7-1.4m

diameter is 0.05-0.08m. The tomb opening is round, and the diameter is 2.4m; the chamber is oval, length is 1.5m, width is 1.2m, and depth is 0.7m. There are two complete human skeletons in the tomb chamber, one 45/50-year-old female and one 35-39-year-old male, placed on the middle of the wooden couch in the supine straight position. The wooden couch comprises nine wooden pillars, whose length is 1.3-1.5m and the diameter is 0.05-0.08m. The grave goods are mainly found around the upper body, including pottery wares, wooden items, bronze objects, cowry ornaments, bone ornament, and agate beads. Some of the wooden objects are found with burnt marks. In addition, there are many sheep/goat bones found next to the human body.

3.3 Zone C

There are eight tombs in Zone C. This tomb group is located between Zone A and B, in the north, west, and east sections. The tombs of Zone C have fewer human bones than the other two zones. There is only one tomb with the surface indicator in the northern section, but unlike the other tombs, the stone piles below the surface mounds make a small round platform with burnt charcoal pieces remaining. The distribution of Zone C tombs and construction tradition may indicate its unique sacrificial function (Fig. 5.5.5-20).

CM44: Located in the northern part of Zone C. There is one round soil mound on the surface ground, and the diameter is 6.2m. One stone pile is 10cm below the surface mound, in a round shape, and the diameter is 4.9m. There is one layer of sand soil under the stone pile, surrounded by one circle of a small trench, whose width is 0.35-0.45m, depth is 0.15-0.2m, filled with fine sand soil, which makes the middle part a small round platform. Two irregular rectangular pits connect the northern trench; the depth is 0.2-0.3m, filled with fine sand soil, with several stones and charcoal pieces remaining on the bottom. There is one small-sized activity surface between two pits. There is one square circle on the west of the trench, composed of six large pebbles and slabs; the circle's length is 0.3m. One burnt surface remains on the platform east of the square circle.

The tomb chamber is in the middle of the platform, in a round-rectangular shape; the length is 1.25-2.25m, the width is 0.9-1.8m, and the depth is 0.73m. There is one layer of small wooden sticks on the chamber bottom; the length of this layer is 1.2m, the width is 0.65m, the wooden

sticks are 1.2m long, diameter is 0.015 m. One 0.5m long and 0.04m thick wooden piece is placed above the wooden sticks on the west, and several human bones are found on the north of the wooden piece. There is one iron object next to the human bones, two shallow wooden bowls on the south and north corner, respectively, and two sheep/goat leg bones on the south bottom (Fig. 5.5.5-21).

CM45 (Fig. 5.5.5-22): Located southeast of Zone C. There is one round soil mound on the surface ground, and the diameter is 2.2m. One enclosed stone circle is 5cm below the surface mound, in an oval shape, the length is 1.83m, width is 1.47m. There is one burnt soil pile in the northwest of the circle; the length is 0.5m, the width is 0.3m, and the width of charcoal pieces remained inside.

The tomb chamber opening is close to the stone circle, in an oval shape; the length is 1.2m, and the width is 0.95m. Small stones and yellow soil fill the tomb chamber; the chamber length is 0.96m, the width is 0.77m, and the depth is 0.25m. Many hair and woolen products on the south and north bottom, many yarn balls dyed in red color on the eastern wall.

CM48 (Fig. 5.5.5-23): Located on the southeast edge of Zone C, there is one round stone and soil mound, the diameter is 2.2m, height is 0.05m. The tomb opening is 10cm below the surface mound, and the tomb chamber is constructed in the bedrock. The chamber opening is oval; the length is 0.82m, the width is 0.65m; the chamber length is 0.68m, the width is 0.53m, depth is 0.2m. There are several pieces of hair and woolen fabrics on the north bottom, one human tooth on the west, and some hair in the southern chamber.

3.4 Zone D

Located in the northwest of Zone A, B and C. There are 5-6 tombs in this zone; one tomb was excavated in the 2014 season, while the data has not been published yet.

4. Age

4.1 Relative Age

Even though there are four zones in Ji'erzankale site, there is no apparent different time phase

stratum sequence between these zones. Thus, the four zones could be used simultaneously but with various functions. The iron knife and glazed beads indicate that Ji'ierzankale site has developed its metal handicraft industry, which is thought to be the characteristic of the Iron Age. The pottery types also showed the transformation from the late Bronze Age to the Early Iron Age, similar to Xiangbaobao and Chawuhu sites, especially the round-based pottery jar. Therefore, the Ji'ierzankale site could be a late Bronze Age to early Iron Age site, probably during the Warring States period.

4.2 Absolute Age

There are twelve radiocarbon dating results from Ji'ierzankale samples (Shen et al., 2015; Wang et al., 2016), and the details can be seen in Table 4. According to the calibrated data, the absolute age of Ji'ierzankale site is between 800 and 400 BC.

5. Interpretation

5.1 Burial tradition and grave goods

The burial tradition of Ji'ierzankale tombs is unique in the Pamir plateau. While the tombs are mainly constructed with enclosed stone circles in a vertical shaft pit, with beam cover, wooden couch, and chamber passage, commonly seen in the late Bronze Age and early Iron Age Xinjiang prehistoric tombs. But in Zone A and B, the black & white stone blocks set on the ground in between the tombs are for the first time found in Xinjiang. There are six more similar settings in the Pamir plateau (IACASS, 2015), and could be a certain burial custom in this region that represents specific contents. The black & white blocks may represent the dark & light, indicating the expression of a calendar switch (Wu, 2018).

Secondary burial is also common in Ji'ierzankale tombs, especially the separate human skulls with no outer muscular tissue, which indicates the dead body is placed on the ground for a short time and then buried after cleaning. The animal chewing marks also prove this assumption. Therefore, one of the burial procedures of Ji'ierzankale people is, after the death, the body is first exposed to the air when the muscular tissues are eaten and cleaned. Then the bones are collected and buried. This procedure is similar to the Zoroastrianism celestial burial tradition (IACASS, 2015).

The wooden fire altar found in the tomb chamber is unique; these altars are preserved in good condition, with no burnt marks on the surface. The inside has one carbonized layer caused by fifteen round pebbles from the interior. The altars could be used during the burial and sputtered out with the filling soil. The fire altars and small wooden sticks also correspond with early Zoroastrianism tradition (Wu, 2018). In addition, the set locations in burials and displaying forms in features of the artifacts and remains also showed that their functions have exceeded the practical utensils and the usual scope of the Scythian burial culture and might play the roles of ritual instruments and ceremonial formulas (IACASS et al., 2017).

5.2 Subsistence

Glazed beads, bamboo combs, silk fragments, and bronze wares are the most common grave goods. The glazed beads are thought to be originated from Mesopotamia or Egypt in 1400 BC and spread to central China during the Spring & Autumn and Warring States period (770-220BC). In addition, the musical instrument wooden harp "Konghou (箜篌)" also originated from Mesopotamia or Asia Minor (Lin, 2006), can be seen in other Xinjiang sites, i.e., Zahunluq site and Yanghai site. These suggest that, located on the Pamir plateau, Ji'erzankale has experienced communication from western and central Asia towards the east. On the other hand, as the typical Chinese products, bamboo comb and silk fragments reflect Eastern China's westward influence on central Asia.

The analysis of the wooden artifacts of Ji'erzankale shows that the material of these objects belongs to seven different species (Shen et al., 2016). The residents appear to choose timber based on its immediate availability in the harsh environment of this dry, high-altitude plateau. They have adapted their needs to the particular characteristics of these local woods rather than ranging more widely to find other timbers (Shen et al., 2015).

The anthropological analysis reveals that the diet of the Ji'erzankale population is relatively homogenous and mainly based on sheep and/or their secondary products and did not have a considerable input of crops such as foxtail or common millet (Guo et al., 2019). In addition, several burnt cannabis remained on the fire altar, which cannot be consumed as daily food, but

played an essential role during mortuary ceremonies, and the cannabis offerings are associated with burials of people of varying social statuses (Ren et al., 2019).

The strontium isotope evidence shows that some of the Ji'erkankale people are locally born and raised, while others may migrate from somewhere else after childhood. They lived a relatively nomadic life with seasonal movements (Ren et al., 2019), contributing to the long-distance cross-culture communication ca. 2500 years ago (Wang et al., 2016).

5.3 Summary

The Pamir Plateau is an important cultural communication and trade channel connecting ancient China, central Asia, and southwest Asia. The various grave goods with distinct regional characteristics from Ji'erkankale site provide evidence of active cultural exchange on the Pamir Plateau before the Han Dynasty. The frequent communication led Ji'erkankale to an admixture of both east and west when the early Zoroastrianism started to develop, which provided new evidence on the origin of Zoroastrianism and broadened the views for the in-depth research on the early stage of the creeds and religious theoretical system of Zoroastrianism.

Part III. Discussion

Chapter 6. Xinjiang Prehistoric Cultural Group

1. Chronological sequence

The past chronological sequence of prehistoric cultures usually follows the general division that Thomsen defines: Stone Age, Copper Age, and Iron Age, while the Stone Age can be divided into Paleolithic and Neolithic times (Renfrew & Bahn, 2017). The difference between the Paleolithic and Neolithic lies in the percussion approach to the lithic tools and the production skills of the pottery wares. As for the prehistoric Xinjiang, the sites distributed in northern Xinjiang and Tarim Basin areas are found with abundant stone artifacts with few animal bones but no pottery sherds, indicating the limited Paleolithic localities of prehistoric Xinjiang during 240,000-4,000 BP.

Geographically speaking, the Paleolithic sites of Xinjiang are not found as much as seen in other regions; the earliest site groups are in the Altun Mountains ranges on the east of Kunlun Mountain and in the Turfan Basin. The Yenuquan and Ka'erdun locations exhibit the lithic assemblages between 300,000-247,000 BP, while the Ancient Yarghul City lithic tools are suggested during 32,000-24,000 BP. Ertrix Lake spot has found several similar stone tools around 24,000 BP, which may have been influenced by the Ancient Yarghul City lithic percussion technology, even though there is no direct evidence on how the technology spread northwards. The later lithic location is Ji'rigale on the west of Pamir Plateau; its stone knife and chopping tools are suggested no later than 10,000 BP. Qijiaoqing in the Hami region might start its Paleolithic time from 9,000 BP. Ancient Yarghul City lithic group, Ertrix Lake group, Southern Tarim lithic assemblage, and Qijiaoqing sites exhibit the same "small tool tradition," which might be influenced by one lithic group Shuidinggou tradition from Ningxia Province.

As one of the updated Paleolithic sites found in northern Xinjiang, Luotuoshi exhibits a similar percussion Levallois technology between 50,000 and 24,000 BP. The nearby Tongtiandong cave

site displays the time starting from 45,000 BP; the coexistence of Levallois and Mousterian technology indicates the transition period from Middle Paleolithic to Upper Paleolithic time.

The lithic tools found in the Chaiwopu site in the Turfan region advance the age of this site to 6,000-5,000 BP, and the pottery sherds might also belong to a later feature, indicating a long-lasting settled-down group in the Eastern Xinjiang.

Generally, the differentiation between the Bronze Age and Iron Age lies in whether the production and usage of iron objects primarily led to the evolution of social complexity, hierarchy division, and state formation. The metal industry is usually developed from native artifacts technology. In Iran, Mesopotamia, and Egypt, there is evidence of early usage of iron objects. The Iron Age in Central Asia started in the second half of the second millennium BC (Young, 1965; Wertime & James, 1980).

However, the situation in Xinjiang differs. Firstly, Xinjiang was inhabited during the Paleolithic time in limited regions. Secondly, there are no clearly defined Neolithic sites in Xinjiang yet, which might result from the jump transition from lithic to metal time and make the long-lasting coexistence situation of painted pottery wares and bronze objects. Finally, it is still a controversial concept in the Xinjiang "Iron Age"⁹.

As for the transition from Bronze Age to the (early) Iron Age, studies on metal objects reveal that tin bronze was the primary material used for tools/weapons during the Bronze Age. The material for casting the Iron Age cauldrons is mainly unalloyed copper, and the proportion of tin bronze decreased markedly from the Bronze Age to the Iron Age during the first millennium BC (Ling et al., 2008; Mei et al., 2003; 2005; Guo, 2012; Wang et al., 2019). As for the age division, the most accepted Xinjiang prehistoric periodization theory suggested by Wang, the Bronze Age started in 2000 BC and ended in 1000 BC, and Xinjiang Iron Age might be ended around 200 BC. While Guo also suggests that Qiemuerqieke could be seen as the starting point of the Xinjiang Bronze Age, which is around 2500-2000 BC, while Yanbulaq represents the late Bronze Age. The Iron Age in Xinjiang might be started in the first millennium BC, considering

⁹ The discussion can be seen in Chapter 2.

the decreased tin bronze and increased iron usage, and the prehistoric Xinjiang ended when Han Chinese was used as the official language with Zhang Qian's trip, which was around 200 BC (Guo, 2012; Mei, 2003). In addition, the Chawuhu site has yielded the earliest iron objects in Xinjiang, so its time range (1100 BC-200 AD) could also be seen as one reference of the Iron Age determination.

Many Xinjiang prehistoric sites are found overlapping with the Bronze Age and Iron Age, where painted pottery wares, bronze, and iron objects coexist. Therefore, this section will not treat each site as one absolute "Bronze Age" or "Iron Age" site but refer to the prehistoric site that showed different time characteristics.

There are several earlier sites in Xinjiang in the Bronze Age:

- Qiemu'erqieke site in the southern Altai Mountain region
- Gumugou/Xiaohe in the south of the Tianshan Mountains region
- Saensayi in the mid-northern Tianshan mountain region
- Tianshanbeilu site in the eastern Xinjiang region
- Xiabandi in the Pamir Plateau

These sites represent different locations of early migration, and inhabitants from central Asia, Mesopotamia, and Southern Siberia arrived in Xinjiang during 2500-1500 BC. Early settlers stayed in the first-arrived locations and kept moving to east and central Xinjiang. At the same time, they received the eastern influence through the Hexi Corridor from Gansu and Henan region in 1300 BC, making the Eastern Xinjiang region a flourished Bronze Age and Iron Age area. Other areas in Xinjiang also experienced significant development during 1500-300 BC, which overlapped the Bronze Age and Iron Age. After collecting 487 absolute age determinations from 32 sites, 62 unclear cases were excluded because they could not verify their original radiocarbon dates/calibrations. Therefore, 425 radiocarbon dates have been recalibrated. The general chronological sequence can be seen in Fig. 6.1.

According to the chronological sequence, we may suggest that the Bronze Age of Xinjiang started with Qiemu'erqieke in the Altai Mountains region in the Northern Xinjiang and Gumugou/Xiaohe in the Lop Nur region in the Eastern Xinjiang, about 2500-2400 BC. The following century in prehistoric Xinjiang experienced the shift from Bronze Age to Iron Age when more alloyed copper appeared in the metal casting industry and finally accelerated the social complexity process.

2. Xinjiang Prehistoric cultural groups

Many named prehistoric "cultures" in Xinjiang represent different features. Some are named by the most representative sites, like Yanbulaq Culture and Subeixi Culture; some scholars brought out new cultures in the same area, like the Shirenzigou-Hongshankou cultural remains. The un-united naming system only makes the understanding of Xinjiang prehistory more complicated. Therefore, this section will describe the "cultural groups" in different geographical zones, which only represent the most representative cultural elements in certain regions, from external to internal.

There are eleven Bronze-Iron Age zones in Xinjiang: (A). Southern Hami Zone, (B). Eastern Hami Zone, (C). Balikun region Zone, (D). Turfan Basin Zone, (E). Altai Mountain Zone, (F). Western Junggar Zone, (G). Mid-northern Tianshan Mountain Zone, (H). Mid-southern Tianshan Mountain Zone, (I). Lop Nur Zone, (J). Southern Tarim Zone, (K). Pamir Plateau Zone. The distribution can be seen in Fig. 6.2.

A. Southern Hami Zone

Tianshanbeilu cultural group is the most representative culture in this zone. Even though not all data have been published yet, the past research has revealed that the Tianshanbeilu site is a long-lasting cemetery during 2011-1029 BC, with four sub-phases in the Late Bronze Age period and no iron objects at all. The tomb structures are mainly rectangular vertical shafts, with a side chamber or secondary platform, side-flexed single-burial, where bronze objects and painted pottery wares are the mostly found grave goods. The technology and raw material of bronze may partly migrate from the east Machang and Siba culture through Hexi Corridor, while the pottery

painting show connections with the north Karasuk and Afanasievo culture (Li & Dang, 1999; Shui, 2001; Li, 2002; Mei, 2003; Han, 2005; Li, 2009; Jia et al., 2009; Yang, 2018; Chen, 2017; Liu et al., 2020).

B. Eastern Hami Zone

Yanbulaq cultural group dominates this zone from Bronze Age to Iron Age between 1350-500 BC. Besides the Yanbulaq site in Kumu city, Wupu site, Aisikexiaer site, Miao'ergou site, and Hanqigou belong to this cultural group, which covers the whole modern Hami Basin. In this cultural group, vertical shaft pits, shaft pits with a secondary platform, and mudbrick pits are popular tomb structures. The burial position is mostly flexed, and pottery wares are the mainly founded grave goods—in the jug, single-handled pot *Dou*, double-handled jar, single-handled cup, single-handled jar, etc. Mostly pottery wares are in red coating with black paintings, and the patterns include triangles, wave lines, "S" shape, and cross patterns; small handles are apparent. The painted pottery has exhibited a strong Xindian and Kayue cultural influence from the east (Xinjiang, 1989; Chen & Hiebert, 1995; Guo, 2012).

C. Balikun region Zone

This cultural group covered the Balikun region area next to the Hami Basin. It included the Shirenzigou/Hongshankou site, Xigou site, Yuegongtai-Xiheigou, Nanwan site, Tuobeiliang site, Baiqier site, and Heigouliang site. This cultural group lasted relatively long in eastern Xinjiang, during 1400 BC-100 AD, covering the Bronze Age and Iron Age periods. Nanwan site adopted the Tianshanbeilu painted pottery style (Han, 2007; Guo, 2012). The Shirenzigou-Xiheigou site group developed its cultural characteristic from the native inhabitants' later ethnic groups, i.e., Xiongnu and Yuezhi. The inhabitants might establish their own primary "state" by the grassland condition in the Balikun region, with the construction of large-scale stone structures and tombs and seasonal movements by the large amounts of horse riding (Ren, 2012; Xi, 2014; Li et al., 2016).

D. Turfan Basin Zone

The Turfan cultural group covers the modern Turfan Basin and the nearby areas, including Yanghai, Subeixi, Yu'ergou, Algou, Sangeqiao, Shengjindian, and Aidinghu sites, among which

Yanghai and Subeixi exhibit the most representative cultural elements. The time is between 1261 BC and 10 AD, except the Sangeqiao site can be as late as 300-800 AD.

Due to the relatively closed geographical condition, the Turfan group exhibits a more independent cultural feature: vertical shaft pit and side chamber pit are the most popular tomb structures, single-burial and multi-burial are common, side-flex supine-straight are the mostly found burial position. As for the grave goods, painted pottery wares, bronze objects, iron objects, and wooden artifacts can all be seen within the burial. The primary pottery type is the pottery double-handled jar, single-handled jar, pottery cup, and shallow bowl. At the same time, the metal objects, devices, weapons, wooden objects, and woolen textiles are mainly for their daily use. The eastern cultural elements may influence the painted pottery wares. In contrast, the pottery patterns, other objects, and the anthropological features exhibit a more independent Turfan local cultural characteristic, which finally became the "Cheshi" state in the Han Dynasty (Guo, 2012; Tulufan, 2013; Zhang et al., 2020).

E. Altai Mountain Zone

Qiemu'erqieke site is the most representative cultural group in this zone, whose influence covers the southern Altai region in the northern Junggar Basin. The tombs are enclosed in a stone circle with the stone coffin in a vertical shaft pit; supine-flex, supine straight, prone straight, and secondary burial are the leading burial positions. The secondary burials are the majority. Round-based pottery wares are the primary grave goods, with few bronze objects, stone arrowheads, and bone items; stone vessels and large stone figurines in front of the tombs are the most apparent feature. This cultural group lasted from 2400 to 1700 BC as one of the earliest Xinjiang Bronze Age cultural groups. The round-based pottery jar, stone vessels, and stone figurines have considerable connections with Afanasievev-Okunevo and Yamnaya cultures from the north (Jia & Betts, 2010; Chen, 2012; Cong & Jia, 2014).

F. Western Junggar Basin Zone

Adunqiaolu is the primary site in this cultural zone between 1700 BC and 1300 BC. The tombs of Adunqiaolu are characterized by large rectangular or sub-square stone slab enclosures containing one or more than one tomb chambers. Also, the features of the cremation burial and

clay coating pottery wares are unique. The house remains are in a large rectangular semi-subterranean building of stone slabs with a narrow corridor entrance. The faience beads, cremation tradition, stone slab tomb structure, and house that remain suggest the cultural connections with Andronovo culture from the north. In the meantime, its early date also indicates this region could be one of the first settled regions for the pastoral group after they arrived in Xinjiang during the Bronze Age (Jia et al., 2017; Cong et al., 2017; Jia, 2018; Jia et al., 2020).

G. Mid-northern Tianshan Mountain Zone

This zone is a relatively sizeable cultural zone that spreads along the Ili River until central Xinjiang. Several large sites in this zone are named with different cultures, i.e., Chawuhu (goukou) Culture, Banjiegou Culture, Qiongkeke Culture, Suodunbulake Culture, etc. These sites exhibit similar cultural elements to Afanasievo and Andronovo culture, and the routes are alongside the Ili River and mid-northern Tianshan Mountain. Despite the Chawuhu, Banjiegou, and Qiongkeke sites, this zone covers Saensayi site, Luanzagangzi site, Jirentai Goukou site, and Sidaogou site. This large-scale cultural group lasted between 2300 BC-100 AD and developed its unique cultural feature after receiving outside influence.

The unique features of this group's site are the surface mound and four-pit chamber tomb structure. The stone and pottery jar exhibit a significant similarity with the Qiemu'erqieke site, which the Andronovo culture may influence. In the meantime, the Chawuhu site represents vital Afanasievo-Andronovo culture elements, with the stone surface indicator and stone enclosures. In contrast, the paintings on the spouted pottery wares are distinguished from other zones, indicating the self-development after receiving the Afanasievo-Andronovo cultural migration. While in the east of this cultural group, it also receives the Turfan-Hami influence on the painted pottery tradition, contributing to this cultural combination group during the cultural exchange (Chen, 2001, 2002; Guo, 2012; Xinjiang, 2013; Betts, 2019).

H. Mid-southern Tianshan Mountain Zone

Qunbake site, Duogang site, Mohuchahan site, Xintala site, Baileqier site, and Kezier site are the representative sites in this cultural group, which covers the time range between 1100-350 BC.

This cultural zone displays more similarity with the mid-northern Tianshan group, especially with the Chawuhu cultural elements, with surface stone mounds as the tomb indicator, vertical shaft, and round grave pit. In addition, several large-scale tombs are constructed with tomb chamber passages covered with wooden beams, some with appending pits. Like Chawuhu site, spouted pottery wares are in large proportion with painted patterns; the bronze weapons, especially bronze knives are the mostly found, with other daily tools, animal bones, and glass beads found altogether. This cultural group may have received the eastern cultural contact from the Chust culture in Fergana Valley, Andronovo culture and Karasuk culture in Minusinsk Basin, and the mid-northern Tianshan cultural group. Many horse bones and bronze weapons suggested the inhabitants of this zone lived a pastoral lifestyle when they moved along the Ili River region through the mid-Tianshan Mountain regions (Mei, 2003; CASS et al., 2014; Zhang & Luo, 2014).

I. Lop Nur Zone

Gumugou Site and Xiaohe Site are the primary two sites in the Lop Nur region in the northeastern Tarim Basin. Between 2500 and 1450 BC, it is considered one of Xinjiang's earliest Bronze Age cultural groups.

The characteristic of this cultural group is distinguished from other Xinjiang Bronze Age sites, with a large proportion of wooden objects. The radical timber rows on the tomb chamber's surface and the standing wooden pillars in front of the wooden coffin are unique features. The wooden coffins are usually placed in a vertical sandpit, buried with woolen, and felt textiles, wooden weapons, daily tools, ornaments, and figurines. Pottery and bronze objects are rare in this cultural group, while wooden and grass objects are common. The tomb structure, placement of wooden coffins, wooden figurines, and the usage of *Ephedra* seeds indicate their unique spiritual tradition in the early times. The wooden figure may have a cultural connection with the stone figurine found in the Qiemuer'qieke site in the Altai region, which may be influenced by the Afanasievev-Okunevo cultural elements from the north (Guo, 2012; Wang, 2014; Xie et al., 2016). This zone's local inhabitants originated and adopted the outland and neighboring cultural and physical migrations.

J. Southern Tarim Basin Zone

Liushui Site and Zaghunluq Site are the most representative sites in the southern Tarim Basin; the time is around 1800-300 BC.

Shaft-pit tombs and Catacomb tombs are the primary tomb type, covered mainly by wooden beams. The burial tradition includes single-burial and multi-burial; supine flex is the primary burial position. Wooden objects, woolen textiles, and pottery wares are the mainly founded grave goods. Wooden Spinning Wheel and Comb relate to the woolen textile-producing industry, combined with the bone & horn objects; all indicate the high development of the artificial and animal husbandry industry. The shallow pottery bowls are similar to the Turfan Basin pottery style, which could result from the westwards cultural connection. At the same time, the wooden Harp exhibits the possible cultural connection with Mesopotamia. The late phase of this cultural group is parallel to Han Dynasty; this bilateral cultural exchange may lead to communication along the Han Silk Road (Wang, 2003; Chen et al., 2011; Zhao, 2014).

K. Pamir Plateau Zone

Xiangbaobao site, Xiabandi Site, and Ji'erzankale site are the major sites in Pamir Plateau Zone; this cultural group covers 2000-400 BC.

The surface stone tomb indicator is one of the tomb features of this cultural group, and the vertical shaft pits are usually found under the surface mounds/circles. Cremation is one unique burial tradition in this cultural group, including two approaches: 1. burning and then burying the bone ash; 2. directly burning in the tomb chamber. This cremation tradition is more similar to Central Asian and South Asian. The pottery jar with a slim neck and trumpet-shaped cup handles found in the Xiabandi site point to the cultural connection with the Andronovo pottery style, while the later-phased Ji'erzankale site shows the early Zoroastrianism elements (black & white blocks and wooden fire altars). This cultural group may have the Andronovo ancestry features and developed more central and even southern Asian traditions in the later time (Guo, 2012; Xinjiang, 2012; Xiao, 2016; Zhang et al., 2016; Wang et al., 2019).

3.Cultural Communication Route

As one of the earliest Bronze Age zones, Qiemuer'qieke cultural group exhibits vital Afanasievo-Okunevo cultural elements from the north. This similarity might result from the direct cultural contact alongside the Altai Mountain ranges when the northern settlers arrived in this zone and the Western Tarim zone (Adunqiaolu) in the middle of the Bronze Age. Part of them might be stopped and settle down; while others keep moving along Tianshan mountain and the Ili River, during which the Saensayi site could be one of their stopping spots when they finally reach an ideal oasis—the Lop Nur region (Li et al., 2013), which has been locally developed for a certain period. However, the eastern Tarim Basin did not only receive the northern contact; the movement from the desert oases of Afghanistan, Turkmenistan, and Uzbekistan through the mountains of Central Asian (BMAC influence) and the Inner Asian Mountain Corridor (IAMC) also reached the Lop Nur region. This assumption may explain the early period of the Gumugou site and the admixture of the inhabitants combining European, Mediterranean, Middle East, and a few Mongolian elements in the anthropological physical features, with some typical Afanasievo feature elements found altogether (Han, 1986; Cui et al., 2002).

The early settlers may not only choose northern Xinjiang as their first destination, but the Pamir Plateau could also be another spot to receive the early migration from central and southern Asia. In the meantime, Tianshanbeilu, one of the representative spots in Eastern Xinjiang, also received external contact, especially from the Gansu and Qinghai provinces through the Hexi Corridor.

The external settlers and the native inhabitants developed their own unique culture when combining early civilizations and the native condition, contributing to a special Xinjiang cultural zone distinguished from other cultural groups in central Asia. These cultural groups maintain communication by moving, trading, and migrating through the internal Xinjiang. For instance, the spouted pottery vessels that uniquely originated from Chawuhu cultural group in the mid-northern Tianshan region are found in other sites along the Ili River. On the other side, the pottery painting tradition might spread westwards after reaching the Hami and Turfan Basin in the east. This mutual communication formed the unique painted spouted pottery tradition in

prehistoric Xinjiang.

Therefore, we may conclude the communication route of prehistoric Xinjiang (Fig. 6.3). At the beginning of the Bronze Age in the mid-late third millennium BC, the external cultural elements arrived at the borders. They kept pushing into central Xinjiang while the native inhabitants initially developed their subsistence. After the settlement, the independent cultural group began their cultural traditions and communicated with neighboring regions. This internal contact could be developed in all directions. The connection route radiates different cultural elements in all directions, contributing to the relatively complicated prehistoric Xinjiang cultural status and creating several independent states before conquering the Han Dynasty.

Part IV

Chapter 7. Conclusion

The research described in the preceding chapters has shed new light on prehistoric Xinjiang and the possible cultural connections with other neighboring regions. This final chapter will highlight the significant Xinjiang prehistoric social status before the Han government set their management in the "Western Regions."

The start of Xinjiang's prehistoric time was around 300,000 BP, when the earliest inhabitants exhibited the lithic assemblages in Yeniuquan and Ka'erdun locations in the Altun Mountains ranges to the east of Kunlun Mountain. The "small tool tradition" that spread from the Shuidingdong site in the east may also affect the Paleolithic Xinjiang from Ertix to the southern Tarim regions. The Mid-Eastern Xinjiang lithic tradition was formed in Turfan and Hami in the followed centuries when the Chaiwopu site yielded both lithic tools and pottery sherds around 6,000-5,000 BP. The northern inhabitants kept the lifestyle of the lithic tools and adopted the Levallois and Mousterian technology exhibited in Luotuoshi and Tongtiandong cave sites.

The prehistory of Xinjiang does not conform to what might be considered more traditional development patterns, from hunter-gather-foragers to agricultural villages. There is no Neolithic and no process of indigenous domestication. Domesticated crops and animals were introduced from outside, not to the settled population, but into the hands of transhumant pastoralists (Betts, 2019). It seems quite possible that the earliest use of copper in Xinjiang is associated with the extension of early copper-using cultures from neighboring regions during the late third millennium BC (Mei, 2000). The earliest cultural groups—Altai Mountain group (Qiemu'erqieke site), Southern Hami group (Tianshanbeilu site), and Lop Nur group (Gumugou and Xiaohe sites)—indicate the early cultural connections in the second millennium BC. The Afanasievo-Andronovo cultural elements spread from the western Junggar region to the foothills of Tianshan Mountain may also have led to the early use of bronze alongside the middle Xinjiang regions (Mid-southern and Mid-northern Tianshan group); meanwhile, the eastern Xinjiang (Southern and Eastern Hami, Balikun, and Turfan Basin group) received the eastern contact

through the Hexi Corridor. This eastern cultural influence is mainly on the pottery and metallurgy aspects, contributing to the coexistence of bronze ware and painted pottery wares. At the same time, the southern Xinjiang section (Southern Tarim Basin and Pamir Plateau group) started another cultural tradition that may be influenced by the South Asian and Mesopotamia cultural elements.

The Afanasievo and Andronovo cultures have obviously influenced the early formation of Bronze Age Xinjiang cultural groups, with the typical surface tomb indicators, unique burial format, and pottery goods customs. The archaeological finds have shed new light on possible cultural connections with Okunevo, Karasuk, and Chust cultures in the Eurasian Steppe. The cultures mentioned above definitely played an essential role in establishing the native cultural groups. The chronological differences in various cultural characteristics indicate the spread routes from southern Siberia and central Asia into Xinjiang and then pushed through Xinjiang in three directions: north, middle, and south.

From the early first millennium BC, iron appeared in prehistoric Xinjiang, and the distribution of mines in the Turfan and Ili River region helped develop the local cultural center. The transmission of tool production and continuously external/internal cultural communication contributed to the revolution on subsistence strategy. The rise of horse nomadism with metal harnesses and weapons has led to frequent conflicts and expansion of local territory. The adoption of agricultural practice assured a relatively stable sedentary life. The exchange system with central China and other regions in the mid-first millennium BC (Mei, 2000) extended the cultural and material exchange route. When the internal communication routes spread the pottery and metal tradition out, the Gansu-Qinghai elements in eastern Xinjiang encountered the Western influence that moved alongside the Ili River and Tianshan Mountain. The local pottery features moved further west, especially during the first millennium BC, when the painted pottery tradition gradually declined in the Gansu-Qinghai region. All these factors finally accelerated the formation of an early communication route—the "pre-Silk Road" in prehistoric Xinjiang.

Situated in the vital part of the Eurasian Steppe and because of the arid condition and geographical location, Xinjiang is distanced from the Eastern and Western agricultural centers,

thus making its development relatively slower than other plain regions in the Paleolithic and Neolithic times. When the western Eurasian Steppe started their Bronze age, the inhabitants of Xinjiang were still living a lithic-based hunting-gathering life. The arrival of well-developed Bronze Age cultural elements from the north leads to the prehistoric Xinjiang jumping from Paleolithic to Bronze Age in the late third millennium BC, forming Xinjiang's subsistence strategy an admixture condition.

The system of Mountain-Oasis-Desert has dominated the prehistoric Xinjiang subsistence system due to its unique topographical condition (Guo, 2012). Economically, the Bronze Age and Iron Age cultural groups are mainly developed in the Mountain-Oasis regions, where animal herding is common in these conditions. On the eve of the Han government, the oasis groups (Turfan and Hami Oasis and Balikun grassland region) are slowly getting rid of the early mountain herding system and transformed into the early city-state by adopting the agricultural practice in their subsistence system with the introduction of wheat, naked barley, and other plants, etc. The revolution on the moving approaches and transhumant actions finally contributed to the rise of northern nomadic groups that separated the prehistoric Xinjiang into several early mobile states, i.e., Yuezhi, Xiongnu, and Wusun.

After the Han government partly conquered the small states in Xinjiang, Xinjiang groups remained in the oasis state or nomadic country form in the following centuries. The Han officials assured the cultural and material exchange: establishing the military basement and agricultural bureau secured stability alongside the exchange route. It realized the continuous trade between central China and Europe through Xinjiang. Silk products have made this route significantly famous among the trade goods, finally opening the "Silk Road."

This road exchanged material resources and cultures and accelerated the transformation of other regions from the nomadic groups into sedentary city life, i.e., the southern areas in Tianshan mountain. On the one hand, the successive years of conflict between the Han Dynasty and Xiongnu changed the condition of eastern Xinjiang. On the other hand, the north Tianshan regions developed into the Wusun state. The northern Kunlun Mountain regions became the Qimo state due to the nonconflicted situation with the help of the Han Dynasty (Guo, 2012).

In all, starting from the mid-late third millennium BC, the prehistoric Xinjiang jumped from Paleolithic time into Bronze Age time with the arrival of externally copper-used and painted pottery groups. The encounter of eastern and western impact created special cultural groups in Xinjiang and then developed into the Iron Age, when new metallurgy, agricultural, and husbandry practices were innovated in the first millennium BC. Prehistoric Xinjiang is a big melting pot that keeps receiving external arrivals, transforms into the native groups, and spreads out. The whole process is a superimposition, acculturation, variation, and transition circulation. The study of prehistoric Xinjiang cultural groups can provide abundant evidence for reconstructing the ancient Mountain-Oasis-Desert social complexity process.

In general, this work is only the first step of prehistoric Xinjiang research to clarify the cultural phenomenon of Xinjiang as part of the Eurasian complexity process. It is essential to build the fundamental framework by collecting updated sites information, which contributes to a significant part of this thesis; the possible cultural contact route is only the result of a simple comparison.

With more sites being discovered, more materials organized and published, the database will be more enriched, and the research topic will be more specific: how did the nomadic cultures originate and develop in Xinjiang? What vital role that other cultures in adjacent areas play in the local cultural formation? Are they contributing to the formation of variant ethnic groups? What happened to different cultural zones? Did all of them transmit to the early state by the eve of the Han Dynasty? and so forth. With more fieldwork and research, the evidence will shed new light on understanding Xinjiang Prehistory.

Bibliography

- Abdurasul, Y., 1993. Xinjiang diqu Xishi qi yicun [The Microlithic Relics in Xinjiang]. *Xinjiang Wenwu*, vol.4, pp. 15-59. [伊弟利斯·阿不都热苏勒:《新疆地区细石器遗存》,《新疆文物》,1993年第4期。]
- Abdurasul, Y., Zhang, C., Xing, K.D., 1996. Tulufan pendi Jiaohe guchenggouxi taidi Jiushi qi didian [Paleolithic Location in Ancient Yarguhl City West Terrace in Turfan Basin]. In: *Wenwu Kaogu yanjiu—Festschrift on 30 years anniversary of Northwest University*. Xi'an: Sanqin Press. (伊弟利斯·阿不都热苏勒, 张川, 刑开鼎:《吐鲁番盆地交河古城西沟台地旧石器地点》,《考古与文物研究—纪念西北大学考古专业成立四十周年文集(1956-1996)》,1996年,三秦出版社)
- Abdurasul, Y., Zhang, C., Hasyet, 1998. E'erqisi he pan de shi qi yi cun ji qi lei xing xue yan jiu [Remains of Stone Age by the Ertix River and Their Typological Research]. *Xinjiang Wenwu*, vol. 3, pp. 45-54. (伊弟利斯·阿不都热苏勒, 张川:《额尔齐斯河畔的石器遗存及其类型学研究》,《新疆文物》1998年第3期。)
- Abuduresule, Y., Li, W.Y., Hu, X.J., 2019. The Xiaohe (Small River) Cemetery and the Xiaohe Culture. In: Betts, A.V.G., Vicziany, M., Jia, P., Castro A.A.D. (eds), 2019. *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads*. Archaeopress.
- Aimaiti, A., 2011. *An exploration into the social life of prehistoric Lopnur [Luobunaoer shi qian ju min she hui sheng huo chu tan]*. Master Thesis of Xinjiang Normal University, Urumchi, China. (艾力·艾买提:《罗布淖尔史前居民社会生活初探》,新疆师范大学2011届硕士学位论文)
- Anthony, A.W., 1998. The opening of the Eurasian steppe at 2000 BCE. In Mair, V.H. (eds), 1999. *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia*. Institute for the Study of Man.
- An, C.B., Wang, W., Duan, F.T., Huang, W., Chen, F.H., 2017. Ya zhou zhong bu gan han qu si chou zhi lu yan xian huan jing yan hua yu dong xi fang wen hua jiao liu [Environmental changes and cultural exchange between East and West along the Silk Road in arid Central Asia]. *Dili Xuebao [Acta Geographica Sinica]*, vol. 72, Nr. 5, pp. 875-891. (安成邦, 王伟, 段阜涛, 黄伟, 陈发虎:《亚洲中部干旱区丝绸之路沿线环境演化与东西方文化交流》,《地理学报》,2017年第72卷第5期。)

- An, J.Y., Yuan, J., 1998. Xinjiang Hejing xian Chawuhugoukou yi, san hao mu di dong wu gu ge yan jiu bao gao. *Kaogu*, vol. 7, pp. 63-68. (安家瑗, 袁靖:《新疆和静县察吾乎沟口一、三号墓地动物骨骼研究报告》,《考古》,1998年第7期。)
- An, Z.M., 1957. Lue lun Gansu Dongxiang xian Tangwangchuan de tao qi. *Kaogu Xuebao*, vol. 2. (安志敏:《略论甘肃东乡自治县唐汪川的陶器》,《考古学报》,1957年第2期。)
- An, Z.M., 1996. Tarim pen di ji qi zhou wei de qing tong wen hua yi cun. *Kaogu*, vol. 12, pp. 70-77. (安志敏:《塔里木盆地及其周围的青铜文化遗存》,《考古》,1996年第12期。)
- An, Z.M., Wu, E.Z., 1957. Shanxi Zhaoyi Dali Shayuan di qu de shi qi shi dai yi cun. *Kaogu Xuebao*, vol. 3, pp. 1-12. (安志敏, 吴汝祚:《陕西朝邑大荔沙苑地区的石器时代遗存》,《考古学报》,1957年第3期。)
- An, Z.M., 1998. Cultural complexes of the Bronze Age in the Tarim Basin and surrounding areas. In Mair, H.V. (eds.), *The Bronze Age and Iron Age people of Eastern Central Asia*. Monograph 26, vol. 2. Washington: Institute for the Study of Man, pp. 45-62.
- Akber, N., 2012. Tulufan Yanghai mu di chu tu de ma xian yu ma biao [Horse checkpiece and Bridle bits which were unearthed in cemetery of Yanghai, Turfan]. *Tulufan xue yan jiu*, vol. 1, pp. 70-75. (阿克拜尔·尼牙孜:《吐鲁番洋海墓地出土的马衔与马镡》,《吐鲁番学研究》,2012年第1期。)
- Akber, N., 2012. Tulufan pen di Yanghai mu di chu tu de ma ju ji xiang guan wen ti yan jiu [On the Horsegears Unearthed in Yanghai Necroples, Turfan and Related Issues]. *Xinjiang da xue xue bao (zhe xue-ren wen she hui ke xue ban)* [Journal of Xinjiang University (Philosophy, Humanities & Social Science)], vol. 40, Nr. 3, pp. 76-79. (阿克拜尔·尼牙孜:《吐鲁番盆地洋海墓地出土的马具及相关问题研究》,《新疆大学学报(哲学·人文社会科学版)》,2012年第40卷第3期。)
- Barber, E. J. W., 1998. Bronze Age cloth and clothing of the Tarim Basin: the Krörän (Loulan) and Qumul (Hami) evidence. In: Mair, V. H. (Ed.), *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia*. University of Pennsylvania Museum and Archaeology, Philadelphia, pp. 647-655.
- Baumer, C., 2011. The Ayala Mazar-Xiaohe Culture: New Archaeological Discoveries in the Taklamakan Desert. *China. Asian Affairs*, vol. 42, pp. 1, 49-69. doi: 10.1080/03068374.2011.539323.
- Bayingolin Mongol Autonomous Cultural Relics Institute, 1992. Qiemo xian Zaghunluq gu mu

- zang 1989 nian qing li jian bao. *Xinjiang Wenwu*, vol. 2, pp. 1-14. (巴音格楞蒙古自治州文管所:《且末县扎洪鲁克古墓葬 1989 年清理简报》,《新疆文物》,1992 年第 2 期。)
- Beck, U., Wagner, M., Li, X., Durkin-Meisterernst, D., Tarasov P.E., 2014. The invention of trousers and its likely affiliation with horseback riding and mobility: A case study of late 2nd millennium BC finds from Turfan in eastern Central Asia. *Quaternary International*, vol. 348, pp. 224-235.
- Betts, A., 2019. Xinjiang in Prehistory. In: Betts, A.V.G., Vicziany, M., Jia, P., Castro, A.A.D. eds, 2019. *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads*. Archaeopress.
- Betts, A., Jia, W.M., Abuduresule, I., 2018. A new hypothesis for early Bronze Age cultural diversity in Xinjiang, China. *Archaeological Research in Asia*, vol. 17, pp. 204-213.
- Betts, A., Jia, W.M., Dodson, J., 2014. The origins of wheat in China and potential pathways for its introduction: A Review. *Quaternary International*, vol. 348, pp. 158-168.
- Bergman, F., 1939. *Archaeological Researches in Sinkiang, especially the Lop-Nor Region*. Bokförlags Aktiebolaget Thule: Stokhome.
- Betts, A., Jia, P., Abuduresule, I., 2019. A new hypothesis for early Bronze Age cultural diversity in Xinjiang, China. *Archaeological Research in Asia*, vol. 17, pp. 204-213.
- Betts, A., 2019. Xinjiang in Prehistory. In: Betts, A.V.G., Vicziany, M., Jia, P., Castro A.A.D. (eds), 2019. *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads*. Archaeopress Archaeology, pp. 9-18.
- Berger, E., Wei, D., Zhu, H., 2014. Caries calibration methods in a Bronze Age Inner Asian skeletal sample. *Society for American Archaeology*. Knoxville, TN.
- Chan, A., Cong, D.X., 2020. Results of Field Research on Ancient Stonework in the River Valleys of Bortala and Ili in Western Tian Sha (Xinjiang, China). *Asian Perspectives*, vol. 59, Nr. 2, pp. 385-420.
- Chang, X.E., 1985. Balikun Nanwan mu di 66 hao mu qing li jian bao. *Xinjiang Wenwu*, vol. 1. (常喜恩:《巴里坤南湾墓地 66 号墓清理简报》,《新疆文物》,1985 年第 1 期。)
- Charmet, G., 2011. Wheat domestication: lessons for the future. *C. R. Biol*, vol. 334, pp. 212-220.
- Chen, A.D., 2012. Lue lun Qiemu'erqieke lei xing shi ren te zheng ji qi we hua yuan yuan [The Characteristic and the Origin of the Qiemu'erqiele Stone Stele]. *Tulufan xue yan jiu*, vol. 2,

- pp. 105-112. (陈爱东:《略论切木尔切克类型石人特征及其文化渊源》,《吐鲁番学研究》, 2012年第2期。)
- Chen, F.H., Yu, Z.C., Yang, M.L., Ito, E., Wang, S.M., Madsen, D.B., Huang, X.Z., Zhao, Y., Sato, T., Birks, H.J.B., Boomer, I., Chen, J.H., An, C.B., Wünnemann, B., 2008. Holocene moisture evolution in arid central Asia and its out-of-phase relationship with Asian monsoon history. *Quaternary Science Reviews*, vol. 27, pp.351-364.
- Chen, G., 1982. Lue lun Xinjiang de cai tao. *Xinjiang Wenwu*, vol. 2. (陈戈:《略论新疆的彩陶》,《新疆文物》, 1982年第2期。)
- 1985. Guan yu Xinjiang yuan gu wen hua de ji ge wen ti. *Xinjiang Wenwu*, vol. 1, pp. 27-38. (陈戈:《关于新疆远古文化的几个问题》,《新疆文物》, 1985年第1期。)
- 1987. Guan yu Xinjiang xin shi qi shi dai wen hua de xin ren shi. *Kaogu*, vol. 4. (陈戈:《关于新疆新石器时代文化的新认识》,《考古》, 1987年第4期。)
- 1990. Guan yu Xinjiang di qu de qing tong shi dai he zao qi tie qi shi dai wen hua de ren shi. *Kaogu*, vol. 4. (陈戈:《关于新疆地区的青铜时代和早期铁器时代文化》,《考古》, 1990年第4期。)
- 1991. Guan yu Yanbulake mu zang de tao lun. *Xinjiang Wenwu*, vol. 1. (陈戈:《关于焉不拉克墓葬的讨论》,《新疆文物》, 1991年第1期。)
- 1991. Lue lun Yanbulake wen hua [The Introduction of Yanbulake Culture in Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1. (陈戈:《略论焉不拉克文化》,《西域研究》, 1991年第1期。)
- 1993. Xinjiang chawuhugoukou wen hua lue lun. *Kaogu yu Wenwu*, vol. 5. (陈戈:《新疆察吾乎沟口文化略论》,《考古与文物》, 1993年第5期。)
- 1994. Xinjiang shi qian wen hua. *Xibei Minzu Yanjiu*, vol. 2. (陈戈:《新疆史前文化》,《西北民族研究》, 1994年第2期。)
- 1994. Xinjiang yuan gu wen hua chu lun. *Zhongya Xuekan*, vol. 4. (陈戈:《新疆远古文化初论》,《中亚学刊》, 1994年第4期。)
- 1999. Chawuhu wen hua bu shuo. *Xinjiang Wenwu*, vol. 1. (陈戈:《察吾乎文化补说》,《新疆文物》, 1999年第1期。)
- 2001. Chawuhugoukou wen hua de lei xing hua fen he fen qi wen ti [The Types and Chronology of the Cha Wu Hu Gou Kou Culture]. *Kaogu yu Wenwu*, vol. 5, pp. 30-48. (陈戈:《察吾乎沟口文化的类型划分和分期问题》,《考古与文物》, 2001年第5期。)

- 2001. Zai lun Chawuhugoukou wen hua. *Tulufan xue yan jiu*, vol. 2, pp. 1-14. (陈戈:《再论察吾乎沟口文化》,《吐鲁番学研究》,2001年第2期。)
- 2001. Xinjiang shi qian shi qi you yi zhong kao gu xue wen hua – su bei xi wen hua shi xi. In: Su, B., 2001. *Su Bingqi yu dang dai zhong guo kao gu xue*. Kexue Press. (陈戈:《新疆史前时期又一种考古学文化—苏贝希文化试析》,原载宿白主编:《苏秉琦玉当代中国考古学》,科学出版社2001年版。)
- 2002. Subeixi wen hua de yuan liu ji yu qi ta wen hua de guan xi. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 2, pp. 11-18. (陈戈:《苏贝希文化的源流及与其他文化的关系》,《西域研究》,2002年第2期。)
- 2017. Xinjiang yuan gu wen hu chu lun [Preliminary Research on Ancient Xinjiang Culture]. In Chen, G., 2017. *Xinjiang kao gu lun wen ji [Collected Papers on Xinjiang Archaeology]*, Beijing: Shangwu Press. (陈戈:《新疆远古文化初论》,见陈戈:《新疆考古论文集》,商务印书馆2017年。)
- Chen, G., Zhang Y.Z., 1999, Shi ji zhi jiao Xinjiang kao gu xue de hui gu yu zhan wang. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1. (陈戈, 张玉忠:《世纪之交新疆考古学的回顾与展望》,《西域研究》,1999年第1期。)
- Chen, G.K., 2017. Metallurgical community of Xichengyi-Qijia cultures: early metal-making specialists in the Hexi Corridor and related issues. *Archaeology and Cultural Relics*, vol. 5, pp. 37-44.
- Chen, J.L., Mei, J.J., Wang, J.X., Yahepujiang, 2013. Xinjiang Balikun Dongheigou yi zhi chu tu tie qi yan jiu. *Wenwu*, vol. 10, pp. 77-84. (陈建立, 梅建军, 王建新, 亚合浦江:《新疆巴里坤东黑沟遗址出土铁器研究》,《文物》,2013年第10期。)
- Chen, K.T. & Hiebert, F.T., 1995. The Late Prehistory of Xinjiang in Relation to its Neighbors. *Journal of World History*, vol. 9, Nr. 2, pp. 243-300.
- Chen, L., 2003. Xinjiang Chabucha'er xian Suodunbulake mu di chu tu ren tou gu yan jiu. *Kaogu*, vol. 7, pp. 79-94. (陈靓:《新疆察布查尔县索墩布拉克墓地出土人头骨研究》,《考古》,2003年第7期。)
- Chen, L., Wang, Y., 2005. Xinjiang Baicheng Kizil mu di ren gu de ren zhong xue yan jiu [Racial Type of Ancient Human Skulls from Kizil Cemetery, Baicheng County, Xinjiang]. *Renlei Xuebao [Acta Anthropologica Sinica]*, vol. 24, Nr. 3, pp. 188-197. (陈靓, 汪洋:《新疆拜城克孜尔墓地人骨的人种学研究》,《人类学学报》,2005年第24卷第3期。)

- Cheng, X.W., 2014. *Xinjiang Balikun Xigou yi zhi 1 hao mu ji chu tu jin shi pin yan jiu*. Master Thesis of Northwest University. (程晓伟:《新疆巴里坤西沟遗址 1 号墓及出土金饰品研究》, 西北大学 2014 年硕士学位论文。)
- Chen, Y. S., Xie, Y. L., Xiong, Y. F., Jia, Y. Y., Huang, X. J., 2000. Zaghunluq mu qun chu tu mao zhi pin shang lan se ran liao de fen xi jian ding yan jiu. *Shanghai bo wu guan ji kan*, pp. 677-683. (陈元生, 解玉林, 熊樱菲, 贾应逸, 黄小江:《扎滚鲁克墓群出土毛织品上蓝色染料的分析鉴定研究》,《上海博物馆集刊》, 2000 年。)
- Chen, Y.Z., Zhao, J., 2018. Turfan Shengjindian mu di 15 hao mu zang chu tu mao zhi pin de xiu fu yu yan jiu [Protection and restoration of wool fabrics unearthed from tomb Nr. 15 Shengjindian cemetery in Turfan]. *Tulufan xue yan jiu*, vol. 2, pp. 103-110. (陈玉珍, 赵静:《吐鲁番胜金店 15 号墓葬出土毛织品的修复与研究》,《吐鲁番学研究》, 2018 年第 2 期。)
- Cheng, Q., Wang, B., Guo, J. L., 2011. Xinjiang Qiemo Zaghunluq mu di chu tu bo li bei yan jiu. *Wenwu*, vol. 7, 88-92. (成倩, 王博, 郭金龙:《新疆且末扎滚鲁克墓地出土玻璃杯研究》,《文物》, 2011 年第 7 期。)
- Cong, D.X., 2019. Tianshan as a Bridge: New Studies of Bronze Age Archaeology in the Western Tianshan, Xinjiang, China. In: Betts, A., Vicziany, M., Jia, W.M., Di Castro, A.A. (eds). *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads*. Archaeopress Publishing Ltd.
- Cong, D.X., Jia, W.M., 2014. *Qiemuer'qieke mu di ji qi zao qi yi cun de chu bu fen xi*. In: The border research center of Jilin University (eds), 2014. *Qing zhu Zhang Zhongpei xian sheng ba shi sui lun wen ji*. Kexue Press. (丛德新, 贾伟明:《切木尔切克墓地及其早期遗存的初步分析》, 见吉林大学边疆考古研究中心(编):《庆祝张忠培先生八十岁论文集》, 科学出版社 2014 年)
- Cong, D.X., Jia, W.M., Betts, A., Jia, X.B., Doumani, P., 2017. Adunqiaolu: xi Tianshan di qu qing tong shi dai yi cun xin lei xing [Adoqolo: New type of Bronze Age Remains in the Western Tianshan Mountains]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 4, pp. 15-27. (丛德新, 贾伟明, 【澳】艾莉森·贝茨, 贾笑冰, 【澳】葆拉·都曼尼:《阿敦乔鲁: 西天山地区青铜时代遗存新类型》,《西域研究》, 2017 年第 4 期。)
- Cong, D.X., Jia, W.M., 2019. Shi qian sheng ye mo shi de huan jing kao gu xue guan cha—yi Wenquan xian Adunqiaolu yi zhi wei li [Environmental archaeology on prehistoric

- subsistence economies: A case study of the Adunqiaolu site in Xinjiang, China]. *Di si ji yan jiu [Quaternary Sciences]*, vol., 39, Nr. 1, pp. 218-227. (丛德新, 贾伟明:《史前生业模式的环境考古学观察—以新疆温泉阿敦乔鲁遗址为例》,《第四纪研究》,2019年第39卷第1期。)
- Cui, Y.Q., Duan, R.H., Zhu, H., Li, W., Zhou, H. 2002. Tulufan gu mu zang ren gu yi hai de xian li ti DNA fen xi [Analysis of Mitochondrial DNA from the ancient tombs of Turfan]. *Bianjiang Kaogu yan jiu [Research of China's Frontier Archaeology]*, vol. 1, pp. 352-356. (崔银秋, 段然慧, 朱泓, 李惟, 周慧:《吐鲁番古墓葬人骨遗骸的线粒体DNA分析》,《边疆考古研究》,2002年第1辑。)
- Cui, Y.Q., Duan, R.H., Zhou, H., Zhu, H., 2002. Xinjiang gu dai ju min de yi chuan jie gou fen xi [Analysis of Genetical Structure of the Ancient Xinjiang Population]. *Gao deng xue xiao hua xue xue bao [Chemical Journal of Chinese Universities]*, vol. 23, Nr. 12, pp. 2278-2280. (崔银秋, 段然慧, 周慧, 朱泓:《新疆古代居民的遗传结构分析》,《高等学校化学学报》,2002年第23期。)
- Cui, Y.Q., Gao, S.Z., Xie, C. Z., Zhang, Q. C., Wang, H. J., Zhu, H., Zhou, H., 2009. Analysis of the matrilineal genetic structure of population in the early Iron Age from Tarim BASin, Xinjiang, China. *Chinese Science Bulletin*, vol. 54, Nr. 21, pp. 3916-3923.
- Dai, L.Z., 1989. Xinjiang Mulei xian chu tu de shi zhi nong ju. *Nongye Kaogu*, vol. 2, pp. 226-227. (戴良佐:《新疆木垒县出土的石制农具》,《农业考古》,1989年第2期。)
- Dai, Q.Y., 2015. Xinjiang Chawuhugoukou mu di qun ren kou fen xi—yi si hao mu di wei li. *Wen hua yi chan yu gong zhong kao gu*, vol. 1, pp. 45-56. (戴青云:《新疆察吾乎沟口墓地群人口分析—以四号墓地为例》,《文化遗产与公众考古》,2015年第一辑。)
- Dai, Y.X., Sun, J.X., 1983. Shanxi Shenmu xian chu tu Xiongnu wenwu. *Wenwu*, vol. 12, pp. 23-30. (戴应新, 孙嘉祥:《陕西神木县出土匈奴文物》,《文物》,1983年第12期。)
- Dani, A.H., Masson, V.M. (eds), 1992. *History of Civilization of Central Asia, The dawn of civilizations: earliest times to 700*. United Nations Educations.
- Debenath Andre & Dibble L. Harold, 1994. *Handbook of Paleolithic typology*. University of Pennsylvania Press.
- Debaine, C., 1988. Archaeology of Xinjiang from the origin to the Han dynasty: First part. *Paléorient*, vol. 14, Nr.1, pp. 5-29.
- Dergachev, V., 1989. Neolithic and Bronze Age cultural communities of the steppe zone of the

- USSR. *Antiquity*, vol. 63, pp. 793-802.
- Derevianko, A.P., Gao, X., Olsen, J.W., Rybin, E.P. 2012. The Paleolithic of Dzungaria (Xinjiang, Northwest China) based on materials from the Luotuoshi Site. *Archaeology Ethnology & Anthropology of Eurasian*, vol. 40, Nr. 4, pp. 2-18.
- Ding, J., 2011. Lun Ili he gu Suodunbulake wen hua [Analyzing Suo Dun Bu La Ke Culture in Yili Valley]. *Yili shi fan xue yuan xue bao (Shehui kexue ban) [Journal of Yili Normal University (Social Science Edition)]*, vol. 3, pp. 30-39. (丁杰:《论伊犁河谷索墩布拉克文化》,《伊犁师范学院学报(社会科学版)》,2011年第3期。)
- Domorös M., Peng G., 1988. *The Climate of China*. Springer, Berlin.
- Doumani, P., Frachetti, M., Beardmore, R., Schmaus, T., Spengler, R., Mar'yashev, A., 2015. Burial ritual, agriculture, and craft production among Bronze Age pastoralists at Tasbas (Kazakhstan). *Archaeological Research in Asia*, vol. 1, pp. 17-32.
- Doumani, P., Jia, W.M., Betts, A., Cong, D.X., 2019. Pots and potters of the Bronze Age of north-west Xinjiang. *Antiquity*, vol. 93, Nr. 371, pp. 1231-1248.
- Gao, S.Z., Zhang, Y., Wie D., Li, H.J., Zhao, Y.B., Cui, Y.Q., Zhou, H., 2015. Ancient DNA Reveals a Migration of the Ancient Di-Qiang Populations into Xinjiang as early as the Early Bronze Age. *American Journal of Physical Anthropology*, vol. 157, pp. 71-80.
- Dodson, J.R., Li, X.Q., Zhou, X.Y., Zhao, K.L., Sun, N., Atahan, P., 2013. Origin and spread of wheat in China. *Quaternary Science Reviews*, vol. 72, pp. 108-111.
- Eng, J. T., Hrivnyak, M., 2020. A comparative perspective on childhood stress and survivorship among Inner Asian populations of the Iron Age. *American journal of Physical Anthropology*, 111 River st, Hoboken 07030-5774, NJ USA: Willey, vol. 171.
- Festa, M., 2017. Prehistoric Cultures in Xinjiang: Retrospect and Prospect. *Athens Journal of History*, vol. 3, Nr. 2, pp. 137-169.
- Flad, R., Li, S.C., Wu, X.H., Zhao, Z.J., 2010. Early wheat in China: Results from new studies at Donghuishan in the Hexi Corridor. *The Holocene*, vol. 20, Nr. 6, pp. 955-965.
- Frachetti, M.D., 2008. *Pastoralist Landscape and Social Interaction in Bronze Age Eurasia*. Berkeley, University of California Press.
- Frachetti, M.D., 2012. *Multiregional emergence of mobile pastoralism and nonuniform institutional complexity across Eurasia*. *Current Anthropology*, vol. 53, Nr. 1, pp. 2-38.
- Frachetti, M.D., 2013. Bronze Age Pastoralism and Differentiated Landscape along the Inner

- Asian Mountain Corridor. In Abraham, S.A., Gullapalli, P., Raczek, T.P., Rizvi, U.Z. (eds.), 2013. *Connections and Complexity: New Approaches to the Archaeology of South Asia*. Walnut Creek, California, pp. 279-298.
- Fu, C., Wang, B. 2009. Urumqi Saensayi mu di chu tu ren ya chi ji gu sunshang de yan jiu [The study of Teeth and Trauma of Ancient Human Skeletons from Saensayi Cemetery, Urumchi, Xinjiang]. *Tulufan xue yan jiu*, vol. 1, pp. 5-20. (付昶, 王博:《新疆乌鲁木齐萨恩萨依墓地出土人牙齿及骨损伤的研究》,《吐鲁番学研究》,2009年第1期。)
- Fu, C., Ruan, Q.R., Hu, X.J., Wang, B., 2010. Urumqi Saensayi mu di chu tu tou gu de ren zhong xue yan jiu [Racial Types of Ancient Human Skulls from the Saensayi Cemetery, Urumchi, Xinjiang]. *Renlei Xuebao [Acta Anthropologica Sinica]*, vol. 29, Nr.4, pp. 405-415. (付昶, 阮秋荣, 胡兴军, 王博:《乌鲁木齐萨恩萨依墓地出土头骨的人种学研究》,《人类学报》,2010年第29卷第4期。)
- Gan, F.X., Li, Q.H., Gu, D.H., Zhang, P., Cheng, H.S., Zhang, B., Ma, B., 2003. Xinjiang Baicheng he Tacheng chu tu de zao qi bo li zhu de yan jiu [Study on early glass beads unearthed from Baicheng and Tacheng of Xinjiang]. *Gui sun yan xue bao [Journal of the Chinese Ceramic Society]*, vol. 31, Nr. 7, pp. 663-668. (干福熹, 李青会, 顾东红, 张平, 承焕生, 张斌, 马波:《新疆拜城和塔城出土的早期玻璃珠的研究》,《硅酸盐学报》,2003年第31卷第7期。)
- Gan, F.X., Cheng, H.S., Li, Q.H., 2006. Origin of Chinese ancient glasses—study on the earliest Chinese ancient glasses. *Science in China Series E: Technological Sciences*, vol. 49, Nr. 6, pp. 701-713.
- Gan, F.X., 2009. Bo li he yu shi zhi lu—jian lun xian qin qian gui suan yan zhi wen wu de zhong wai wen hua he ji shu jiao liu [The Glass and Jade Road—The Cultural and Technical Exchange of Silicate Based Artifacts with Outside China before Pre-Qin Period]. *Guangxi min zu da xue xue bao (zi ran ke xue ban) [Journal of Guangxi University for Nationalities (Natural Science Edition)]*, vol. 15, Nr. 4, pp. 6-17. (干福熹:《玻璃和玉石之路—兼论先秦前硅酸盐质文物的中、外文化和技术交流》,《广西民族大学学报(自然科学版)》,2009年第15卷第4期。)
- Gao, X., 2013. Paleolithic Cultures in China Uniqueness and Divergence. *Current Anthropology*, Vol. 54, Nr. S8. Pp. S358-S370.
- Gao, X., Norton, C.J., 2002. A critique of the Chinese 'Middle Palaeolithic'. *Antiquity*, vol. 76,

pp. 397-412.

- Ge, B.W., Wang, H.J., Xie, C.Z., Cui, Y.Q., Zhu, H., Zhou, H., 2008. Xinjiang Zaghunluq gu dai ren qun de xian li ti DNA fen xi [Mitochondrial DNA Analysis of Zhagunluke Ancient Population of Xinjiang in China]. *Jilin da xue xue bao (li xue ban) [Journal of Jilin University (Science Edition)]*, vol. 46, Nr. 6, 1206-1210. (葛斌文, 王海晶, 谢承志, 崔银秋, 朱泓, 周慧:《新疆扎滚鲁克古代人群的线粒体 DNA 分析》,《吉林大学学报(理学版)》,2008 年第 46 卷第 6 期。)
- Gong, Y.W., Yang, Y.M., Ferguson, D.K., Tao, D.W., Li, W.Y., Wang, C.S., Lv, E.G., Jiang, H.E., 2010. Investigation of ancient noodles, cakes, and millet at the Subeixi Site, Xinjiang, China. *Journal of Archaeological Science*, vol. 38, Nr. 7, pp. 470-479.
- Good, I., 1998. Bronze Age cloth and clothing of the Tarim Basin: the Chärchän evidence. In: Mair, V. H. (ed.), *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia. University of Pennsylvania Museum and Archaeology*. Philadelphia, pp. 656-668.
- Görsdorf, J., Parzinger, H., Nagler, A., 2004. ¹⁴C Dating of the Siberian Steppe Zone from Bronze Age to Scythian Time, in Scott, E.M., Alekseev, A.Y., Zaitseva, G. (eds), 2004. Impact of the Environment of Human Migration in Eurasian. *Dordrecht*, pp. 83-90.
- Gresky, J., Wu, X.H., Wagner, M., Schultz, T.S., Schultz, M., 2008. Alltagsstress in Liushui, Krankheitsbilder des Bewegungsapparates im Bronzezeitlichen Westchina. *Eurasia Antiquae*, Band 14.
- Gersky, J., Wagner, M., Schmidet-Schultz, T.H., Schwarz, L., Wu, X.H., Aisha, A., Tarasov, P.E., Schultz, M., 2016. “You must keep going”—Musculoskeletal system stress indicators of prehistoric mobile pastoralists in Western China. *Quaternary International*, vol. 405, pp. 186-199.
- Guo, J.G., 2002. Tashikurgan Xiabandi shui ku qu wen wu diao cha. *Xinjiang Wenwu*, vol. 3 & 4. (郭建国:《塔什库尔干下坂地水库区文物调查》,《新疆文物》,2002 年第 3&4 期。)
- Guo, W., 2003. *Fu zhong qian kun—qing tong Fu yu cao yuan wen ming*. Shanghai she hui ke xue yuan Press. (郭物:《鍍中乾坤: 欧亚草原与青铜鍍》,上海社会科学院出版社 2003 年)
- Guo, W., 2012. *Xinjiang Shi qian wan qi she hui de Kaoguxue Yan jiu [Archaeological Research on the Societies of the Late Prehistoric Xinjiang]*. Shanghai Guji Press. (郭物:《新疆史前晚期社会的考古学研究》,上海古籍出版社 2012 年。)

- Guo, Y., Luo, J., Xie, S.Y., Wu, X.H., Fuller, B.T., 2019. Isotopic reconstruction of human diet in the Ji'ezankale site, Xinjiang Uyghur Autonomous Region, China. *International Journal of Osteoarchaeology*, vol. 30, Nr. 1, pp. 65-72.
- Gurianov, V., Adamov, D., Tagankin, V., Kull, L., 2015. Clarification of Y-DNA Haplogroup Q1b Phylogenetic Structure Based on Y-Chromosome Full Sequencing. *The Russian Journal of Genetic Genealogy*, vol. 7, Nr. 1, pp. 90-105.
- Hami wen wu zhi bian zhuan zu, 1993. *Hami Wen Wu Zhi*. Xinjiang Renmin Press. (哈密文物志编纂组:《哈密文物志》, 新疆人民出版社 1993 年。)
- Hami di qu wen guan suo, 1998. Hami Huangtian Miaoergou diao cha. *Xinjiang Wenwu*, vol. 1, pp. 32-35. (哈密地区文管所:《哈密黄田庙尔沟墓地调查》,《新疆文物》, 1998 年第 1 期。)
- Han, J.Y., 2007. *Xinjiang de qing tong shi dai he zao qi tie qi shi dai wen hua*. Wenwu Press. (韩建业:《新疆的青铜时代和早期铁器时代文化》, 文物出版社 2007 年)
- Han, J.Y., 2017. Gong yuan qian 2 qian ji zhong hou ye ya zhou zhong bu di qu de huan di tao guan. *Kaogu*, vol. 9, pp. 82-93. (韩建业:《公元前 2 千纪中后叶亚洲中部地区的圜底陶罐》,《考古》, 2017 年第 9 期。)
- Han, J.Y., 2018. Zai lun si chou zhi lu qian de cai tao zhi lu [Further Discussion about the Painted Pottery Road before the Silk Road]. *Shou Cang*, vol. 1, pp. 20-32. (韩建业:《再论丝绸之路前的彩陶之路》,《收藏》, 2018 年第 1 期。)
- Han, K.X., 1986. Xinjiang Kong que he Gumugou mu di ren gu yan jiu [Anthropological Characters of the Human Skulls from Ancient Cemetery at Gumugou, Xinjiang]. *Kaogu Xuebao*, vol. 3, pp. 361-384. (韩康信:《新疆孔雀河古墓沟墓地人骨研究》,《考古学报》, 1986 年第 3 期。)
- Han, K.X., 1990. Xinjiang Hami Yanbulake gu mu ren gu zhong xi cheng fen yan jiu. *Kaogu Xuebao*, vol. 3. (韩康信:《新疆哈密焉不拉克古墓人骨种系成分研究》,《考古学报》, 1990 年第 3 期。)
- Han, K.X., 1993. *Ancient Race Study on the Silk Road*. Xinjiang Renmin Press. (韩康信:《丝绸之路古代居民种族人类学研究》, 新疆人民出版社 1993 年。)
- He, F., Adili, 2005. Xinjiang gu dai wen wu zhong de ku zhuang. *Xinjiang Wenwu*, 3, pp. 100-103. (何芳, 阿迪力:《新疆古代文物中的裤装》,《新疆文物》, 2005 年第 3 期。)
- He, H.Q., Xu, Y.Q., 2002. Xinjiang Hami Wupu gu dai ren lei lu gu ce liang de zhong zu yan jiu

- [Anthropological study of ancient human skulls from Wupu site, Hami, Xinjiang]. *Renleixue Xuebao [Acta Anthropologica Sinica]*, vol. 21, Nr.2, pp. 102-110. (何惠琴, 徐永庆:《新疆哈密五堡古代人类颅骨测量的种族研究》,《人类学学报》,2002年第21卷第2期。)
- He, H.Q., Jin, J.Z., Xu, C., Jiang, Y.R., Zhu, Q.Q., Tan, J.Z., Huang, W., Xu, Y.Q., Jin, L., Ren, D.M., 2003. 3200 nian qian Zhongguo Xinjiang Hami gu ren gu de mtDNA duo tai xing tan jiu [Study on mtDNA polymorphism of ancient human bone from Hami of Xinjiang, China 3200 BP]. *Renleixue Xuebao [Acta Anthropologica Sinica]*, vol. 22, Nr. 4, pp. 329-337. (何惠琴, 金建中, 许淳, 姜言睿, 朱琪泉, 谭婧泽, 黄微, 徐永庆, 金力, 任大明:《3200年前中国新疆哈密古人骨的 mtDNA 多态性研究》,《人类学学报》,2003年第22卷第4期。)
- He, J. J., Wang, B., 2016. Zaghunluq mao bian dai yan jiu. *Xibu Kaogu*, vol. 1. (贺婧婧, 王博:《扎滚鲁克毛编带研究》,《西部考古》,2016年第1期。)
- He, J.J., Wang, B., 2017. Xiaohe mao zhi ji de tan suo [A Study of Wool Looms in Xiaohe Cemetery]. *Zhongguo guo jia bo wu guan guan kan [Journal of National Museum of China]*, vol. 2, pp. 17-34. (贺婧婧, 王博:《小河毛织机的探索》,《中国国家博物馆馆刊》,2017年第2期。)
- He, L.T., Zhu, H., Li, W.Y., Abuduresule, Y., 2014. Xinjiang luo bu po Xiaohe mu di ju min de kou qiang jian kang yu yin shi [Oral Health and Diet of the Xiaohe Cemetery Populations in Lop Nur, Xinjiang Province]. *Renlei Xuebao [Acta Anthropologica Sinica]*, vol. 33 Nr. 4, pp. 497-509. (贺乐天, 朱泓, 李文瑛, 伊弟利斯·阿不都热苏勒:《新疆罗布泊小河墓地居民的口腔健康与饮食》,《人类学学报》,2014年第33卷第4期。)
- He, Z.L., 2005. *Xinjiang chu tu kong hou de yin yue kao gu xue yan jiu [Archaeological Research on the Konghoun Excavated in Xinjiang]*, Ph.D. thesis of Chinese National Academy of Arts. (贺志凌:《新疆出土箜篌的音乐考古学研究》,中国艺术研究院2005年博士学位论文。)
- He, Z.L., 2006. Xinjiang chu tu kong hou de xing zhi yuan yuan tan jiu [Shape Origin of the Relic Harp of Uigur Area]. *Zhongguo yin yue xue (ji kan) [Musicology in China]*, vol. 6: 43-51. (贺志凌:《新疆出土箜篌的形制渊源探究》,《中国音乐学(季刊)》,2006年第1期。)
- Hemphil, B.E. & Mallory, J.P., 2004. Horse-mounted invaders from the Russo-Kazakh steppe or

- agricultural colonists from western Central Asia? A craniometric investigation of the Bronze Age settlement of Xinjiang. *American Journal of Physical Anthropology: The Official Publication of the American Association of Physical Anthropologists*, vol. 124, Nr. 3, pp. 199-222.
- Herrmann, A., 1910. Die alten Seidenstrassen zwischen China and Syrien. Aus dem zweiten Buch: Zentralasien nach Ss-ma Ts'ei und den Annalen der Han-Dynastie. Georg August-Universität, Göttingen.
- Hong, C., Jiang, H.E., Yang, Y.M., Lv, E.G., Wang, C.S., 2010. Mei lian mian yi xi fu ce ding fa zai gu dai niu nai can liu wu jian ce zhong de ying yong [Application of enzyme-linked immunosorbent assay (ELISA) method in the detection of ancient milk residues]. *Sciences of Conservation and Archaeology*, vol. 23, Nr.1, pp. 25-28. (洪川, 蒋洪恩, 杨益民, 吕恩国, 王昌燧:《酶联免疫吸附测定法在古代牛奶残留物检测中的应用》,《文物保护与考古科学》,2011年第23卷第1期。)
- Hong, C., Jiang, H.E., Lv, E.G., Wu, Y.F., Guo, L.H., Xie, Y.M., Wang, C.S., Yang, Y.M., 2012. Identification of Milk Component in Ancient Food Residue by Proteomics. *PloS one*, vol. 7, Nr. 5: e37053, pp. 1-7.
- Høisæter, T.L., 2017. Politics and nomads: the emergence of the Silk Road exchange in the Tarim Basin region during late prehistory (2000-400 BCE). *Bulletin of the School of Oriental and African Studies*, vol. 80, Nr. 2, pp. 339-363.
- Hu, Q.Y., 1980. Shi lun Qijia wen hua de bu tong lei xing ji qi yuan liu. *Kaogu yu Wenwu*, vol. 3. (胡谦盈:《试论齐家文化的不同类型及其源流》,《考古与文物》,1980年第3期。)
- Huang, W.B., 1983. *Xinjiang kao gu fa jue bao gao (1957-1958) [An Archaeological Tour of Xinjiang (1957-1958)]*. Wenwu Press. (黄文弼:《新疆考古发掘报告》,文物出版社1983年。)
- Huang, W.W., Ouyang, Z.S., Rui, D.K., Mei, S.L., Lei, J.Q., 1988. Xinjiang Talimu pen di nan yuan xin fa xian de shi qi [New Discoveries of Stone Artifacts on the southern Edge of the Tarim Basin, Xinjiang]. *Renlei Xuebao*, vol. 04.002, pp. 295-301. (黄慰文, 欧阳志山, 瑞迪克, 梅莎莉, 雷加强:《新疆塔里木盆地南缘新发现的石器》,《人类学学报》,1988年第7卷第4期。)
- IACASS (Institute of Archaeology, Chinese Academy of Social Science), 1980. *Yinxu Fuhao mu*. Wenwu Press. (中国社会科学院考古研究所:《殷墟妇好墓》,文物出版社1980年。)

- 1980. Qinghai gu dai wen hua. *Kaogu Xuebao*, vol. 2. (中国社会科学院考古研究所:《青海古代文化》,《考古学报》,1980年第2期。)
- 1980. Fang she xing tan su ce ding nian dai bao gao (er) [Radiocarbon Dating Report, 2]. *Wenwu*, vol. 2. (中国社会科学院考古研究所:《放射性碳素测定年代报告(二)》,《文物》,1980年第2期。)
- 1981. Xinjiang Ke'ermuqi gu mu qun fa jue jian bao. *Wenwu*, vol. 1, pp. 23-32. (中国社会科学院考古研究所:《新疆克尔木齐古墓群发掘简报》,《文物》,1981年第1期。)
- 1981. Pamir gao yuan gu mu [Ancient tombs on the Pamir Plateau]. *Kaogu Xuebao*, vol. 2, pp. 199-212. (中国社会科学院考古研究所:《帕米尔高原古墓》,《考古学报》,1981年第2期。)
- 1988. Gansu Linxia Lianhuatai Xindian wen hua mu zang fa jue bao gao. *Wenwu*, vol. 3. (中国社会科学院考古研究所:《甘肃临夏莲花台辛店文化墓葬发掘报告》,《文物》,1988年第3期。)
- 1988. Fang she xing tan su ce ding nian dai bao gao (yi wu) [Radiocarbon Dating Report, 15]. *Kaogu*, vol. 7. (中国社会科学院考古研究所:《放射性碳素测定年代报告(一五)》,《考古》,1988年第7期。)
- 1989. Fang she xing tan su ce ding nian dai bao gao (yi liu) [Radiocarbon Dating Report 16]. *Kaogu*, vol. 7. (中国社会科学院考古研究所:《放射性碳素测定年代报告(一六)》,《考古》,1989年第7期。)
- 1990. Fangshexing tansu ceding niandai baogao (yi qi) [Radiocarbon Dating Report 17]. *Kaogu*, vol. 7. (中国社会科学院考古研究所:《放射性碳素测定年代报告(一七)》,《考古》,1990年第7期。)
- 1991. Fang she xing tan su ce ding nian dai bao gao (yi ba) [Radiocarbon Dating Report 18]. *Kaogu*, vol. 7. (中国社会科学院考古研究所:《放射性碳素测定年代报告(一八)》,《考古》,1991年第7期。)
- 1991. *Zhongguo kao gu xue zhong tan shi si nian dai shu ju ji: 1965-1991* [Radiocarbon Dates in Chinese Archaeology: 1965-1991]. Wenwu Press. (中国社会科学院考古研究所:《中国考古学中碳十四年代数据集:1961-1991》,文物出版社1991年。)
- 1996. Fang she xing tan su ce ding nian dai bao gao (er san). *Kaogu*, vol. 7. (中国社会科学院考古研究所:《放射性碳素测定年代报告(二三)》,《考古》,1996年第7期。)
- 1997. Fang she xing tan su ce ding nian dai bao gao (er si) [Radiocarbon Dating Report 24].

- Kaogu, 7, 614-628. (中国社会科学院考古研究所:《放射性碳素测定年代报告(二四)》,《考古》,1996年第7期。)
- 2003. *Zhongguo kao gu xue: Xia Shang juan [Chinese Archaeology: Xia and Shang]*. China Social Sciences Press, pp. 535-562. (中国社会科学院考古研究所:《中国考古学:夏商卷》,中国社会科学出版社2003年。)
- 2010. *Zhongguo kao gu xue: Xin shi qi shi dai juan [Chinese Archaeology: Neolithic]*. China Social Sciences Press, pp. 612-632. (中国社会科学院考古研究所:《中国考古学:新石器时代卷》,中国社会科学出版社2010年。)
- 2015. Xinjiang Tashkurgan Ji'ertzankale mu di fa jue bao gao. *Kaogu Xuebao*, vol. 2, pp. 229-252. (中国社会科学院考古研究所:《新疆塔什库尔干吉尔赞喀勒墓地发掘报告》,《考古学报》,2015年第2期。)
- IACASS (Institute of Archaeology, Chinese Academy of Social Sciences), Boertal meng gu zhi zhou bo wu guan, Wenquan xian wen wu ju, 2013. Xinjiang Wenquan xian Adunqiaolu yi zhi yu mu di. *Kaogu*, vol. 7, pp. 25-32. (中国社会科学院考古研究所,博尔塔拉蒙古自治州博物馆,温泉县文物局:《新疆温泉县阿敦乔鲁遗址与墓地》,《考古》,2013年第7期。)
- IACASS (Institute of Archaeology, Chinese Academy of Social Sciences), Xinjiang wei wu er zhi zhi qu Aksu di qu wen wu ju [Aksu Bureau of Cultural Relics of Xinjiang Uygur Autonomous Region], Baicheng xian wen wu ju [Bureau of Cultural Relics of Baicheng County], 2014. *Baicheng Duogang mu di [Duogang Cemetery of Baicheng County]*. Wenwu Press. (中国社会科学院考古研究所,新疆维吾尔自治区阿克苏地区文物局,拜城县文物局:《拜城多岗墓地》,文物出版社2014年。)
- IACASS (Institute of Archaeology, Chinese Academy of Social Sciences), Xinjiang Kashi di qu wen wu ju, Tashkurgan xian wen wu guan li suo, 2017. Xinjiang Tashkurgan Ji'ertzankale mu di 2014 nian fa jue bao gao. *Kaogu Xuebao*, vol. 4, pp. 545-572. (中国社会科学院考古研究所,新疆喀什地区文物局,塔什库尔干县文物管理所:《塔什库尔干吉尔赞喀勒墓地2014年发掘报告》,《考古学报》,2017年第4期。)
- Jia, W.M, 2013. Saensayi mu di dian fen li can liu wu fen xi. In: Xinjiang Wenwu Kaogu Yanjiusuo [Xinjiang Institute of Cultural Relics & Archaeology], 2013. *Xinjiang Saensayi mu di*. Wenwu Press, pp. 224-235. (贾伟明:《萨恩萨依墓地淀粉粒残留物分析报告》,见新疆文物考古研究所:《新疆萨恩萨依墓地》,文物出版社2013年,第224-235页。)

- Jia, W.M., 2018. Shi qian you mu sheng ye de kao gu xue guan cha [An Archaeological Survey on Prehistoric Nomadic Pastoralism: An Analysis of Prehistoric Settlements in Western Tianshan of Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 3, pp. 63-75. (贾伟明:《史前游牧生业的考古学观察》,《西域研究》,2018年第3期。)
- Jia, W.M., Betts, A.V.G., Wu, X.H., 2009. Prehistoric archaeology in the Zhunge'er (Junggar) Basin, Xinjiang, China. *Eurasian Prehistory*, vol. 6, Nr.1-2, pp. 167-198.
- Jia, W.M., Betts, A., 2010. A re-analysis of the Qiemu'erqieke (Shamirshak) cemeteries, Xinjiang, China. *Journal of Indo-European Studies*, vol.38, Nr. 3&4, pp. 1-43.
- Jia, W.M., Betts, A., Wu, X.H., 2011. New evidence for Bronze Age agricultural settlements in the Zhunge'er (Junggar) Basin, China. *Journal of Field Archaeology*, vol. 36, Nr. 4, pp. 269-280.
- Jia, W.M., Betts, A., Cong, D.X., Jia, X.B., Doumani, P.D., 2017. Adunqiaolu: new evidence for the Andronovo in Xinjiang, China. *Antiquity*, vol., 91, Nr. 357, pp. 621-639.
- Jia, W.M., Betts, A., Doumani, P.D., Cong, D.X., Jia, X.B., 2017. Bronze Age Hill Forts: New evidence for defensive sites in the western Tian Shan, China. *Archaeological Research in Asia*, vol. 15, pp. 70-81.
- Jia, W.M., Caspari, G., Betts, A., Mohamadi, B., Baiz, T., Cong, D.X., Sheng, H., Meng, Q., 2020. Seasonal movements of Bronze Age transhumant pastoralists in western Xinjiang. *PLoS ONE*, vol. 15, Nr. 11: e0240739, pp: 1-24.
- Jia, W.M., Chau, F., 2019. Early Wheat Cultivation and Plant use in Xinjiang Prehistory: New Evidence Based on Starch Analysis. In: Betts, A.V.G., Vicziany, M., Jia, W.M., Castro, A.A.D., 2019. *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads*. Archaeopress Archaeology.
- Jia, W.M., Wu, X.H., Betts, A., 2008. Zhunga'er di qu de shi qian kao gu yan jiu. *Xinjiang Wenwu*, vol. 1-2, pp. 35-54. (贾伟明, 巫新华, 艾丽森·拜茨:《准噶尔地区的史前考古研究》,《新疆文物》,2008年第1-2期。)
- Jia, Y.Y., Chen, Y.S., Xie, Y.L., Xiong, Y.F., Wang, X.L., 2008. Xinjiang Zaghunluq, Sampula mu qun chu tu (xi zhou zhi dong han) mao zhi pin de jian ding [The identification of wool textiles from Zaghunluke and Sampula tombs (from Western Zhou to Eastern Han) in Xinjiang]. *Wenwu bao hu yu Kao gu ke xue [Sciences of Conservation and Archaeology]*, vol. 20, 18-23. (贾应逸, 陈元生, 解玉林, 熊樱菲, 王秀兰:《新疆扎滚鲁克、山普拉

- 墓群出土（西周至东汉）毛织品的鉴定》，《文物保护与考古科学》，2008 年第 20 卷第 1 期。)
- Jiang, H.E., 2006. *Tulufan Yanghai mu di zhi wu yi cun yu gu Yanghai ren ji huan jing zhi jian de guan xi* [The Plant Remains of the Yanghai Tombs (2500 yrs B. P.), and Their Relationship to the Ancient Yanghai People and Environment]. Ph.D. thesis of the Institute of Botany, Chinese Academy of Science. (蒋洪恩:《吐鲁番洋海墓地植物遗存与古洋海人及环境之间的关系》，中国科学院研究生院 2006 年博士学位论文。)
- Jiang, H.E., 2008. *Xinjiang (Tulufan) ruo gan zhong yao yi zhi zhi wu kao gu xue yan jiu* [Archaeobotanical Studies in Several Important Sites of Xinjiang, China]. Post-doc Thesis of Institute of Botany, Chinese Academy of Science and Academia Turfanica. (蒋洪恩:《新疆（吐鲁番）若干重要遗址植物考古学研究》，中国科学院植物研究所博士后科研流动站/吐鲁番学研究院博士后科研工作站 2008 年博士后研究工作报告。)
- Jiang, H.E., Li, X., Zhao, Y.X., Ferguson, D.K., Hueber, F., Bera, S., Wang, Y.F., Zhao, L.C., Liu, C.J., Li, C.S., 2006. A new insight into Cannabis sativa (Cannabaceae) utilization from 2500-year-old Yanghai Tombs, Xinjiang, China. *Journal of Ethnopharmacology*, vol. 108, pp. 414-422.
- Jiang, H.E., Li, X., Li, C.S., 2007. Xinjiang Tulufan Yanghai mu di chu tu de liang shi zuo wu ji qi gu huan jing yi yi [Cereal remains from Yanghai Tomb in Turfan, Xinjiang and their palaeoenvironmental significance]. *Gu di li xue bao* [Journal of Palaeography], vol. 9, Nr. 5, pp. 551-558. (蒋洪恩, 李肖, 李承森:《新疆吐鲁番洋海墓地出土的粮食作物及其古环境意义》，《古地理学报》，2007 年第 9 卷第 5 期。)
- Jiang, H.E., Wu, Y., Wang, H.H., Ferguson, D.K., Li, C.S., 2013. Ancient plant use at the site of Yuergou, Xinjiang, China: implications from desiccated and charred plant remains. *Veget Hist Archaeobot*, vol. 22, pp. 129-140.
- Jiang, H.E., Zhang, Y.B., Lv, E.G., Wang, C.S., 2015. Archaeobotanical evidence of plant utilization in the ancient Turfan of Xinjiang, China: a case study at the Shengjindian cemetery. *Veget Hist Archaeobot*, vol. 24, pp. 165-177.
- Jing, M. 2012. *Xinjiang Shirenzigou yi zhi chu tu shi mo pan he shi mo bang de chu bu ke ji yan jiu*. Master Thesis of Northwest University. (井明:《新疆石人子沟遗址出土石磨盘和石磨棒的初步科技研究》，西北大学 2012 年硕士学位论文。)
- Kamberi, D., Mair, V. H., 1994. The Three Thousand Year Old Chärchän Man Preserved at

- Zaghunluq—Abstract Account of a Tomb Excavation in Chärchän County of Uyghuristan. *Sino-PLatonic Paper*, vol. 44, pp.1-15.
- Kohl, L.P., 1981. *The Bronze Age civilization of Central Asia: recent Societ discoveries*. New York: Me. E. Sharp.
- Kohl, L.P., 1984. *Central Asia: Paleolithic Beginnings to the Iron Age*. Editions Recherche sur les Civilisations.
- Kovalev, A.A., 2011. The great migration of the Chemurcheck people from France to the Altai in the early 3rd millennium BCE. *International Journal of Eurasian Studies*, pp. 1-50.
- Kovalev, A.A., Erdenebaatar, D., 2009. Discovery of new cultures of the Bronze Age in Mongolia according to the data obtained by the International Central Asian Archaeological Expedition. *Current archaeological research in Mongolia*, pp: 149-170.
- Kramell, A., Li, X., Csuk, R., 2014. Dyes of late Bronze Age textile clothes and accessories from the Yanghai archaeological site, Turfan, China: Determination of the fibers, color analysis and dating. *Quaternary International*, vol. 348, pp.214-223.
- Kuzmina, E.E., 1998. Cultural connections of the Tarim basin people and pastoralists of the Asian steppes in the Bronze Age. In Mair V.H. (eds), 1999. *The Bronze Age and Early Iron Age peoples of Eastern Central Asia*. Vol. 1, University of Pennsylvania Museum and Archaeology, Philadelphia, pp. 63-93.
- Li, C.C., Xu, G.L., Cao, H.Y., Wang, L., 2017. Shi lun Xinjiang Shanshan Yanghai mu di chu tu de zao qi tu pi [A Tentative Study on the Early Adobe in Shanshan Yanghai Cemetery in Xinjiang]. *Tulufan xue yan jiu*, vol. 2, pp. 104-114. (李春长, 徐桂玲, 曹洪勇, 王龙:《试论新疆鄯善洋海墓地出土的早期土坯》,《吐鲁番学研究》,2017年第2期。)
- Li, C.X., 2010. *Xiaohe mu di gu dai sheng wu yi hai de fen zi yi chuan xue yan jiu [Molecular Genetic Analysis of Ancient Remains from Xiaohe Cemetery]*. Ph.D. Thesis of Jilin University. (李春香:《小河墓地古代生物遗骸的分子遗传学研究》,吉林大学2010年博士学位论文。)
- Li, C.X., Li, H.J., Cui, Y.Q., Xie, C.Z., Cai, D.W., Li, W.Y., Mair, V.H., Xu, Z., Zhang, Q.C., Abuduresule, Y., Jin, L., Zhu, H., Zhou, H., 2010. Evidence that a West-East admixed population lived in the Tarim Basin as early as the early Bronze Age. *BMC Biology*, vol. 8: 15, pp. 1-12.
- Li, C.X., Lister, D.L., Li, H.J., Xu, Y., Cui, Y.Q., Bower, M.A., Jones, M.K., Zhou H.,2011.

- Ancient DNA analysis of desiccated wheat grains excavated from a Bronze Age cemetery in Xinjiang. *Journal of Archaeological Science*, vol. 38, pp. 115-119.
- Li, C.X., Ning, C., Hagelberg, E., Li, H.J., Zhao, Y.B., Li, W.Y., Abuduresule, I., Zhu, H., Zhou, H., 2015. Analysis of ancient human mitochondrial DNA from the Xiaohe cemetery: insights into prehistoric population movements in the Tarim Basin, China. *BMC genetics*, vol. 16, Nr. 1: 78, pp. 1-11.
- Li, H., Lotter, M.G., 2018. Lithic production strategies during the late Middle Pleistocene at Dali, Shaanxi Province, China: implications for understanding late archaic humans. *Archaeological and Anthropological Sciences* (2018). <https://doi.org/10.1007/s12520-018-0626-6>
- Li, J., 2014. *Xinjiang Xiaohe deng mu zang chu tu mao zhi pin de fen xi yan jiu [Research on Unearther Wool Fabric of Xiaohe and Other Cemeteries in Xinjiang]*. Master Thesis of Zhejiang Sci-Tech University. (李菁:《新疆小河等墓葬出土毛织品的分析研究》, 浙江理工大学 2014 年硕士学位论文。)
- Li, J., Pang, Z.H., Froehlich, K., Huang T.M., Kong, Y.L., Song, W.H., Yun, H.X., 2015. Paleo-environment from isotopes and hydrochemistry of groundwater in East Junggar Basin, Northwest China. *Journal of Hydrology*, vol. 529, pp. 650-661.
- Li, J.F., 1991. *Climate in Xinjiang*. China Meteorological Press. Beijing.
- Li, J.F., Abuduresule, I., Hueber, F.M., Li, W.Y., Hu, X.J., Li, Y.Z., Li, C.S., 2013. Buried in Sands: Environmental Analysis at the Archaeological Site of Xiaohe Cemetery, Xinjiang, China. *PolS one*, vol. 8 Nr. 7: e68957, pp. 1-9.
- Li, J.G., Lv, E.G., 2003. Wenquan xian Adunqiaolu yi cun de kao gu diao cha he yan jiu. *Xinjiang Wenwu*, vol. 1, pp. 20-27. (李金国, 吕恩国:《温泉县阿敦乔鲁遗存的考古调查和研究》,《新疆文物》, 2003 年第 1 期。)
- Li, J.J., Zhang, Y., Zhang, Y.B., Wang, L., Jiang, H.E., 2015. Xinjiang Turfan Shengjindian mu di xiao mai yi cun jia gong chu li fang shi chu tan [Preliminary studies on the method of wheat processing from Shengjindian Cemetery, Turfan in Xinjiang]. *Di si ji yan jiu [Quaternary Sciences]*, vol. 35 Nr. 1, pp. 218-228. (李晶静, 张勇, 张永兵, 王龙, 蒋洪恩:《新疆吐鲁番胜金店墓地小麦遗存加工处理方式初探》,《第四纪研究》, 2015 年第 35 卷第 1 期。)
- Li, S.C., 2009. Yanghai mu di xin jin shou jiao wen wu yin chu de wen ti [The issue of new

- archaeological evidence from Yanghai cemetery for Siwa Culture]. *Tulufan xue yan jiu*, vol. 1, pp. 1-4. (李水城:《洋海墓地新近收缴文物引出的问题》,《吐鲁番学研究》,2009年第1期。)
- Li, S.C., 2009. Tianshanbeilu mu di yi qi yi cun fen xi. In: School of Archaeology and Museology of Peking University & National Museum of China (eds), 2009. *Yu Weichao xian sheng ji nian wen ji*. Wenwu Press, pp. 193-202. (李水城:《天山北路墓地一期遗存分析》,见北京大学考古文博学院,中国国家博物院:《俞伟超先生纪念文集》,文物出版社2009年,第193-202页。)
- Li, W.Y., 1997. Hami Yanbulake mu di dan ren zang, he zang guan xi ji xiang guan wen ti tan tao. *Xinjiang Wenwu*, vol.2. (李文瑛:《哈密焉不拉克墓地单人葬、合葬关系及相关问题探讨》,《新疆文物》,1997年第2期。)
- Li, X., Dang, T., 1995. Zhunger'er pen di zhou yuan di qu chu tu tong qi chu tan [A preliminary study of copper and bronze artefacts unearthed from the surrounding regions of the Zhunger'er Basin]. *Xinjiang Wenwu*, vol. 1, pp. 40-51. (李肖,党彤:《准噶尔盆地周缘地区出土铜器初探》,《新疆文物》,1995年第1期。)
- Li, X., Wagner, M., Wu, X.H., Tarasov, P., Zhang, Y.B., Schmidt, A., Goslar, T., Gresky, J., 2013. Archaeological and palaeothological study on the third/second century BC grave from Turfan, China: Individual health history and regional implication. *Quaternary International*, vol. 290-291, pp. 335-343.
- Li, X.X., Zhong, Y.L., 2016. Xinjiang Balikun Dongheigou yi zhi shi zhu gao tai, shi wei jian zhu yu mu zang guan xi yan jiu [Research on the relationship among the stone platform, stone-enclosed buildings and tombs of Dongheigou site in Barkol County, Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1, pp. 66-72. (李雪欣,钟燕丽:《新疆巴里坤东黑沟遗址石筑高台、石围建筑与墓葬关系研究》,《西域研究》,2016年第1期。)
- Li, Y., 2021. Agriculture and palaeoeconomy im prehistoric Xinjiang, China (3000-200 BC). *Vegetation History and Archaeobotany*, vol. 30, Nr. 2, pp. 287-303.
- Li, Y., You, Y., Liu, Y.T., Xu, N., Wang, J.X., Ma, J., Ren, M., Xi, T.Y., 2016. Xinjiang Shirenzigou yu Xigou yi zhi chu tu ma gu ji zhui yi chang xian xiang yan jiu. *Kaogu*, vol. 1, pp. 108-120. (李悦,尤悦,刘一婷,徐诺,王建新,马健,任萌,习通源:《新疆石人子沟与西沟遗址出土马骨脊椎异常现象研究》,《考古》,2016年第1期。)
- Li, Y., Ma, J., Zhang, C.R., Liu, H., Zong, T.Y., Chen, T., Huang, Z.X., Ren, M., Xi, T.Y., Wang,

- J.X., Wen, R., 2020. Zhongguo gu dai mu ye she hui gu zhi pin de chu bu kao cha: yi Xinjiang Balikun Shirezigou yi zhi wei li [Worked bone production in ancient pastoral societies in China: A case study of the Shirezigou site in Balikun, Xinjiang]. *Di si ji yan jiu [Quaternary Sciences]*, vol. 40, Nr.2, pp. 331-342. (李悦, 马健, 张成睿, 刘欢, 宗天宇, 陈婷, 黄泽贤, 任萌, 习通源, 王建新, 温睿:《中国古代牧业社会骨制品的初步考察:以新疆巴里坤石人子沟遗址为例》,《第四纪研究》,2020年第40卷第2期。)
- Li, Y., Zhang, C.R., Taylor, W.T.T., Cheng, L., Flad, R.K., Boivin, N., Liu, H., You, Y., Wang, J.X., Ren, M., Xi, T.Y., Han, Y.F., Wen, R., Ma, J., 2020. Early evidence for mounted horseback riding in northwest China. *Proceedings of the National Academy of Science*, vol. 117, Nr.47, pp. 29569-29576.
- Li, Y.C., 1959. Xinjiang fa xian de cai tao. *Kaogu*, vol. 3. (李遇春:《新疆发现的彩陶》,《考古》,1959年第3期。)
- Li, Y.C., 1988. Boertala zi zhi zhou zhong yao gu cheng zhi he gu mu zang. *Wenbo*, vol. 5, pp. 20-25. (李遇春:《博尔塔拉自治州重要古城址和古墓葬》,《文博》,1988年第5期。)
- Li, Y.Q., 2020. Agriculture and palaeoeconomy in prehistoric Xinjiang, China (3000-200 BC). *Vegetation History and Archaeobotany*, pp. 1-17. <https://doi.org/10.1007/s00334-020-00774-2>
- Li, Z., 1962. Altai di qu shi ren mu diao cha jian bao. *Wenwu*, vol. 7-8, pp. 103-108. (李征:《阿勒泰地区石人墓调查简报》,《文物》,1962年第7-8期。)
- Li, Z.D., 2015. *Xinjiang Tulufan Shengjiandian mu di ren gu yan jiu [The Skeletal Research of Shengjiandian Cemeteries, Turfan, Xinjiang]*. Master Thesis of Jilin University. (李志丹:《新疆吐鲁番胜金店墓地人骨研究》,吉林大学2015年硕士学位论文)
- Liang, Y.M., Yang, Y.M., Abuduresule, I., Li, W.Y., Li, X.M., Wang, C.S., 2012. Xiaohe mu di chu tu de cao lou can liu wu de dan ban zhi zu xue fen xi [Proteomic analysis of residues in grass basket excavated from Xiaohe graveyard]. *Wenwu bao hu yu kao gu ke xue [Sciences of Conservation and Archaeology]*, vol. 24, Nr. 4, pp. 81-85. (梁一鸣, 杨益民, 伊弟利斯·阿不都热苏勒, 李文瑛, 李晓明, 王昌燧:《小河墓地出土草篓残留物的蛋白质组学分析》,《文物保护与考古科学》,2012年第24卷第4期。)
- Lin, M.C., 2002. Tu huo luo ren de qi yuan yu qian xi. *Xinjiang Wenwu*, vol. 3-4. (林梅村:《吐火罗人的起源与迁徙》,《新疆文物》,2002年第3-4期。)
- Lin, M.C., 2003. Tu huo luo ren de qi yuan yu qian xi [The origin and migration of the

- Tocharians]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 3, pp. 9-23. (林梅村:《吐火罗人的起源与迁徙》,《西域研究》,2003年第3期。)
- Lin, M.C., 2006. *Fifteen lectures on archaeology of the Silk Road*. Peking University Press. (林梅村:《丝绸之路考古十五讲》,北京大学出版社2006年。)
- Lin, Y.X., Rehren, T., Wang, H., Ren, X.Y., Ma, J., 2019. The beginning of faience in China: A review and new evidence. *Journal of Archaeological Science*, vol. 105, pp. 97-115.
- Ling, X., Chen, X., Wang, J.X., Chen, L., Ma, J., Ren, M., Xi, T.Y., 2013. Xinjiang Balikun Dongheigou yi zhi chu tu ren gu de tan dan tong wei su fen xi [Carbon and Nitrogen Isotopic Analysis of Human Bones Excavated from the Dongheigou Site, Ba Li-kun County, Xinjiang Autonomous Region]. *Renlei xuebao [Acta Anthropologica Sinica]*, vol. 32, Nr.2, pp. 219-225. (凌雪,陈曦,王建新,陈靛,马健,任萌,习通源:《新疆巴里坤东黑沟遗址出土人骨的碳氮同位素分析》,《人类学学报》,2013年第32卷第2期。)
- Liu, C., Liu, R.L., Zhou, P.C., Lv, C., Yang, C.X., Pollard, A.M., Hommel, P., Ma, J., Cui, J.F., Bray, P., Tong, J.Y., Rawson, J., 2020. Metallurgy at the Crossroads: New analyses of copper-based objects at Tianshanbeilu, eastern Xinjiang, China. *Acta Geologica Sinica-English Edition*, vol. 94, Nr.3, pp. 594-602.
- Liu, H., Tian, X.F., Zhang, Y.B., Wang, C.S., Jiang, H.E., 2013. The discovery of *Artemisia annua* L. in the Shengjindian cemetery, Xinjiang, China and its implications for early uses of traditional Chinese herbal medicine qinghao. *Journal of Ethnopharmacology*, vol. 146, pp. 278-286.
- Liu, H.L., 1992. Turfan Aidinghu Pankan chu tu de hu diao yang wen tong shi—shi lun Erdos shi qing tong qi zai xi yu de ying xiang. *Xinjiang Wenwu*, vol. 2, pp. 31-34. (柳洪亮:《吐鲁番艾丁湖潘坎出土的虎叼羊纹铜饰牌》,《新疆文物》,1992年第2期。)
- Liu, J. Guo, D. H. Zhou, Y., Wu, Z. Y., Li, W. Y., Zhao, F., Zheng, X. M., 2011. Identification of ancient textiles from Yingpan, Xinjiang, by multiple analytical techniques. *Journal of Archaeological Science*, vol. 38, pp. 1763-1770.
- Liu, J., Mouri, C., Laursen, R., Zhao, F., Zhou, Y., Li, W. Y., 2013. Characterization of dyes in ancient textiles from Yingpan, Xinjiang. *Journal of Archaeological Science*, vol. 40, pp. 4444-4449.
- Liu, R.J., 2009. Xinjiang Balikun Yuegongtai-Xiheigou yi zhi qun chu bu ren shi [Some viewpoints on Yuegongtai-Xiheigou sites, Balikun county, Xinjiang Autonomous Region].

- Xibei da xue xue bao (zhe xue she hui ke xue ban) [Journal of Northwest University (Philosophy and Social Sciences Edition)]*, vol. 39, Nr. 2. (刘瑞俊:《新疆巴里坤岳公台-西黑沟遗址群初步认识》,《西北大学学报(哲学社会科学版)》,2009年第39卷第2期。)
- Liu, X.T., 2000. Xinjiang di qu shi qian mu zang de chu bu yan jiu. *Shiqian yanjiu*, vol. 00. (刘学堂:《新疆地区史前墓葬的初步研究》,《史前研究》,2000年第00期。)
- Liu, X.T., 2011. Ili he shang you shi qian kao gu xin fa xian ji qi chu bu yan jiu [On the New Prehistoric Discoveries in Upper Ili Valley]. *Xinjiang Wenwu*, vol. 1, pp. 85-108. (刘学堂:《伊犁河上有史前考古新发现及其初步研究》,《新疆文物》,2011年第1期。)
- Liu, X.T., 2019. A report on Archaeological Findings in the Upper Yili Valley. In: Betts, A.V.G., Vicziany, M., Jia, P., Castro, A.A.D. eds, 2019. *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads*. Archaeopress.
- Liu, X.Y., Lister, D.L., Zhao, Z.J., Petrie, C.A., Zeng, X.S., Jones, P.J., Staff, R.A., Pokharia, A.K., Bates, J., Singh, R.N., Weber, S.A., Matuzeviciute, G.M., Dong, G.H., Li, H.M., Lv, H.L., Jiang, H.E., Wang, J.X., Ma, J., Tian, D., Jin, G.Y., Zhou, L.P., Wu, X.H., Jones, M., 2017. Journey to the east: Diverse routes and variable flowering times for wheat and barley en route to prehistoric China. *PLoS One*, vol. 12, Nr.11: e0187405, pp. 1-16.
- Liu, Z., Gao, Y., Zhang, Q.C., Zhu, H., 2006. Xinjiang Yanghai mu di qing tong shi dai ju min cuo he ji xing huan bing lv ji gou cheng fen xi [Mobility rate and composition analysis of malocclusion of resident in bronze age from Yanghai cemetery, Xinjiang]. *Jilin da xue xue bao (yi xue ban) [Journal of Jilin University (Medicine Edition)]*, vol. 32, vol. 1: 165-167. (刘政,高扬,张全超,朱泓:《新疆洋海墓地青铜时代居民错颌畸形患病率及构成分析》,《吉林大学学报(医学版)》,2006年第32卷第1期。)
- Long, J.F., 2013. *Shi lun Xinjiang Tianshan nan lu shi qian shi qi de shi gou mu zang*. Master Thesis of Minzu University of China. (龙静璠:《试论新疆天山南麓史前时期的石构墓葬》,中央民族大学2013年硕士学位论文。)
- Long, J.F., 2018. Xinjiang Tianshan nan lu shi qian zu qun shi gou mu zang de wen hua shu xing fen xi [Analysis of Cultural Attribute of Prehistoric Stone-constructed Tombs of Ethnic Groups in Southern Tianshan Mountains of Xinjiang]. *Zhongyang min zu da xue xue bao (zhe xue she hui ke xue ban) [Journal of Minzu University of China (Philosophy and Social Sciences Edition)]*, vol. 3, pp. 107-117. (龙静璠:《新疆天山南麓史前族群石构墓葬的文化属性分析》,《中央民族大学学报(哲学社会科学版)》,2018年第3期。)

- 化属性分析》，《中央民族大学学报（哲学社会科学版）》，2018年第45卷第3期。）
- Long, J.F., 2019. Xinjiang Tianshan nan lu qing tong shi dai mo qi zhi zao qi tie qi shi dai shi gou mu zang de lei xing ji yan bian. *Sichuan Wenwu [Sichuan Cultural Relics]*, vol.3, pp. 41-50. (龙静璠：《新疆天山南麓青铜时代末期至早期铁器时代石构墓葬的类型及演变》，《四川文物》，2019年第3期。)
- Long, T.W., Wagner, M., Demske, D., Leipe, C., Tarasov, P. E., 2017. Cannabis in Eurasia: origin of human use and Bronze Age trans-continental connections. *Vegetation History and Archaeobotany*, vol. 26, Nr. 2, pp. 245-258.
- Lu, L.P., 2017. Xinjiang chu tu shuang lian qi chu tan. *Beifang Wenwu*, vol. 2, pp. 31-37. (鲁礼鹏：《新疆出土双联器初探》，《北方文物》，2017年第2期。)
- Lu, Y.B., An, C.B., Wang, Z.L., Zhao, J.J., Wei, H.T., Tao, S.C., Huang, W., Ma, M.M., 2013. Mid-Holocene climate change in the eastern Xinjiang region indicated by the grain size and stable isotope record from Lake Barkol, northwest China. *Environmental earth science*, vol. 68, Nr. 8, pp. 2163-2169.
- Luo F., 2009. Tulufan Yanghai mu di chu tu de fei qu lai qi [Boomerangs Identified at Yanghai Cemetery in Xinjiang]. *Kaogu yu Wenwu*, vol. 3, pp. 83-89. (罗丰：《吐鲁番洋海墓地出土的飞去来器》，《考古与文物》，2009年第3期。)
- Luo, J., 2012. Xinjiang Hami Tianshanbeilu mu di chu tu ren wu wen shuang er cai tao guan de yi shu nei han [A Study to the Artistic Connotation of the Binaural Pattern Painted Pottery of the Northern Tianshan Cemetery in Hami, Xinjiang]. *Yi shu tan suo [Arts Exploration]*, vol. 26, Nr.2, pp. 015-018. (罗佳：《新疆哈密天山北路墓地出土人物纹双耳彩陶罐的艺术内涵》，《艺术内涵》，2012年第26卷第2期。)
- Lv, E.G., 1995. Lun Xinjiang kao gu xue yan jiu zhong cun zai de ji ge wen ti. *Xinjiang Wenwu*, vol. 2. (吕恩国：《论新疆考古学研究中存在的几个问题》，《新疆文物》，1995年第2期。)
- Lv, E.G., 1999. Chawuhu wen hua yan jiu. *Xinjiang Wenwu*, vol. 3&4, pp. 75-86. (吕恩国：《察吾乎文化研究》，《新疆文物》，1999年第3&4期。)
- Lv, E.G., Chang, X.E., Wang, B.H., 2001. Xinjiang qing tong shi dai kao gu wen hua qian lun. In: Su, B. (eds), 2001. *Su Bingqi yu dang dai zhong guo kao gu xue*. Kexue Press, pp. 179-184. (吕恩国，常喜恩，王炳华：《新疆青铜时代考古文化浅论》，见宿白（著）：《苏秉琦玉当代中国考古学》，科学出版社2001年。)

- Lv, E.G., Wang, L., Guo, W., 2017. Yanghai mu di fen qi yu duan dai yan jiu [A Study on the Staging and Dating of Yanghai Cemetery]. *Tulufan xue yan jiu*, vol. 1, pp. 1-18. (吕恩国, 王龙, 郭物:《洋海墓地分期与断代研究》,《吐鲁番学研究》,2017年第1期。)
- Ma, J., 2008. Gong yuan qian 8-3 shi ji de sa yan-a er tai -zao qi tie qi shi dai ou ya cao yuan dong bu cao yuan wen hua jiao liu. *Ou ya xue kan*, vol. 8. (马健:《公元前 8-3 世纪的萨彦-阿尔泰:早期铁器时代欧亚东部草原文化交流》,《欧亚学刊》,2008年第8期。)
- Ma, J., Wang, J., Zhao, H., Xi, T., Yahepu, J., Jiang, X., 2014. Excavation Report on F2 of Shirezigou Site, Barkol, Xinjiang in 2009. *Kaogu yu Wenwu*, vol. 5, pp. 25-36.
- Ma, J., 2011. *Xiongnu zang yi de kao gu xue tan suo*. Lanzhou University Press. (马健:《匈奴葬仪的考古学探索》,兰州大学出版社 2011 年。)
- Ma, L.Q., 2005. *Yuan Xiongnu, Xiongnu li shi yu wen hua de kao gu xue yan suo*. Inner Mongolia University Press. (马利清:《原匈奴、匈奴:历史与文化的考古学探索》,内蒙古大学出版社 2005 年。)
- Ma, Q.Y., Jiang, H.E., Zhao, Y.X., 2011. Xinjiang Yanghai gu dai da ma ye de da ma fen fen xi [Analysis of Cannabinoids from Leaves of Ancient Cannabis sativa Found in Yanghai Xinjiang, China]. *Tian ran chan wu yan jiu yu kai fa [Nat Prod Res Dev]*, vol. 23, pp.82-88. (马青云, 蒋洪恩, 赵友兴:《新疆洋海古代大麻叶的大麻酚分析》,《天然产物研究与开发》,2011 年第 23 期。)
- Mai, H.J., Yang, Y.M., Abuduresule, I., Li, W.Y., Hu, X.J., Wang, C.S., 2016. Characterization of cosmetic sticks at Xiaohe Cemetery in early Bronze Age Xinjiang, China. *Scientific reports*, vol. 6: 18939, pp. 1-9.
- Mallory, J.P., 1989. *In search of the Indo-Europeans: Languages, Archaeology and Myth*. London: Thames & Hudson.
- Mallory, J.P., Maior, V.H., 2000. *The Tarim Mummies—Ancient China and the Mystery of the Earliest peoples from the West*. Thames & Hudson.
- Marcott, S.A., Shakun, J.D., Clark, P.U., Mix, A.C., 2013. A reconstruction of regional and global temperature for the past 11,300 years. *Science*, vol. 339, pp. 11983-1201.
- Masson, V.M., 1992. The decline of the Bronze Age civilization and movements of the tribes. In: Dani, A.H., Masson, V.M., 1992. *History of Civilization of Central Asia, The dawn of civilization: earliest times to 700. BC*. United Nations Education, pp. 337-356.
- Mei, J.J., 2000. *Copper and Bronze Metallurgy in Late Prehistorical Xinjiang: Its Cultural*

- Context and Relationship with Neighboring Regions*. BAR International Series 865, Oxford: Archaeopress.
- Mei, J.J., 2003. Cultural Interaction between China and central Asia during the Bronze Age. *Proceedings-British Academy*, vol. 121. Oxford University Press Inc.
- Mei, J.J., 2004. Early Copper-based Metallurgy in China: Old Question, New Perspective. *Bulletin of Archaeology, The University of Kanazawa*, vol. 27, pp. 109-118.
- Mei, J.J., Ling, Y., Chen, K.L., Abuduresule, Y., Li, W.Y., Hu, X.J., 2013. Xinjiang Xiaohe mu di chu tu bu fen jin shu qi de chu bu fen xi [A Preliminary Scientific Analysis of Some Metal Objects Excavated from the Xiaohe Cemetery in Xinjiang, China]. *Xiyu yanjiu [Western Studies]*, vol. 1, pp. 39-49. (梅建军, 凌勇, 陈坤龙, 伊第利斯, 李文瑛, 胡兴军:《新疆小河墓地出土部分金属器的初步分析》,《西域研究》,2013年第1期。)
- Mei, J.J., Shell, C., 1998. Copper and bronze metallurgy in late prehistoric Xinjiang, in V.H. Mair (ed.), 1998. *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia*. Philadelphia: The University of Pennsylvania Museum Publications, pp. 581-603.
- Mei, J.J., Shell, C., 1999. The existence of Andronovo cultural influence in Xinjiang during the second millennium BC. *Antiquity*, vol. 73, pp. 570-578.
- Mo, Z.X., 2010. Xinjiang Balikun Heigouliang mu di yu Dongheigou mu di de kao gu lei xing xue bi jiao yan jiu. *Kaogu yu Wenwu*, vol. 5, pp. 51-56. (磨占雄:《新疆巴里坤黑沟梁墓地与东黑沟墓地的考古类型学比较研究》,《考古与文物》,2010年第5期。)
- Nakamura, H., 2002. The geographical diversity of the frequency of the Glu-D1f allele in Asian common wheat, and the transmission route through which the wheat may have reached Japan. *Australian journal of agricultural research*, vol. 53, Nr. 11, pp. 1265-1269.
- NCHA (the National Cultural Heritage Administration), 2010. *2009 zhong guo zhong yao kao gu fa xian [Major Archaeological Discoveries in China in 2009]*. Wenwu Press, pp. 96-98. (国家文物局:《2009年中国重要考古发现》,文物出版社2010年。)
- Ning, C., Gao, S.Z., Deng, B.P., Zheng, H.X., Wei, D., Lv, H.Z., Li, H.J., Song, L., Wu, Y., Zhou, H., Cui, Y.Q., 2016. Ancient mitochondrial genome reveals trace of prehistoric migration in the east Pamir by pastoralist. *Journal of Human Genetics*, vol. 61, pp. 103-108.
- Ning, C., Wang, C.C., Gao, S.Z., Yang, Y., Zhang, X., Wu, X.Y., Zhang, F., Nie, Z.Z., Tang, Y.P., Robbeets, M., Ma, J., Krause, J., Cui, Y.Q., 2019. Ancient Genomes Reveal Yamnaya-Related Ancestry and a Potential Source of Indo-European Speakers in Iron Age

- Tianshan. *Current Biology*, vol. 29, Nr.15, pp. 2526-2532.
- Ningxia wen wu kao gu yan jiu suo [Ningxia Institute of Cultural Relics and Archaeology], Wuzhong shi wen wu guan li suo, 2009. *Wuzhong bei jiao bei wei tang mu*. Wenwu Press. (宁夏文物考古研究所, 吴忠市文物管理所:《吴忠北郊北魏唐墓》, 文物出版社 2009 年。)
- Northwest University, Hami di qu wen guan hui, 2005. Xinjiang Balikun Yuegongtai-Xiheigou yi zhi qun diao cha. *Kaogu yu Wenwu*, vol. 2, pp. 3-17. (西北大学, 哈密地区文管会:《新疆大丽坤岳公台-西黑沟遗址群调查》,《考古与文物》, 2005 年第 2 期。)
- Northwest University wen hua yi chan yu kao gu xue yan jiu zhong xin [Research Center of Cultural Heritage and Archaeology], Hami di qu wen wu ju, Balikun xian wen guan suo, 2006. Xinjiang Balikun Dongheigou yi zhi diao cha [The Investigation Report on the Dongheigou Site in Balikun of Xinjiang]. *Kaogu yu Wenwu*, vol. 5, pp. 16-26. (西北大学文化遗产与考古学研究中心, 哈密地区文物局, 巴里坤县文管所:《新疆巴里坤东黑沟遗址调查》,《考古与文物》, 2006 年第 5 期。)
- Northwest University wen hua yi chan yu kao gu xue yan jiu zhong xin [Cultural Heritage and Archaeological Research Center], Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], 2006. Nileke xian Qiongkeke yan hua diao cha. *Xinjiang Wenwu*, vol. 2, pp. 19-37. (西北大学文化遗产与考古学研究中心, 新疆文物考古研究所:《尼勒克县穷科克岩画调查》,《新疆文物》, 2006 年第 2 期。)
- Northwest University wen hua yi chan yu kao gu xue yan jiu zhong xin [Research Center of Cultural Heritage and Archaeology], Hami di qu wen wu ju, Balikun xian wen guan suo, 2014. 2008 nian Balikun xian Hongshankou yi zhi kao gu diao cha. *Xinjiang Wenwu*, vol. 2, pp. 18-30. (西北大学文化遗产与考古学研究中心, 哈密地区文物局, 巴里坤县文管所:《2008 年巴里坤县红山口遗址考古调查》,《新疆文物》, 2014 年第 2 期。)
- Northwest University wen hua yi chan yu kao gu xue yan jiu zhong xin [Research Center of Cultural Heritage and Archaeology], Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hami di qu wen wu ju, 2014. 2009 nian Xinjiang Yiwu xian Tuobeiliang mu di fa jue jian bao. *Kaogu yu Wenwu*, vol. 4, pp. 24-26. (西北大学文化遗产与考古学研究中心, 新疆文物考古研究所, 哈密地区文物局:《2009 年新疆伊吾县托背梁墓地发掘简报》,《考古与文物》, 2014 年第 4 期。)
- Northwest University wen hua yi chan yu kao gu xue yan jiu zhong xin [Research Center of

- Cultural Heritage and Archaeology], Hami di qu wen wu ju, Balikun xian wen wu ju, 2014. Xinjiang Balikun Hongshankou yi zhi 2008 nian diao cha jian bao. *Wenwu*, vol. 7, pp. 17-30. (西北大学文化遗产与考古学研究中心, 哈密地区文物局, 巴里坤县文物局:《新疆巴里坤红山口遗址 2008 年调查简报》,《文物》, 2014 年第 7 期。)
- Northwest University wen hua yi chan yu kao gu xue yan jiu zhong xin [Research Center of Cultural Heritage and Archaeology], Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hami diqu wen wu ju, Balikun xian wen wu ju, 2014. 2009 nian Xinjiang Balikun Shirenzigou yi zhi F2 fa jue bao gao. *Kaogu yu Wenwu*, vol. 5, pp. 25-36. (西北大学文化遗产与考古学研究中心, 新疆文物考古研究所, 哈密地区文物局, 巴里坤县文物局:《2009 年新疆巴里坤石人子沟遗址 F2 发掘报告》,《考古与文物》, 2014 年第 5 期。)
- Northwest University wen hua yi chan yu kao gu xue yan jiu zhong xin [Research Center of Cultural Heritage and Archaeology], Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hami di qu wen wu ju, Balikun xian wen wu ju, 2014. 2009 nian Balikun xian Shirenzi gou yi zhi kao gu fa jue jian bao. *Xinjiang Wenwu*, vol. 2, pp. 31-44. (西北大学文化遗产与考古学研究中心, 新疆文物考古研究所, 哈密地区文物局, 巴里坤县文物局:《2009 年巴里坤县石人子沟遗址考古发掘简报》,《新疆文物》, 2014 年第 2 期。)
- Northwest University wen hua yi chan yan jiu yuan [School of Cultural Heritage and Archaeology], Hami di qu wen wu ju, Balikun xian wen guan suo, 2016. Xinjiang Hami Balikun Xigou yi zhi 1 hao mu fa jue jian bao [The excavation of Tomb M1 at Xigou Site in Barkol Kazakh Autonomous County, Hami Prefecture, Xinjiang]. *Wenwu*, vol. 5, pp. 15-31. (西北大学文化遗产研究院, 哈密地区文物局, 巴里坤县文管所:《新疆哈密巴里坤西沟遗址 1 号墓发掘简报》,《文物》, 2016 年第 5 期。)
- Palidan S., 2019. Shanshan xian Yanghai mu di chu tu mu tong lei xing ji qi wen shi te zheng. *Xinjiang Yishu (han wen)*, vol. 4, pp. 3. (帕丽旦·沙丁:《鄯善县洋海墓地出土木桶类型及其纹饰特征》,《新疆艺术(汉文)》, 2019 年第 4 期。)
- Parzinger, H. (2006). *Die Frühen Völker Eurasien [The Early Peoples of Eurasia]* C. H. Beck, Munich. (German).
- Peking University Technology Archaeology Laboratory of the School of Archaeology and Museology, 1978. Ye ti shan shuo fa tan shi si nian dai ce ding. *Wenwu*, vol. 5. (北京大学

- 文物保护科学技术研究所碳十四实验室：《液体闪烁法碳十四年代测定》，《文物》，1978 年第 5 期。)
- Pierre, T.C., Young, Z.J., 1932. On some Neolithic (and possibly Paleolithic) finds in Mongolia, Sinkiang, and west China. *Bull of the Geological Society of China*, vol. 12, Nr. 1-2, pp. 83-104.
- Pei, S.W., Gao, X., Wang, H.M., Kuman, K., Bae, C.J., Chen, R.Y., Guan, Y., Zhang, Y., Zhang, X.L., Peng, F., Li, X.L., 2012. The Shuidonggou Site complex: new excavations and implications for the earliest Late Paleolithic in North China. *Journal of Archaeological Science*, vol. 39, pp. 3610-3626.
- Qiu, L., 1988. Xinjiang Heshuo Xintala yi zhi de fa xian. *Xinjiang she hui ke xue [Soc Sci Xinjiang]*, vol. 4, pp. 114. (丘陵：《新疆和硕新塔拉遗址的发现》，《新疆社会科学》，1988 年第 4 期。)
- Qian, W., 2006. *Xinjiang Hami di qu shi qian shi qi tong qi ji qi yu lin jin di qu wen hua de guan xi*. Zhi shi chan quan Press. (潜伟：《新疆哈密地区史前时期铜器及其与邻近地区文化的关系》，知识产权出版社 2006 年。)
- Qiu, Z.W., Yang, Y.M., Shang, X., Li, W.Y., Abuduresule, Y., Hu, X.J., Pan, Y., Ferguson, D.K., Hu, Y.W., Wang, C.S., Jiang, H.E., 2014. Paleo-environment and paleo-diet inferred from Early Bronze Age cow dung at Xiaohe Cemetery, Xinjiang, NW China. *Quaternary International*, vol. 349, pp. 167-177.
- Qu, Y.T., Yang, Y.M., Hu, Y.W., Wang, C.S., 2013. Xinjiang Gumugou mu di ren fa jiao dan bai de ti qu yu tan dan tong wei su fen xi [The extraction and the C, N isotope analysis of hair keratin from Gumugou cemetery in Xinjiang]. *Di qiu hua xue [Geochimica]*, vol. 42, Nr. 5, pp. 447-453. (屈亚婷，杨益民，胡耀武，王昌燧：《新疆古墓沟人发角蛋白的提取与碳、氮稳定同位素分析》，《地球化学》，2013 年第 42 卷第 5 期。)
- Qu, Y.T., Hu, Y.W., Rao, H.Y., Abuduresule, I., Li, W.Y., Hu, X.J., Jiang, H.E., Wang, C.S., Yang, Y.M., 2018. Diverse lifestyle and populations in the Xiaohe culture of the Lop Nur region, Xinjiang, China. *Archaeol Anthropol Sci*, vol. 10, pp. 2005-2014.
- Rao, H.Y., Yang, Y.M., Abudreesule, I., Li, W.Y., Hu, X.J., Wang, C.S., 2015. Proteomic identification of adhesive on a bone sculpture-inlaid wooden artifacts from the Xiaohe Cemetery, Xinjiang, China. *Journal of Archaeological Science*, vol. 53, pp. 148-155.
- Rashid, A., Hes D., 2002. Ancient Corpses of Zaghunluq, In: Wang, B.H. (eds). *The Ancient*

- Corpses of Xinjiang — The peoples of Ancient Xinjiang and their culture*. Xinjiang Renmin Press, pp. 73-93.
- Ren, M., 2012. *Gong yuan qian yi qian ji dong Tianshan di qu de zhi wu kao gu xue yan jiu* [Study on Archaeological Remains Around the Eastern Tianshan Mountain in First Millennium B.C]. Ph.D. Thesis of Northwest University. (任萌: 《公元前一千纪东天山地区的植物考古学研究》, 西北大学 2021 年博士学位论文。)
- Ren, M., 2012. Cong Heigouliang mu di, Dongheigou yi zhi kan xi han qian qi dong Tianshan di qu xiong nu wen hua [Knowing the Xiongnu Culture in Eastern Tianshan Mountain from Tomb Heigouliang and Dongheigou Site at the Beginning of Xihan Dynasty]. *Xibu Kaogu*, vol. 5, pp. 252-290. (任萌: 《从黑沟梁墓地、东黑沟遗址看西汉以前东天山地区匈奴文化》, 《西部考古》, 2012 年第 5 期。)
- Ren, M., Tang, Z.H., Wu, X.H., Spengler, R., Jiang, H.E., Yang, Y.M., Boivin, N., 2019. The origins of cannabis smoking: Chemical residue evidence from the first millennium BCE in the Pamirs. *Science advances*, vol. 5, Nr. 6, eaaw1391, pp. 1-8.
- Renfrew, C., Bahn, P., 2017. *Archaeology: Theories, Methods and Practice*. Thames & Hudson Ltd, London.
- Ruan, C.W., Liu, J.Y., 1999. Baicheng xian Kizil shui ku mu di nian dai ce ding bao gao [Radiocarbon Dating of the Cemetery near the Kizil Reservoir, Baicheng County], *Xinjiang Wenwu*, vol. 3-4, pp. 114-115. (阮成文, 刘景光: 《拜城克孜尔水库墓地碳十四年代测定报告》, 《新疆文物》, 1999 年第 3-4 期。)
- Ruan, Q.R., Liu, Y.S., 2013. Ya xin mu ren—Saensayi mu di de ji yi. *Xinjiang Huabao*, vol. 4, pp. 60-65. (阮秋荣, 刘玉生: 《亚心牧人—萨恩萨依墓地的记忆》, 《新疆画报》, 2013 年第 4 期。)
- Sameer, M.A., Zhang, J.Z., Zhang, Z.H., Fang, X.X., 2018. Bronze age and iron age cultures in Xinjiang, Liaison to Harappa: a retrospect. *International Journal of Heritage, Art and Multimed*, vol.1, issues: 3, pp. 51-70.
- Schröder, O., Wagner, M., Wutke, S., Zhang, Y., Ma, Y.X., Xu, D.L., Goslar, T., Neef, R., Tarasov, P.E., Ludwig, A., 2016. Ancient DNA identification of domestic animals used for leather objects in Central Asia during the Bronze Age. *The Holocene*, vol. 26, pp. 1722-1729.
- Schultz, M., Schultz, T.H.S., Wu, X.H., 2007. Ergebnisse der paläopathologisch-anthropologischen Untersuchung der menschlichen Skelettfunde aus

- dem Grab 26 von Liushui, Xinjiang (China). *Eurasia Antiquae*, Band 13.
- Schultz, M., Schultz, T.H.S., Wagner, M., Wu, X.H, 2008. Xinjiang Yutian xian Liushui mu di 26 hao mu chu tu ren gu de gu bing li xue he ren lei xue chu bu yan jiu. *Kaogu*, vol. 3.
- Shang, Y.P., Li, J.X., 2018. Xinjiang Mohuchahan mu di chu tu qing tong qi mai cang huan jing yu xiu shi ji li fen xi. *Wenwu Shijie*, vol. 5, pp. 76-80. ()
- Shao H.Q., 2006. Cong M75 kan Yanbulake mu di de fenqi. *Xinjiang Wenwu*, vol. 2. (邵会秋: 《从 M75 看焉不拉克墓地的分期》, 《新疆文物》, 2006 年第 2 期。)
- 2007. *Xinjiang shi qian shi qi wen hua ge ju de yan jin ji qi yu zhou lin di qu wen hua de guan xi [The Development of the Prehistoric Cultures in Xinjiang and the Interaction with Neighbor Cultures]*. Ph.D. Thesis of Jilin University. (邵会秋: 《新疆史前时期文化格局的演进及其与周邻地区文化的关系》, 吉林大学 2007 年博士学位论文)
- 2008. Shi lun Xinjiang Altai di qu de liang lei qing tong wen hua. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 4. (邵会秋: 《试论新疆阿勒泰地区的两类青铜文化》, 《西域研究》, 2008 年第 4 期。)
- 2008. Xinjiang Zaghunluq wen hua chu lun. *Bianjiang kaogu yanjiu [Res China's Front Archaeol]*, vol. 00. (邵会秋: 《新疆扎滚鲁克文化初论》, 《边疆考古研究》, 2008 年第 00 期。)
- 2012. Xinjiang Subeixi wen hua yan jiu [Research on the Subeixi Culture in Xinjiang]. *Bianjiang kaogu yanjiu [Res China's Front Archaeol]* vol. 12, pp. 193-220. (邵会秋: 《新疆苏贝希文化研究》, 《边疆考古研究》, 2012 年第 12 期。)
- 2018. *Xinjiang shi qian shi qi wen hua ge ju de yan jin ji qi yu zhou lin wen hua de guan xi [The Development of the Prehistoric Cultures in Xinjiang and the Interaction with Neighbor Cultures]*. Kexue Press. (邵会秋: 《新疆史前文化格局眼睛及其与周邻文化的关系》, 科学出版社 2018 年。)
- Shao, K.L., Zhang, J.P., Cong, D.X., Jia, W.M., Cui, A.N., Wu, N.Q., 2019. Zhi wu wei ti hua shi fen xi jie shi Adunqiaolu yi zhi gu ren sheng cun ce lue [Analysis of plant microfossils reveal the ancient survivals strategy of the Adunqiaolu site in Xinjiang, China. *Di si ji yan jiu [Quaternary Sciences]*, vol. 39, Nr. 1, pp. 37-47. (邵孔兰, 张健平, 丛德新, 贾伟明, 崔安宁, 吴乃琴: 《植物微体化石分析揭示阿敦乔鲁遗址古人生存策略》, 《第四纪研究》, 2019 年第 39 卷第 1 期。)
- Shao, X.Z., Wang, B., 1989. Zaghulunq er hao mu liang ju gu shi de chu bu yan jiu. *Xinjiang*

- Wenwu*, 4, 72-77. (邵兴周, 王博:《扎洪鲁克二号墓两具古尸的初步研究》,《新疆文物》, 1989年第4期。)
- Shen, H., Wu, X.H., Tang, Z.H., Zhou, X.Y., Sun, N., Li, X.Q., 2015. Wood Usage and Fire Veneration in the Pamir, Xinjiang, 2500 yr BP. *PlosS one*, vol. 10, Nr. 8: e0134847, pp. 1-13.
- Shen, H., Li, X.Q., Zhou, X.Y., Wu, X.H., Tang, Z.H., Sun, N., 2015. Wood types and environment of the Tashkurgan region, Xinjiang, at 2500 cal yr BP, based on a record from the Ji'erkankale Necropolis. *Review of Palaeobotany and Palynology*, vol. 238, pp. 7-14.
- Shevchenko, A., Yang, Y.M., Knaust, A., Thomas, H., Jiang, H.E., Lv, E.G., Wang, C.S., Shevchenko, A., 2013. Proteomics identifies the composition and manufacturing recipe of the 2500-year-old sourdough bread from Subeixi cemetery in China. *Journal of Proteomics*, vol. 105, pp. 363-371.
- Shishlina, N.I., 2004. North-west Caspian Sea steppe: Environment and migration crossroads of pastoral culture population during the third millennium BCE. In Scott, E., Alekseev, A., Zaitseva, A.Y. (eds). *Impact of the Environment on Human Migration in Eurasian. Chelyabinsk*. Chelyabinsk Gousudarstvenyi Universitet, pp. 91-105.
- 2008. *Reconstruction of the Bronze Age of the Caspian Steppe: Life Styles and Life ways of Pastoral Nomads*. Oxford, Archaeopress.
- Shnirelman, V.A., 1992. The emergence of a food-producing economy in the steppe and forest-steppe zones of eastern Europe. *The Journal of Indo-European Studies*, vol. 20, Nr.1, pp. 123-143.
- Shui, T., 2001. Xinjiang qing tong shi dai zhu wen hua de bi jiao yan jiu—fu lun zao qi zhong xi wen hua jiao liu de li shi jin cheng [A Comparative Study of Bronze Cultures in Xinjiang—with a discussion of the process of early cultural exchange between the East and the West]. In: Shui, T., 2001. *Zhongguo xi bei di qu qing tong shi dai kao gu lun ji*. Kexue Press, pp. 6-46. (水涛:《新疆青铜时代诸文化的比较研究—附论早期中西文化交流的历史进程》, 见水涛:《中国西北地区青铜时代考古论集》, 科学出版社 2001年。)
- Shui, T., 2001. *Zhongguo xi bei di qu qing tong shi dai kao gu lun ji*. Kexue Press. (水涛:《中国西北地区青铜时代考古论集》, 科学出版社 2001年。)
- Shui Tao, 2008. Xinjiang shi qian kao gu xue shu yan tao hui ji yao [Literature review on Prehistory Conference]. *Wenwu*, vol. 12, pp. 98-101. (水涛:《新疆史前考古学术研讨会纪

- 要》，《文物》，2008年第12期。)
- Si, Y., Lv, E.G., Li, X., Jiang, H.E., Hu, Y.W., Wang, C.S., 2013. Xinjiang Yanghai mu di xian min de shi wu jie gou ji ren qun zu cheng tan suo [Exploration of human diet and populations from the Yanghai Tomb, Xinjiang]. *Chin Sci Bull (Chin Ver)*, vol. 58, pp. 1-8. doi: 10.1360/972012-1007. (司艺, 吕恩国, 李肖, 蒋洪恩, 胡耀武, 王昌燧: 《新疆洋海墓地先民的食物结构及人群组成探索》, 《科学通报》, 2013年第58期。)
- Spengler, R., Frachetti, M., Doumani, P., Rouse, L., Cerasetti, B., Bullion, E., Mar'yashev, A., 2014. Early agriculture and crop transmission among Bronze Age mobile pastoralists of Central Eurasia. *Proceedings of the Royal Society B: Biological Sciences*, vol. 281, Nr. 1783: 20133382, pp. 1-7.
- Spengler, R.N., Frachetti, M.D., Doumani, P.N., 2014. Late Bronze Age agriculture at Tasbas in the Dzhungar Mountains of eastern Kazakhstan. *Quaternary International*, vol. 348, pp. 147-157.
- Takelamagan sha mo zong kao dui kao gu zu, A'erjinshan zi ran bao hu qu guan li chu [Archaeological Group Subordinated the Comprehensive Surveying Team of Taklamakan], 1990. A'erjin Shan Xishiqi [The Microlithic of A'er-jin Mountain], *Xinjiang Wenwu*, vol. 4, pp. 14-19. (塔克拉玛干沙漠综考队考古组, 阿尔金山自然保护区管理处: 《阿尔金山细石器》, 《新疆文物》, 1990年第4期。)
- Taklamakan zong kao dui kao gu zu, 1990. Qiemo xian gu dai wen hua yi cun kao cha. *Xinjiang Wenwu*, 4, 20-29. (塔克拉玛干综考队考古组: 《且末县古代文化遗存考察》, 《新疆文物》, 1990年第4期。)
- Tan, J.Z., Han, K.X., 2007. Zhongguo bei fang ji ge gu dai min zu de ti zheng lei xing he zhong zu shu xing [Physical Characters and Ethnic Affiliations of Several Nationalities in North China]. *Xiandai ren lei xue tong xun [Communication on Contemporary Anthropology]*, vol. 1: e8, pp. 58-66. (谭婧泽, 韩康信: 《中国北方几个古代民族的体征类型和种族属性》, 《现代人类学通讯》, 2007年第1期。)
- Tan, J. Z., Li, L. M., Zhang, J. B., Fu, W. Q., Guang, H. J., Ao, X., Wang, L.E., Wu, X. H., Han, K. X., Jin, L., Li, H., 2012. Craniometrical evidence for population admixture between Eastern and Western Eurasians in Bronze Age southwest Xinjiang, *Chinese Science Bulletin*, vol. 58, Nr. 3, pp.299-306.
- Tan, Y.H., 2011. Xinjiang Tashikuergan xian Xiabandi AII hao mu di xin shi [A New Exploration

- to the Cemetery Xiabandi AII in Tash-Kurgan County in Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 3, pp. 83-90. (谭玉华:《新疆塔什库尔干县下坂地 AII 号墓地新识》,《西域研究》,2011 年第 3 期。)
- Tang, Z. H., Chen, D. M., Wu, X. H., Mu, G. J., 2013. Redistribution of prehistoric Tarim people in response to climate change. *Quaternary International* vol. 308-309, pp.6-41.
- Tarasov, P.E., Demske, D., Leipe, C., Long, T.W., Müller, S., Hoelzmann, P., Wagner, M., 2018. An 8500-year palynological record of vegetation, climate change and human activity in the Bosten Lake region of Northwest China. *Palaeogeography, Palaeoclimatology, Palaeoecology*, vol. 516, pp. 166-178.
- Technology Archaeology Laboratory of the School of Archaeology and Museology, Peking University, 1980. Tan shi si nian dai ce ding bao gao (2). *Wenwu*, vol. 2, pp. 82-85. (北京大学文物保护科学技术研究所碳十四实验室:《碳十四年代测定报告(二)》,《文物》,1980 年第 2 期。)
- Thornton, C.P., Schurr, T.G., 2004. Genes, language, and culture: an example from the Tarim Basin. *Oxford Journal of Archaeology*, vol. 23, Nr. 1, pp. 83-106.
- Tian, D., Ma, J., Wang, J.X., Pilgram, T., Zhao, Z.J., Liu, X.Y., 2018. Cultivation of Naked Barley by Early Iron Age Agro-pastoralists in Xinjiang, China. *Environmental Archaeology*, vol, 23, Nr.4, pp. 416-425.
- Tian, D., 2018. *Gong yuan qian yi qian ji dong tian shan di qu de zhi wu kao gu xue yan jiu [Archaeobotanical study on the region of East Tianshan Mountains in first millennium BC: Shirenzigou-centric perspective]*. Ph.D. Thesis of Northwest University. (田多:《公元前一千纪东天山地区的植物考古学研究》,西北大学 2018 年博士学位论文。)
- Tian, G.J., Guo, S.X., 1986. *Erdos shi qing tong qi*. Wenwu Press. (田广金,郭素新:《鄂尔多斯式青铜器》,文物出版社 1986 年。)
- Tian, X.H., Wu, Y., 2013. Xinjiang Baicheng Duogang mu di kao gu xin shou huo. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 3, pp. 141-142. (田小红,吴勇:《新疆拜城多岗墓地考古新收获》,《西域研究》,2013 年第 3 期。)
- Tong, J.Y., Ma, J., Li, W.Y., Chang, X.E., Yu, J.J., Wang, J.X., Ma, Y.X., Tian, Y.L., Reheman, K., Simayi, M., Liu, R.L., 2020. Chronology of the Tianshanbeilu Cemetery in Xinjiang, Northwestern China. *Radiocarbon*, vol. 00 Nr.00, pp. 1-14.
- Tulufan di qu wen guan suo, 1984. Xinjiang Shanshan su ba shi gu mu zang. *Kaogu*, vol. 1, pp.

- 41-50. (吐鲁番地区文管所:《新疆鄯善苏巴什古墓葬》,《考古》,1984年第1期。)
- 1988. Xinjiang Shanshan xian su ba shi gu mu qun de xin fa xian. *Kaogu*, vol. 6, pp: 502-506. (吐鲁番地区文管所:《新疆鄯善县苏巴什古墓群的新发现》,《考古》,1988年第6期。)
- 1991. Alagou shu xue mu guan mu qing li jian bao. *Xinjiang Wenwu*, vol. 2, pp. 18-20. (吐鲁番地区文管所:《阿拉沟竖穴木椁墓清理简报》,《新疆文物》,1991年第2期。)
- Tulufan di qu wen wu ju [Turfan Cultural Relics Bureau], 2011. 1987 nian shou jiao de Yanghai mu di bei dao chu tu qi wu [Cultural Relics Unearthed from Yanghai Cemetery Reclaimed in 1987]. *Tulufan xue yan jiu*, vol. 2, pp: 12-35. (吐鲁番地区文物局:《1987年收缴的洋海墓地被盗出土器物》,《吐鲁番学研究》,2011年第2期。)
- Tulufan shi wen wu ju [Turfan Cultural Relics Bureau], Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Tulufan xue yan jiu yuan [Turfanica Academia], Tulufan bo wu guan [Turfan Museum], 2019. *Xinjiang Yanghai mu di [Report of Archaeological Excavations at Yanghai Cemetery]*. Wenwu Press. (吐鲁番市文物局,新疆文物考古研究所,吐鲁番学研究院,吐鲁番博物馆:《新疆洋海墓地》,文物出版社2019年。)
- Tulufan xue yan jiu yuan [Turfanica Academia], 2013. Xinjiang Tulufan shi Shengjindian mu di fa jue jian bao. *Kaogu*, vol. 2, pp. 29-55. (吐鲁番学研究院:《新疆吐鲁番市胜金店墓地发掘简报》,《考古》,2013年第2期。)
- Tulufan xue yan jiu yuan [Turfanica Academia], 2013. Xinjiang Tulufan Shengjindian mu di 2 hao mu fa jue jian bao. *Wenwu*, vol. 3, pp. 20-24. (吐鲁番学研究院:《新疆吐鲁番胜金店墓地2号墓发掘简报》,《文物》,2013年第3期。)
- Tuolahazi, A., 1998. 1985 nian Qiemu Zaghunluq chu tu de mao zhi wu shou hui wen yang qian xi. *Xinjiang Wenwu*, 4, 88-93. (阿丽娅·拖拉哈孜:《1985年且末扎滚鲁克出土的毛织物手绘纹样浅析》,《新疆文物》,1998年第4期。)
- Vicziany, M., 2019. Ancient Xinjiang at the International Crossroads. In: Betts, A.V.G., Vicziany, M., Jia, P., Castro A.A.D. (eds), 2019. *The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads*. Archaeopress Archaeology, pp. 1-8.
- Urumqi shi wen wu guan li suo [Urumqi Municipal Office for the Preservation of Cultural Relics], 1990. Urumqi Banfanggou xin fa xian de liang pi tong qi. *Xinjiang Wenwu*, vol. 4, pp. 97-99. (乌鲁木齐市文物管理所:《乌鲁木齐板房沟新发现的二批铜器》,《新疆文

- 物》，1990年第4期。)
- Wang, B., 1996. Qiemu'erqieke wen hua chu tan. In: *Kaogu wenwu yan jiu—ji nian xi bei da xue kao gu zhuan ye cheng li si shi zhou nian wen ji*. Sanqin Press. (王博:《切木尔切克文化初探》，见西北大学文博学院(编):《考古文物研究—纪念西北大学考古专业成立四十周年文集》，三秦出版社1996年。)
- Wang, B., 2003. Xinjiang Zaghunluq kong hou. *Wenwu*, vol. 2, pp. 56-62. (王博:《新疆扎滚鲁克箜篌》，《文物》，2003年第2期。)
- Wang, B., Chang, X.E., 1986. Wensu xian Baozidong mu zang qun de diao cha he fa jue. *Xinjiang Wenwu*, vol. 2, pp. 1-22. (王博, 常喜恩:《温宿县包孜东墓葬群的调查和发掘》，《新疆文物》，1986年第2期。)
- Wang, B., Cui, J., Guo, J.G., 1998. Hami Hanqigou mu di chu tu lu gu yan jiu. *Xinjiang Wenwu*, vol. 1, pp. 83-87. (王博, 崔静, 郭建国:《哈密寒气沟墓地出土颅骨研究》，《新疆文物》，1998年第1期。)
- Wang, B., Lu, L.P., 2004. Zaghunluq he Sampula gu mu chu tu de bo li qi. *Tulufan xue yan jiu*, vol. 2. (王博, 鲁礼鹏:《扎滚鲁克和山普拉古墓出土的玻璃器》，《吐鲁番学研究》，2004年第2期。)
- Wang, B., Tan, D.H., 1995. Hami Yanbulake mu di fen qi wen ti. *Xinjiang Wenwu*, vol. 3. (王博, 覃大海:《哈密焉不拉克墓葬的分期问题》，《新疆文物》，1990年第3期。)
- Wang, B., Wang, M.F., 2009. Zaghunluq mu di chu tu kui ji yan jiu [Research on the Wool Textile Unearthed from Zhagunluk Cemetery]. *Xinjiang shi fan da xue xue bao (zhe xue she hui ke xue ban)* [Journal of Xinjiang Normal University (Social Sciences)], vol. 30, pp. 85-91. (王博, 王明芳:《扎滚鲁克墓地出土绢罽研究》，《新疆师范大学学报(哲学社会科学版)》，2009年第30卷第3期。)
- Wang, B., Wang, M. F., 2010. Zaghunluq mao xiu. *Wenbo*, vol. 3, pp. 77-85. (王博, 王明芳:《扎滚鲁克毛绣》，《文博》，2010年第3期。)
- Wang, B.H., 1979. Xinjiang dong jiang he nan jiang di qu kao gu xin fa xian. *Xinjiang Kaogu*, vol. 1. (王炳华:《新疆东疆和南疆地区考古新发现》，《新疆考古》，1979年第1期。)
- 1983. Kongquehe Gumugou fa jue ji qi chu bu yan jiu [Archaeological excavations at Gumugou site, Kongque River and a preliminar study on the discoveries]. *Xinjiang she hui ke xue [Soc Sci Xinjiang]*, vol. 1, pp. 117-127. (王炳华:《孔雀河古墓沟发掘及其初步研究》，《新疆社会科学》，1983年第1期。)

- 1983. Gumugou ren she hui wen hua sheng huo zhong ji ge wen ti [Some Problems about the social and cultural life of the man of the Gumugou]. *Xinjiang da xue xue bao: zhe xue, ren wen she hui ke xue ban [Xinjiang Univ Philos Humanit Soc Sci]*, vol. 2, pp. 86-90. (王炳华:《古墓沟人社会文化生活中几个问题》,《新疆大学学报(哲学、人文社会科学版)》,1983年第2期。)
- 1983. Xinjiang nong ye kao gu gai shu. *Nongye Kaogu*, vol. 1, pp. 102-121. (王炳华:《新疆农业考古概述》,《农业考古》,1983年第1期。)
- 1985. Gu dai Xinjiang sai ren li shi gou chen. *Xinjiang she hui ke xue [Soc Sci Xinjiang]*, vol. 1, pp. 48-64. (王炳华:《古代新疆塞人历史钩沉》,《新疆社会科学》,1985年第1期。)
- 1993. Xinjiang xi shi qi yi cun chu bu yan jiu [Preliminary research on Xinjiang Microlithic Sites]. In: Wang, B.H., 1993. *Si chou zhi lu kao gu yan jiu*. Urumchi: Xinjiang Renmin Press, pp. 129-145. (王炳华:《新疆细石器遗存初步研究》,见王炳华:《丝绸之路考古研究》,新疆人民出版社1993年。)
- 1996. A Preliminary Analysis of the Archaeological Cultures of the Bronze Age in the Region of Xinjiang. *Anthropology & Archaeology of Eurasia*, vol. 34, Nr. 4, pp. 67-86.
- 2014. Yi zhong kao gu yan jiu xian Xiang de wen hua zhe xue si kao—Tou shi suo wei “Tu huo luo” yu Kongque he qing tong shi dai kao gu wen hua yan jiu [A Cultural-philosophical Thinking about a Phenomenon of Archaeological Researches—A Research of the Studies on the So-called “Tochori” and Archaeological Cultures of the Bronze Age at the Kongchi River]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1, pp. 86-99. (王炳华:《一种考古研究现象的文化哲学思考—透视所谓“吐火罗”与孔雀河青铜时代考古文化研究》,《西域研究》,2014年第1期。)
- 2014. *Gumugou*. Xinjiang Renmin Press. (王炳华:《古墓沟》,新疆人民出版社2014年。)
- Wang, B.H., Liu, J.L., Mei, Y.X., Zhang, Y.X., Lv, X.X., 1989. Xinjiang Hami Wupu gu mu chu tu da mai de yan jiu. *Nongye Kaogu*, vol. 1, pp. 70-73. (王炳华,刘杰龙,梅玉祥,张玉霞,吕巡贤:《新疆哈密五堡古墓出土大麦的研究》,《农业考古》,1989年第1期。)
- Wang, L.J., Wang, Y.Q., Li, W.Y., Spate, M., Reheman, K., Sun, Q.L., Wang, B.H., Xu, H., Zhang, Z.Y., Zhang, G.L., Jiang, H.E., 2021. Inner Asian agro-pastoralism as optimal adaptation strategy of Wupu inhabitants (3000-2400 cal BP) in Xinjiang, China. *The Holocene*: 0959683620941139, pp. 1-14.

- Wang, J., Xi, L., 2009. Study on Settlement of Early Nomadic Culture Around the Eastern Tianshan Mountain. *Kaogu*, vol. 1, pp. 28–37.
- Wang, J.X., He, J.F., 2006. Qiongkeke yan hua de fen lei ji fen qi yan jiu. *Xinjiang Wenwu*, vol. 2, pp. 73-83. (王建新, 何军锋:《穷科克岩画的分类及分期研究》,《新疆文物》,2006年第2期。)
- Wang, J.X., Xi, L., 2009. Dong Tianshan di qu zao qi you mu wen hua ju luo kao gu yan jiu. *Kaogu*, vol. 1, pp. 28-37. (王建新, 席琳:《东天山地区早期游牧文化聚落考古研究》,《考古》,2009年第1期。)
- Wang, M.Z., 2013. Lun Ke'ermuqi wen hua he Ke'ermuqi mu di de shi dai [On the Kermuqi Culture and the Age of Kermuqi Graves]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 2. (王明哲:《论克尔木齐文化和克尔木齐墓地的时代》,《西域研究》,2013年第2期。)
- Wang, Q., Ma, Z.K., Chen, Q.H., Ma, Y.C., Ruan, Q.R., Wang, Y.Q., Han, J.Y., Yang, X.Y., 2020. Xinjiang Nileke xian Jirentai Goukou yi zhi shi qi gong neng fen xi: lai zi zhi wu wei ti yi cun de zheng ju [Microbotanical remains provides direct evidence for the functional study of stone tools from Jartai Pass site in Nilka County, Xinjiang]. *Di si ji yan jiu [Quaternary Sciences]*, vol. 40, Nr. 2, pp. 450-461. (王清, 马志坤, 陈秋荷, 马永超, 阮秋荣, 王永强, 韩建业, 杨晓燕:《新疆尼勒克县吉仁台沟口遗址石器功能分析:来自植物微体遗存的证据》,《第四纪研究》,2020年第40卷第2期。)
- Wang, T.T., Fuller, B.T., Wei, D., Chang, X.E., Hu, Y.W., 2015. Investigating Dietary Patterns with Stable Isotope Ratios of Collagen and Starch Grain Analysis of Dental Calculus at the Iron Age Cemetery Site of Heigouliang, Xinjiang, China. *International Journal of Osteoarchaeology*, vol. 26, Nr. 4, pp. 692-704.
- Wang, T.T., Wei, D., Chang, X.E., Yu, Z.Y., Zhang, X.Y., Wang, C.S., Hu, Y.W., Fuller, B.T., 2019. Tianshanbeilu and the Isotopic Millet Road: reviewing the late Neolithic/Bronze Age tradition of human millet consumption from north China to Europe. *National Science Review*, vol. 6, pp. 1024-1039.
- Wang, W., Wang, Y.Q., An, C.B., Ruan, Q.R., Duan, F.T., Li, W.Y., Dong, W.M., 2018. Human diet and subsistence strategies from the Late Bronze Age to historic times at Goukou, Xinjiang, NW China. *The Holocene*, vol. 28, Nr. 4, pp. 640-650.
- Wang, X.Y., Tang, Z.H., Wu, J., Wu, X.H., Wu, Y.Q., Zhou, X.Y., 2016. Strontium isotope evidence for a highly mobile population on the Pamir Plateau 2500 years ago. *Scientific*

- reports, vol. 6, Nr. 1, pp. 1-7.
- Wang Y.Q., Dang, Z.H., 2011. Xinjiang Hami Wupu Aisikexiaer nan mu di kao gu xin fa xian. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 2. (王永强, 党志豪:《新疆哈密五堡艾斯克霞尔南墓地考古新发现》,《西域研究》,2011年第2期。)
- Wang, Y.Q., Ruan, Q.R., 2016. 2015 nian Xinjiang Nileke xian Jirentai Goukou kao gu gong zuo de xin shou huo. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1, pp. 132-134. (王永强, 阮秋荣:《2015年新疆尼勒克县吉仁台沟口考古工作的新收获》,《西域研究》,2016年第1期。)
- Wang, Y.Q., Yuan, X., Ruan, Q.R., 2019. Xinjiang Nileke xian Jirentai Goukou yi zhi 2015-2018 nian kaou gu shou huo ji chu bu ren shi. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1, pp. 133-138. (王永强, 袁晓, 阮秋荣:《新疆尼勒克县吉仁台沟口遗址2015-2018年考古收获及初步认识》,《西域研究》,2019年第1期。)
- Wang, Y.Z., Rehren, T., Tan, Y.C., Cong, D.X., Jia, W.M., Henderson, J., Ma, H.J., Betts, A., Chen, K.L., 2020. New evidence for the transcontinental spread of early faience. *Journal of Archaeological Science*, vol. 116, pp. 1-8.
- Wang, Z.L., 1994. 1993 nian Hejing Baileqier mu di fa jue shou huo. *Xinjiang Wenwu*, vol. 3, pp. 35. (王宗磊:《1993年和静拜勒其尔墓地发掘收获》,《新疆文物》,1994年第3期。)
- Wagner, M., Wu, X.H., Tarasov, P., Aisha, A., Ramsey, C.B., Schultz, M., Schmidt-Schultz, T., Gresky, J., 2011. Radiocarbon-dated archaeological record of early first millennium B.C. mounted pastoralists in the Kunlun Mountains, China. *Proceedings of the National Academy of Sciences*, vol. 108, Nr. 38, pp. 15733-15738.
- Wei, D., 2009, Xinjiang Yanbulake wen hua gu dai ju min ren zhong xue yan jiu, *Bianjiang kaogu yanjiu [Res China's Front Archaeol]*, vol. 8. (魏东:《新疆焉不拉克文化古代居民人种学研究》,《边疆考古研究》,2009年第8期。)
- Wei, D., Zhao, Y.S., Chang, X.E., Zhu, H., 2012. Hami Tianshanbeilu mu di chu tu lu gu de ce liang xing zhuang [Cranimetric Variation of Ancient Skulls from the Hami Tianshan North Road Cemetery]. *Renleixue xuebao [Acta Anthropologica Sinica]*, vol. 31, Nr.4, pp. 395-406. (魏东, 赵永生, 常喜恩, 朱泓:《哈密天山北路墓地出土颅骨的测量性状》,《人类学学报》,2012年第31卷第4期。)
- Wei, D., Zeng, W., Chang, X.E., Zhu, H., 2012. Xinjiang Hami Heigouliang mu di chu tu ren gu de chuang shang, bing li ji yi chang xing tai yan jiu [An Osteological analysis of Huamn

- Remains from the Heigouliang Cemetery in Hami, Xinjiang]. *Renleixue Xuebao [Acta Anthropologica Sinica]*, vol. 31, Nr. 2, pp. 176-186. (魏东, 曾雯, 常喜恩, 朱泓: 《新疆哈密黑沟梁墓地出土人骨的创伤, 病理及异常形态研究》, 《人类学学报》, 2012 年第 3 期。)
- Wei, D., 2017. *Qing tong shi dai zhi zao qi tie qi shi dai Xinjiang Hami di qu gu dai ren qun de bian qian yu jiao liu mo shi yan jiu*. Kexue Press. (魏东: 《青铜时代至早期铁器时代新疆哈密地区古代人群的变迁与交流模式研究》, 科学出版社 2017 年。)
- Wertime, T.A., James, D.M., 1980. *The coming of the age of iron*. Yale Univ. Press.
- Wu, E., 1985. Yin zhi zhou chu de bei fang qing tong qi. *Kaogu xuebao*, vol. 2, pp. 135-156. (乌恩: 《殷至周初的北方青铜器》, 《考古学报》, 1985 年第 2 期。)
- Wu, E., 2002. Lun Zhongguo bei fang zao qi you mu ren qing tong dai shi de qi yuan. *Wenwu*, vol. 6, pp. 68-77. (乌恩: 《论中国北方早期游牧人青铜带饰的起源》, 《文物》, 2002 年第 6 期。)
- Wu, X.H., 2014. 2013 nian Xinjiang Tashkurgan Ji'ertzankale mu di de kao gu fa jue. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1, pp. 124-127. (巫新华: 《2013 年新疆塔什库尔干吉尔赞喀勒墓地的考古发掘》, 《西域研究》, 2014 年第 1 期。)
- Wu, X.H., 2018. Xinjiang Ji'ertzankale mu qun yun han de suo luo ya si de jiao wen hua yuan su tan xi [An Analysis of the Zoroastrianism Cultural Element in Jierzankale Tombs, Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 2, pp. 95-107. (巫新华: 《新疆吉尔赞喀勒墓群蕴含的琐罗亚斯德教文化元素探析》, 《西域研究》, 2018 年第 2 期。)
- Wu, X.H., Wagner, M., Görsdorf, J., Tarasov, P., Aisha, A., Mei, J.J., 2006. Das Gräberfeld Liushui des 9. Bis 7. Jahrhundert v. Chr. Im Kunlun-Gebirge, NW-China. *Eurasia Antiqua*, Band 12.
- Wu, Y. 2012. Lun Kashi Xiabandi mu di qing tong shi dai wen hua [On the Bronze Culture of Xiabandi Cemetery in Kashi, Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 4, pp. 36-44. (吴勇: 《论新疆喀什下坂地墓地青铜时代文化》, 《西域研究》, 2012 年第 4 期。)
- Wu, Y.C., 2013. Xiaohe mu di ren xing diao xiang yan jiu [Research on Figure Sculptures of Xiaohe Cemetery]. *Xinjiang yi shu xue yuan xue bao [Journal of Xinjiang Art Institute]*, vol. 11, Nr. 3, pp. 1-7. (吴艳春: 《小河墓地人形雕像研究》, 《新疆艺术学院学报》, 2013 年第 3 卷第 11 期。)

- Wei, L.H., Li, H., Xu, W.K., 2015. The separate origins of the the Tocharians and the Yuezhi: Results from recent advances in archaeology and genetics. In: Malzahn, M., Peyrot, M., Fellner, H., Illes, T.S. (eds), 2015. *Tocharian Texts in Contexts: International Conference on Tocharian Manuscripts and Silk Road Culture*. Bremen: Hempen Verlag.
- Xi, T.Y., 2014. *Qing tong shi dai zhi zao qi tie qi shi dai dong Tianshan di qu ju luo yi zhi yan jiu*. Ph.D. Thesis of Northwest University. (习通源:《青铜时代至早期铁器时代东天山地区聚落遗址研究》, 西北大学 2014 年博士学位论文。)
- Xia, L.M., 1997. Gu Loulan ren dui sheng tai huan jing de shi ying—Luobupo di qu mu zang ma huang de wen hua si kao [Environmental accommodate of the ancient Loulan people: a consideration of the mortuary objects *Ephedra* of the Lop Nur]. *Zhongguo she hui ke xue [Soc Sci China]*, vol. 3, pp. 115-130. (夏雷鸣:《古楼兰人对生态环境的适应—罗布泊地区墓葬麻黄的文化思考》,《中国社会科学》, 1997 年第 3 期。)
- Xiao, X.Y., 2016. Xinjiang zao qi sang zang zhong de yong huo xian xiang [Use of Fire in Funerals in the Early Periods of Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1, pp. 56-65. (肖小勇:《新疆早期丧葬中的用火现象》,《西域研究》, 2016 年第 1 期。)
- Xie, C.Z., Liu, S.B., Cui, Y.Q., Zhu, H., Zhou, H., 2005. Xinjiang Chawuhugou gu dai ju min xian li ti DNA xu lie duo tai xing fen xi [Analysis of Mitochondrial DNA from the Ancient Tombs of Chawuhu]. *Jilin da xue xue bao (li xue ban) [Journal of Jilin University (Science Edition)]*, vol. 43, Nr. 4, pp. 438-540. (谢承志, 刘树柏, 崔银秋, 朱泓, 周慧:《新疆察吾呼沟古代居民线粒体 DNA 序列多态性分析》,《吉林大学学报(理学版)》, 2005 年第 43 卷第 4 期。)
- Xie, M.S., Yang, Y.M., Wang, B.H., Wang, C.S., 2013. Interdisciplinary Investigation on Ancient *Ephedra* Twigs from Gumugou Cemetery (2800 b.p.) in Xinjiang Region, Northwest China. *Microscopy Research and Technique*, vol. 76, pp. 663-672.
- Xie, M.S., Shevchenko, A., Wang, B.H., Shevchenko, A., Wang, C.S., Yang, Y.M., 2016. Identification of a dairy product in the grass woven basket from Gumugou Cemetery (3800 BP, northwestern China). *Quaternary International*, vol. 426, pp. 158-165.
- Xin, X.Y., 2015. Research on Prehistoric Hats in Xinjiang (2000 BC-200 BC). *Asian Social Science*, vol. 11, Nr. 7, pp. 333-340.
- Xin, X.Y. 2017. Research on the Structure and Techniques of Prehistoric Footwear Unearthed from Xinjiang. *Advances in Social Science, Education and Humanities Research*, vol. 144,

pp. 268-273.

Xin, X.Y., Kang, X.J., Yang, R.L., 2017. Xinjiang Yanghai mu di chu tu mao zhi wu shang hua jiao lu wen yuan yuan yan jiu [Research on the origin of Elk Pattern on the woolen Textile Unearthed from Yanghai Cemetery, Xinjiang]. *Zhuang Shi*, vol. 7, pp. 85-87. (信晓瑜, 康晓静, 杨汝林:《新疆洋海墓地出土毛织物上花角鹿纹渊源研究》,《装饰》,2017年第7期。)

Xinjiang dui, IACASS [Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences], Xinjiang Bayinguoleng meng gu zi zhi zhou wen guan suo, 1987. Xinjiang Luntai Qunbake gu mu zang di yi ci fa jue jian bao. *Kaogu*, vol. 11, pp. 987-996. (中国社会科学院考古研究所新疆队, 新疆巴音郭楞蒙古自治州文管所:《新疆轮台群罢课古墓葬第一次发掘简报》,《考古》,1987年第11期。)

Xinjiang dui, IACASS (Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences), Xinjiang Bayinguoleng meng gu zu zi zhi zhou wen guan suo, 1988. Xinjiang Hejing xian Chawuhugoukou yi hao mu [Cemetery Nr. 1 at Chawuhu Pass, Hejing County, Xinjiang]. *Kaogu Xuebao*, vol. 1, pp. 75-99. (中国社会科学院考古研究所新疆队, 新疆巴音郭楞蒙古自治州文管所:《新疆和静县察吾呼沟口一号墓》,《考古学报》,1988年第1期。)

Xinjiang dui, IACASS (Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences), Xinjiang Bayinguoleng Menggu zi zhi zhou wen guan suo, 1990. Xinjiang Hejing xian Chawuhugoukou er hao mu di fa jue jian bao. *Kaogu*, vol. 6, pp. 511-518. (中国社会科学院考古研究所新疆队, 新疆巴音郭楞蒙古自治州文管所:《新疆和静县察吾呼沟口二号墓地发掘简报》,《考古》,1990年第6期。)

Xinjiang dui, IACASS (Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences), Xinjiang Bayinguoleng Mengguzu zi zhi zhou wen guan suo, 1990. Xinjiang Hejing xian Chawuhugoukou san hao mu di fa jue jian bao. *Kaogu*, vol. 10, pp. 882-889. (中国社会科学院考古研究所新疆队。新疆巴音郭楞蒙古自治州文管所:《新疆和静县察吾呼沟口三号墓地发掘简报》,《考古》,1990年第10期。)

Xinjiang dui, IACASS [Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences], Xinjiang Bayinguoleng menggu zi zhi zhou wen guan suo, 1991. Xinjiang Luntai xian Qunbake mu zang di er san ci fa jue jian bao. *Kaogu*, vol. 8, pp. 684-736. (中国社会科学院考古研究所新疆队, 新疆巴音郭楞蒙古自治州文管所:《新疆轮台县

- 群巴克墓葬第二三次发掘简报》，《考古》，1991年第8期。)
- Xinjiang dui, IACASS [Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences], 2005. Xinjiang Tashkurgan Ji'ertzankale mu di fa jue bao gao [The excavation of the Jirzankal cemetery in Taxkorgan county, Xinjiang]. *Kaogu Xuebao*, vol. 2, pp. 229-251. (中国社会科学院考古研究所新疆队：《新疆塔什库尔干吉尔赞喀勒墓地发掘报告》，《考古学报》，2005年第2期。)
- Xinjiang dui, IACASS [Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences], 2006, Xinjiang Yutian xian Liushui qing tong shi dai mu di. *Kaogu*, vol.7. (中国社会科学院考古研究所新疆队：《新疆于田县流水青铜时代墓地》，《考古》，2006年第7期。)
- Xinjiang dui, IACASS [Xinjiang Team of Institute of Archaeology, Chinese Academy of Social Sciences], 2013. Xinjiang Jimusa'er xian Luanzagangzi yi zhi diao cha jian bao [A Brief Report on the excavation of Luanzagangzi Site in Jimusa County, Xinjiang]. *Bianjiang Kaogu Yanjiu [Res China's Front Archaeol]*, vol. 13, pp. 43-52. (中国社会科学院考古研究所新疆队：《新疆吉木萨尔县乱杂岗子遗址调查简报》，《边疆考古研究》，2013年第13期。)
- Xinjiang Museum, 2010. *Gu dai xi yu fu shi xie cui [Costume essence in ancient western regions]*. Wenwu Press, Beijing. (新疆博物馆：《古代西域服饰撷萃》，文物出版社2010年。)
- Xinjiang Museum, Bayingolin Mongol Autonomous Prefecture Cultural Relics Institute, Qiemo County Cultural Relics Institute, 2002. Qiemo Zaghunluq er hao mu di fa jue jian bao. *Xinjiang Wenwu*, vol. 1-2, pp.1-21. (新疆博物馆，巴音郭楞蒙古族自治州文管所，且末县文管所：《且末扎滚鲁克二号墓地发掘简报》，《新疆文物》，2002年第1-2期。)
- Xinjiang Museum, Bayingolin Mongol Autonomous Prefecture Cultural Relics Institute, Qiemo County Cultural Relics Institute, 2003. Xinjiang Qiemo Zaghunluq yi hao mu di fa jue bao gao. *Kaogu Xuebao*, vol. 3, pp. 89-136. (新疆博物馆，巴音郭楞蒙古族自治州文管所，且末县文管所：《新疆且末扎滚鲁克一号墓地发掘报告》，《考古学报》，2003年第3期。)
- Xinjiang Museum, Bayingolin Mongol Autonomous Prefecture Cultural Relics Institute, Qiemo County Cultural Relics Institute, 2003. 1998 nian Zaghunluq di san qi wen hua mu zang fa jue jian bao. *Xinjiang Wenwu*, vol. 1, pp. 1-19. (新疆博物馆，巴音郭楞蒙古族自治州文

- 管所，且末县文管所：《1998 年扎滚鲁克第三期文化墓葬发掘简报》，《新疆文物》，2003 年第 1 期。)
- Xinjiang Museum, Beijing Natural History Museum, and Xinjiang Geological Bureau Research Team, 1995. Tashiku'ergan xian Ji'rigale jiu shi qi shi dai yi zhi diao cha [Investigation of the Ji'rigale Paleolithic site in Tashkurgan County]. In: Xinjiang Institute of Cultural Relics & Archaeology (prin. ed), 1995. *Xinjiang Wenwu Kaogu xin shou huo (1979-1989) [New Achievements in Xinjiang Cultural Relics and Archaeology (1979-1989)]*. Urumchi: Xinjiang People's Press, pp. 1-3. (新疆维吾尔自治区博物馆，北京自然博物馆，新疆维吾尔自治区地质局区测大队：《塔什库尔干县吉日尕勒旧石器时代遗址调查》，见新疆文物考古研究所（编）：《新疆文物考古新收获（1979-1989）》，新疆人民出版社 1995 年，第 1-13 页。)
- Xinjiang Tulufan xue yan jiu yuan [Xinjiang Academia Turfanica], Xinjiang Wenwu Kaogu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], 2011. Xinjiang Shanshan Yanghai mu di fa jue bao gao [Excavation on the Yanghai Cemetery in Shanshan (Piqan) County, Xinjiang]. *Kaogu xuebao*, vol. 1, pp. 99-150. (新疆吐鲁番学研究，新疆文物考古研究所：《新疆鄯善洋海墓地发掘报告》，《考古学报》，2011 年第 1 期。)
- Xinjiang wei wu er zi zhi qu cong kan bian ji zu, 1984. *Tajike zu she hui li shi diao cha*. Xinjiang Renmin Press. (新疆维吾尔自治区丛刊编辑组：《塔吉克族社会历史调查》，新疆人民出版社 1984 年。)
- Xinjiang wei wu er zi zhi qu bo wu guan, Xinjiang she hui ke xue yuan kao gu yan jiu suo, 1979. *Jian guo yi lai Xinjiang kao gu de zhu yao shou huo*. In: *Wenwu Kaogu gong zuo san shi nian*. Wenwu Press, pp. 171-172. (新疆维吾尔自治区博物馆，新疆社会科学院考古研究所：《建国以来新疆考古的主要收获》，见《文物》月刊编辑委员会（编）：《文物考古工作三十年》，文物出版社 1979 年，第 171-172 页。)
- Xinjiang wei wu er zi zhi qu bo wu guan kao gu dui, 1981. Xinjiang Qitai xian Banjiegou xin shi qi shi dai yi zhi. *Kaogu*, vol. 6, pp. 552-553. (新疆维吾尔自治区博物馆考古队：《新疆奇台县半截沟新石器时代遗址》，《考古》，1981 年第 6 期。)
- Xinjiang wei wu er zi zhi qu wen guan hui, 1982. Xinjiang Mulei xian Sidaogou yi zhi. *Kaogu*, vol. 2, pp. 113-120. (新疆维吾尔自治区文管会：《新疆木垒县四道沟遗址》，《考古》，1982 年第 2 期。)
- Xinjiang wei wu er zi zhi qu bo wu guan, Tulufan di qu wen guan suo, 1982. Xinjiang Tulufan

- Aidinghu gu mu zang. *Kaogu*, vol. 4, pp. 365-372. (新疆维吾尔自治区博物馆, 吐鲁番地区文管所: 《新疆吐鲁番艾丁湖古墓葬》, 《考古》, 1982 年第 4 期。)
- Xinjiang wei wu er zi zhi qu bo wu guan, Heshuo xian wen hua guan, 1986. Heshuo xian Xintala, qu hui yuan shi wen hua yi zhi diao cha. *Xinjiang Wenwu*, vol. 1, pp. 1-5. (新疆维吾尔自治区博物馆, 和硕县文化馆: 《和硕县新塔拉曲惠原始文化遗址调查》, 《新疆文物》, 1986 年第 1 期。)
- Xinjiang wei wu er zi zhi qu wen wu pu cha ban gong shi, Tulufan di qu wen wu pu cha dui, 1988. Tulufan di qu wen wu pu cha zi liao. *Xinjiang Wenwu*, vol. 3, pp. 11-43. (新疆维吾尔自治区文物普查办公室, 吐鲁番地区文物普查队: 《吐鲁番地区文物普查资料》, 《新疆文物》, 1988 年第 3 期。)
- Xinjiang wei wu er zi zhi qu wen hua ting wen wu chu, Xinjiang da xue li shi xi wen bo gan bu zhuan xiu ban, 1989. Xinjiang Hami Yanbulake mu di. *Kaogu Xuebao*, vol.3. (新疆维吾尔自治区文化厅文物处, 新疆大学历史系文博干部专修班: 《新疆哈密焉不拉克墓地》, 《考古学报》, 1989 年第 3 期。)
- Xinjiang wei wu er zi zhi qu wen wu ko gu yan jiu suo, 2016. *Xinjiang Mohuchahan mu di*. Kexue Press. (新疆维吾尔自治区文物考古研究所: 《新疆莫乎察汗墓地》, 科学出版社 2016 年。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], 1987. Balikun xian Nanwan M95 hao mu shi jue jian bao. *Kaogu yu Wenwu*, vol. 5. (新疆文物考古研究所: 《巴里坤县南湾 M95 号墓试掘简报》, 《考古与文物》, 1987 年第 5 期。)
- 1987. Xinjiang Hejing xian Chawuhoukou si hao mu di 1986 nian du fa jue jian bao. *Xinjiang Wenwu*, vol. 1, pp. 1-9. (新疆文物考古研究所: 《新疆和静县察吾呼沟口四号墓地 1986 年度发掘简报》, 《新疆文物》, 1986 年第 1 期。)
- 1988. Xinjiang Heshuo Xintala yi zhi fa jue jian bao. *Kaogu*, vol. 5, pp. 399-476. (新疆文物考古研究所: 《新疆和硕新塔拉遗址发掘简报》, 《考古》, 1988 年第 5 期。)
- 1988. Chabucha'er xian Suodunbulake gu mu zang fa jue jian bao. *Xinjiang Wenwu*, vol. 2, pp. 19-26. (新疆文物考古研究所: 《察布查尔县索墩布拉克古墓葬发掘简报》, 《新疆文物》, 1988 年第 2 期。)
- 1992. Hami Wupu mudi 151, 152 hao muzang. *Xinjiang Wenwu*, vol. 3. (新疆文物考古研究所: 《新疆哈密五堡墓地 151、152 号墓葬》, 《新疆文物》, 1992 年第 3 期。)
- 1993. Shanshan Subeixi mu qun yi hao mu di fa jue jian bao. *Xinjiang Wenwu*, vol. 4, pp.

- 1-13. (新疆文物考古研究所:《鄯善苏贝希墓群一号墓地发掘简报》,《新疆文物》,1993年第4期。)
- 1999. Xinjiang Chabucha'er xian Suodunbulake gu mu qun. *Kaogu*, vol. 8, pp. 17-26. (新疆文物考古研究所:《新疆察布查尔县索墩布拉克古墓群》,《考古》,1999年第8期。)
- 1999. *Xinjiang Chawuhu—da xing shi zu mu di fa jue bao gao [Xinjiang Chawuhu—A Large-scale Clan Cemetery Excavation Report]*. Dongfang Press. (新疆文物考古研究所:《新疆察吾乎—大型氏族墓地发掘报告》,东方出版社1999年。)
- 2002. Nileke xian Qiongkeke yi hao mu di kao gu fa jue bao gao [Excavation of the Nr. 1 Cemetery at Qiongkeke in Nilek County]. *Xinjiang Wenwu*, vol. 3 & 4, pp. 13-53. (新疆文物考古研究所:《尼勒克县穷科克一号墓地考古发掘报告》,《新疆文物》,2002年第3&4期。)
- 2002. Xinjiang Baicheng xian Kiziltur mu di di yi ci fa jue. *Kaogu*, vol. 6, pp. 14-29. (新疆文物考古研究所:《新疆拜城县克孜尔墓地第一次发掘》,《考古》,2002年第6期。)
- 2003. 2002 nian Xiaohe mu di kao gu diao cha yu fa jue bao gao]. *Bianjiang Kaogu yanjiu [Res China's Front Archaeol]*, vol. 3, pp. 338-398. (新疆文物考古研究所:《2002年小河墓地考古调查与发掘报告》,《边疆考古研究》,2003年第3期。)
- 2004. Ili zhou ni le ke xian Qirentuohai mu di fa jue jian bao. *Xinjiang Wenwu*, vol. 3, pp. 60-87. (新疆文物考古研究所:《伊犁州尼勒克县奇仁托海墓地发掘简报》,《新疆文物》,2004年第3期。)
- 2007. Xinjiang Luobupo Xiaohe mu di 2003 nian fa jue jian bao [A Brief Excavation Report on Xiaohe Graveyard Located in Luobupo, Xinjiang Autonomous Region]. *Wenwu*, vol. 10, pp. 4-42. (新疆文物考古研究所:《新疆罗布泊小河墓地2003年发掘简报》,《文物》,2007年第10期。)
- 2011. Tuokexun xian Yu'ergou yi zhi mu di kao gu fa jue bao gao. *Xinjiang Wenwu*, vol. 2, pp. 92-120. (新疆文物考古研究所:《托克逊县鱼儿沟遗址墓地考古发掘报告》,《新疆文物》,2011年第2期。)
- 2012. *Xinjiang Xiabandi mu di*. Wenwu Press. (新疆文物考古研究所:《新疆下坂地墓地》,文物出版社2012年。)
- 2013. Xinjiang Altai di qu gu mu zang fa jue jian bao. *Wenwu*, vol. 3, pp. 4. (新疆文物考古研究所:《新疆阿勒泰地区古墓葬发掘简报》,《文物》,2013年第3期。)
- 2013. *Xinjiang Saensayi mu di*. Wenwu Press. (新疆文物考古研究所:《新疆萨恩萨依墓

- 地》，文物出版社 2013 年。)
- 2014. Wulumuqishi Yu'ergou yi zhi yu Alagou mu di. *Kaogu*, vol. 4, pp. 331-347. (新疆文物考古研究所：《乌鲁木齐市鱼儿沟遗址与阿拉沟墓地》，《考古》，2014 年第 4 期。)
- 2014. Xinjiang Hejing xian Mohuchahan mu di fa jue jian bao. *Kaogu yu Wenwu*, vol. 5, pp. 3-24. (新疆文物考古研究所：《新疆和静县莫乎察汗墓地发掘简报》，《考古与文物》，2014 年第 5 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Xinjiang da xue li shi xi 88 ji kao gu zhuan ye, Turfan di qu bo wu guan, Shanshan xian wen hua ju. 1997. Xinjiang Shanshan xian Sangeqiao gu mu zang de qiang jiu qing li fa jue. *Xinjiang Wenwu*, vol. 2, pp. 1-21. (新疆文物考古研究所，新疆大学历史系 88 级考古专业，吐鲁番地区博物馆，鄯善县文化局：《新疆鄯善县三个桥古墓葬的抢救清理发掘》，《新疆文物》，1997 年第 2 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Xinjiang da xue li shi xi, Tulufan di qu bo wu guan, Shanshan xian wen hua ju, 2002. Xinjiang Shanshan Sangeqiao fa jue jian bao. *Wenwu*, vol. 6, pp. 46-56. (新疆文物考古研究所，新疆大学历史系，吐鲁番地区博物馆，鄯善县文化局：《新疆鄯善三个桥发掘简报》，《文物》，2002 年第 6 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hami di qu wen guan suo, 1991. Hami-Balikun gong lu gai xian kao gu diao cha. *Xinjiang Wenwu*, vol. 1, pp. 5-12. (新疆文物考古研究所，哈密地区文管所：《哈密-巴里坤公路改线考古调查》，《新疆文物》，1991 年第 1 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hami di qu wen wu guan li suo, 2004. 1996 nian Hami Huntian Shangmiaoergou cun yi hao mu di fa jue jian bao. *Xinjiang Wenwu*, vol. 2, pp. 1-26. (新疆文物考古研究所，哈密地区文物管理所：《1996 年哈密黄田上庙尔沟村一号墓地发掘简报》，2004 年第 2 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hejing xian wen hua guan, 1988. Hejing Chawuhugou si hao mu di 1987 nian du fa jue jian bao. *Xinjiang Wenwu*, vol. 4, pp. 1-27. (新疆文物考古研究所，和静县文化馆：《和静察吾乎沟四号墓地 1987 年度发掘简报》，《新疆文物》，1988 年第 4 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hejing xian wen hua guan, 1989. Hejing xian Chawuhugou er hao mu. *Xinjiang Wenwu*,

- vol. 4, pp. 11-33. (新疆文物考古研究所, 和静县文化馆:《和静县察吾乎沟二号墓》,《新疆文物》,1989年第4期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hejing xian wen hua guan, 1990. Hejing xian Chawuhugou san hao mu di fa jue jian bao. *Xinjiang Wenwu*, vol. 1, pp. 1-19. (新疆文物考古研究所, 和静县文化馆:《和静县察吾乎沟三号墓地发掘简报》,《新疆文物》,1990年第1期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hejing xian wen hua guan, 1992. Hejing xian Chawuhugou wu hao mu di fa jue jian bao. *Xinjiang Wenwu*, vol. 2, pp. 15-30. (新疆文物考古研究所, 和静县文化馆:《和静县察吾乎沟五号墓地发掘简报》,《新疆文物》,1992年第2期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hejing xian min zu bo wu guan, 1999. Hejing xian Baileqi'er shi wei mu fa jue jian bao. *Xinjiang Wenwu*, vol. 3 & 4, pp. 30-60. (新疆文物考古研究所, 和静县民族博物馆:《和静县拜勒其尔石围墓发掘简报》,《新疆文物》,1999年第3&4期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Ili ha sa ke zi zhi zhou wen wu ju, Nileke xian wen wu ju [Culture Bureau of the Ili Kazakh Autonomous Prefecture], 2017. Xinjiang Nileke xian Jirentai Goukou yi zhi. *Kaogu*, vol. 7, pp. 57-70. (新疆文物考古研究所, 伊犁哈萨克自治州文物局, 尼勒克县文物局:《新疆尼勒克县吉仁台沟口遗址》,《考古》,2017年第7期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Ili ha sa ke zi zhi zhou wen wu ju, Nileke xian wen wu ju [Culture Bureau of the Ili Kazakh Autonomous Prefecture], Nileke xian wen guan suo [Culture Bureau of Nilka County], 2018. The Jartai Pass Site in Nilka County, Xinjiang. *Chinese Archaeology*, vol. 18, Nr. 1, pp. 38-51.
- Xinjiang wen wu kaogu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Northwest University Research Center of Cultural Heritage and Archaeology, 2007. 2006 nian Balikun Dongheigou yi zhi fa jue. *Xinjiang Wenwu*, vol. 2, pp. 32-60. (新疆文物考古研究所, 西北大学文化遗产与考古学研究中心:《2006年巴里坤东黑沟遗址发掘》,《新疆文物》,2007年第2期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Northwest University Research Center of Cultural Heritage and Archaeology, 2009.

- Xinjiang Balikun xian Dongheigou yi zhi 2006-2007 nian fa jue jian bao. *Kaogu*, vol. 1, pp. 3-27. (新疆文物考古研究所, 西北大学文化遗产与考古学研究中心:《新疆巴里坤县东黑沟遗址 2006-2007 年发掘简报》,《考古》, 2009 年第 1 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Tulufan di qu bo wu guan, 1994. Shanshan xian Subeixi mu qun san hao mu di. *Xinjiang Wenwu*, vol. 2, pp. 1-20, 32. (新疆文物考古研究所, 吐鲁番地区博物馆:《鄯善县苏贝希墓群三号墓地》,《新疆文物》, 1994 年第 2 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Tulufan di qu bo wu guan, 2002. Xinjiang Shanshan xian Subeixi yi zhi ji mu di. *Kaogu*, vol. 6, pp. 522-537. (新疆文物考古研究所, 吐鲁番地区博物馆:《新疆鄯善县苏贝希遗址墓地》,《考古》, 2002 年第 6 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Hami di qu wen wu guan li duo, 2002. Xinjiang Hami shi Aisikexiaer mu di kao gu fa jue. *Kaogu*, vol. 6. (新疆文物考古研究所, 哈密地区文物管理所:《新疆哈密市艾斯克霞尔墓地的发掘》,《考古》, 2002 年第 6 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Tulufan di qu bo wu guan, 2003. The Subeixi Site and Cemeteries in Shanshan County, Xinjiang. *Chinese Archaeology*, vol. 3, Nr. 1, pp. 135-142.
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Tulufan di qu wen wu ju [Turfan Cultural Relics Bureau], 2004. Xinjiang Shanshan xian Yanghai mu di de kao gu xin shou huo. *Kaogu*, vol. 5, pp. 387-391. (新疆文物考古研究所, 吐鲁番地区文物局:《新疆鄯善县洋海墓地的考古新收获》,《考古》, 2004 年第 5 期。)
- Xinjiang wen wu kao gu yan jiu suo [Xinjiang Institute of Cultural Relics & Archaeology], Urumqi shi wen wu guan li suo [Urumqi Municipal Office for the Presevation of Cultural Relics], 2012. Xinjiang Urumqi Saensayi mu di fa jue jian bao [Excavation of the Sa'ensayi Cemetery in Urumchi, Xinjiang]. *Wenwu*, vol. 5, pp. 4-12. (新疆文物考古研究所, 乌鲁木齐市文物管理所:《新疆乌鲁木齐萨恩萨依墓地发掘简报》,《文物》, 2012 年第 5 期。)
- Xinjiang she hui ke xue yuan kao gu yan jiu suo, 1981. Xinjiang Alagou shu xue mu guo mu fa jue jian bao. *Wenwu*, vol. 1, pp. 18-22. (新疆社会科学院考古研究所:《新疆阿拉沟竖穴木椁墓发掘简报》,《文物》, 1981 年第 1 期。)

- Xu, Y.F., Wang, B., 2002. Bu'erjin xian shi ren lu shi de diao cha. *Xinjiang Wenwu*, vol. 1 & 2, pp. 38-50. (徐玉峰, 王博:《布尔津县石人、鹿石的调查》,《新疆文物》,2002年第1、2期。)
- Xu, Y.Q., 2015. Cong xin jin de kao gu fa xian kan si ji tai ren zai zhong xi jiao liu zhong de zuo yong he di wie. *Pingdingshan xue yuan xue bao [Journal of Pingdingshan University]*, vol. 30 Nr.6, pp: 53-58. (徐艳芹:《从新近的考古发现看斯基泰人在中西交流中的作用和地位》,《平顶山学院学报》,2015年第30卷第6期。)
- Yan, W.M., 1978. Gansu cai tao de yuan liu. *Wenwu*, vol. 10. (严文明:《甘肃彩陶的源流》,《文物》,1978年第10期。)
- Yang, C.P., Zhao, Y.F., Wu, X.J., 2010. Xinjiang Shanshan Yanghai di qu qing tong-tie qi shi dai ren qun tou mian bu xing tai te zheng guan cha [Exploring the craniofacial morphology of bronze age-iron age of Shanshan Yanghai populations in Xinjiang]. In: Dong. W. (ed), *Proceedings of the Twelfth Annual Meeting of the Chinese Society of Vertebrate Paleontology*. Beijing: China Ocean Press, pp: 121-132. (杨翠平, 赵亚峰, 吴秀杰:《新疆鄯善洋海地区青铜-铁器时代人群头面部形态特征观察》,见董为(主编):《第十二届中国古脊椎动物学学术年会论文集》,海洋出版社2010年,第121-132页。)
- Yang, J.H., 2004. *Chun qiu zhan guo shi qi zhong guo bei fang wen hua dai de xing cheng*. Wenwu Press. (杨建华:《春秋战国时期中国北方文化带的形成》,文物出版社2014年。)
- Yang, J.H., Shao, H.Q., Pan, L., 2020. *The Metal Road of the Eastern Eurasian Steppe*. Springer Singapore.
- Yang, R.P., Yang, Y.M., Li, W.Y., Abuduresule, Y., Hu, X.J., Wang, C.S., Jiang, H.E., 2014. Investigation of cereal remains at the Xiaohe Cemetery in Xinjiang, China. *Journal of Archaeological Science*, vol. 49, pp. 42-47.
- Yang, Y.M., 2020. Archaeometry should be based on Archaeology, A comment on Lin et al. (2019). *Journal of Archaeological Science*, vol. 119, Nr.105149, pp. 1-4.
- Yang, Y.Y., 1999. Xinjiang gu dai wen hua de fu za xing ji qi xiang guan wen ti de tan tao. *Xinjiang Wenwu*, vol. 3-4. (羊毅勇:《新疆古代文化的复杂性及其相关问题的探讨》,《新疆文物》,1999年第3-4期。)
- Yang, Z.X., 2018. *Hami Tianshanbeilu mu di chu tu tong qi de ke xue fen xi [Scientific Study on the Bronze from Tianshanbeilu Cemetery]*. Master Thesis from Northwest University. (杨曾欣:《哈密天山北路墓地出土铜器的科学分析》,西北大学2018年硕士学位论文。)

- You, Y., Wang, J.X., Zhao, X., Ling, X., Chen, X.L., Ma, J., Ren, M., Yuan, J., 2014. Xinjiang Shirenzigou yi zhi chu tu Shuang feng tuo de dong wu kao gu xue yan jiu [A Zooarchaeological Research on Bactrian Camel Bones in the Shirenzigou site, Xinjiang]. *Di si ji yan jiu [Quaternary Sciences]*, vol. 34, Nr.1, pp. 173-186. (尤悦, 王建新, 赵欣, 凌雪, 陈相龙, 马健, 任萌, 袁靖:《新疆石人子沟遗址出土双峰驼的动物考古学研究》,《第四纪研究》,2014年第34卷第1期。)
- You, Y., Lv, P., Wang, J.X., Ma, J., Ren, M., 2018. The emergence and early utilization of domestic sheep in Xinjiang. *Chinese Archaeology*, vol. 18, pp. 172-179.
- Young Jr, T.C., 1965. A Comparative Ceramic Chronology for Western Iran, 1500-500BC. *Iran*, vol. 3, pp. 53-85.
- Yu, J.J., 2018. 2016-2017 nian Xinjiang Jimunai xian Tongtiandong yi zhi kao gu fa jue xin shou huo [The new achievements on the excavation from Tongtiandong Cave Site]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 8, pp. 132-135. (于建军:《2016-2017年新疆吉木乃县通天洞遗址考古发掘新收获》,《西域研究》,2018年第8期。)
- Yu, J.J., He, J.N., 2017. Xinjiang Jimunai Tongtiandong yi zhi fa jue huo zhong yao shou huo [The great achievements from Xinjiang Tongtiandong Site]. *Zhongguo Wenwu Bao*, 2017, December 1st. (于建军, 何嘉宁:《新疆吉木乃通天洞遗址发掘获重要收获》,《中国文物报》2017年12月1日。)
- Yu, X.F., 1992. Xinjiang Hami Wupu 152 hao gu mu chu tu nong zuo wu fen xi. *Xinjiang Wenwu*, vol. 3. (于喜凤:《新疆哈密五堡152号古墓出土农作物分析》,《新疆文物》,1992年第3期。)
- Yuan, X., Luo, J.M., Ruan, Q.R., 2020. Xinjiang Nileke xian Jirentai goukou yi zhi 2019 nian fajue shou huo yu chu bu ren shi [Preliminary Studies on the Excavation of the Jirentai Goukou Site in Nileke County of Xinjiang 2019]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 1, pp. 120-125. (袁晓, 罗佳明, 阮秋荣:《新疆尼勒克县吉仁台沟口遗址2019年发掘收获与初步认识》,《西域研究》,2020年第1期。)
- Zhang C., 1996. 1990 zhi 1995 nian Xinjiang jing nei de jiu shi qi diao cha gong zuo yu shou huo [Paleolithic investigations and achievements in Xinjiang, 1990-1995]. *Xinjiang Wenwu*, vol. 4, pp. 57-64. (张川:《1990至1995年新疆境内的旧石器调查工作与收获》,《新疆文物》,1996年第4期。)
- Zhang C., 1997. Lun Xinjiang shi qian kao gu wen hua de fa zhan jie duan. *Xiyu Yanjiu [The*

- Western Regions Studies*], vol. 3. (张川:《论新疆史前考古文化的发展阶段》,《西域研究》,1997年第3期。)
- Zhang, C.A., 1997. Qian xi qing tong shi dai Hami de nong ye sheng chan zhuang kuang [Brief Study on Agricultural Production of Hami in Bronze Age]. *Nongye Kaogu*, vol. 3, pp. 41–50. (张成安:《浅析青铜时代哈密的农业生产状况》,《农业考古》,1997年第3期。)
- Zhang, C., Festa, M., 2020. Archaeological Research in the Ili Region: A Review. *Asian Perspectives*, vol. 59, Nr. 2, pp. 338-384.
- Zhang, F., 2010. Xinjiang dong bu di qu gu wen hua tan wei. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 2. (张凤:《新疆东部地区古文化探微》,《西域研究》,2010年第2期。)
- Zhang, F., Ning, C., Scott, A., Fu, Q.M., Bjørn, R., Li, W.Y., Wie, D., Wang, W.J., Fan, L.Y., Abuduresule, I., Hu, X.J., Ruan, Q.R., Niyazi, A., Dong, G.H., Cao, P., Liu, F., Dai, Q.Y., Feng, X.T., Yang, R.W., Tang, Z.H., Ma, P.C., Li, C.X., Gao, S.Z., Xu, Y., Wu, S.H., Wen, S.Q., Zhu, H., Zhou, H., Robbeets, M., Kumar, V., Krause, J., Warinner, C., Jeong, C.W., Cui, Y.Q., 2021. The genomic origins of the Bronze Age Tarim Basin mummies. *Nature (2021)*, <https://doi.org/10.1038/s41586-021-04052-7>
- Zhang, G.L., Wang, S.Z., Ferguson, D.K., Yang, Y.M., Liu, X.Y., Jiang, H.E., 2015. Ancient Plant use and paleoenvironmental analysis at the Gumugou Cemetery, Xinjiang, China: implication from desiccated plant remains. *Archaeol Anthropol Sci*, vol. 9, pp. 145-152.
- Zhang, J., ed. 1993. *Balikun Hasake zi zhi xian zhi [Gazetteer of Barkol Kazakh County]*. Urumqi: Xinjiang University Press. (张建国(编):《巴里坤哈萨克自治县志》,新疆大学出版社1993年。)
- Zhang, J.B., Wu, X.H., Li, L.M., Jin, L., Li, H., Tan, J.Z., 2011. Xinjiang Yutian Liushui mu di qing tong shi dai ren lei lu gu de fei lian xu xing te zheng yan jiu [Cranial Non-metric Evidence for Population Admixture Between East and West Eurasia in Bronze Age, Southwestern Xinjiang]. *Renleixue xuebao [Acta Anthropologica Sinica]*, vol. 30, Nr. 4, pp. 379-404. (张建波,巫新华,李黎明,金力,李辉,谭婧泽:《新疆于田流水墓地青铜时代人类颅骨的非连续性特征研究》,《人类学学报》,2011年第30卷第4期。)
- Zhang, J.P., Lv, H.Y., Jia, W.M., Flad R., Wu, N.Q., Betts, A., 2017. Cultivation strategies at the ancient Luanzagangzi settlement on the easternmost Eurasian steppe during the late Bronze Age. *Veget Hist Archaeology*, vol. 26, pp. 505-512.
- Zhang, L.H., Zhu, H., 2009. Xinjiang Shanshan Yanghai qing tong shi dai ju min lu gu chuang

- shang yan jiu [Xinjiang Province, Yanghai site, Bronze Age inhabitants cranial trauma research]. *Bianjiang kaogu yanjiu [Res China's Front Archaeol]*, vol. 0, pp: 327-335. (张林虎, 朱泓:《新疆鄯善洋海青铜时代居民颅骨创伤研究》,《边疆考古研究》,2009年第0期。)
- Zhang, P., 1999. Cong Kizil yi zhi he mu zang kan Qiuci qing tong shi dai de wen hua [Approaching the Bronze Cultures in Kucha from the Kizil Relics and Tombs], *Xinjiang Wenwu*, vol. 2, pp. 59-65. (张平:《从克孜尔遗址和墓葬看龟兹青铜时代的文物》,《新疆文物》,1999年第2期。)
- Zhang, Q.C., Chang, X.E., Liu, G.R., 2009. Xinjiang Balikun xian Heigouliang mu di chu tu ren gu de shi xing fen xi [Stable Isotopic Analysis on Human Bones from Heigouliang Cemetery in Barkol, Xinjiang]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 3, pp. 45-49. (张全超, 常喜恩, 刘国瑞:《新疆巴里坤县黑沟梁墓地出土人骨的食性分析》,《西域研究》,2009年第3期。)
- Zhang, Q.C., Chang, X.E., Liu, G.R., 2010. Xinjiag Hami Tianshanbeilu mu di chu tu ren gu de wen ding tong wei su fen xi [Stable Isotopic Analysis of Human Bones Unearthed from Tianshanbeilu Cemetery in Hami, Xinjiang]. *Xiyu yanjiu [The Western Regions Studies]*, vol. 2, pp. 38-43. (张全超, 常喜恩, 刘国瑞:《新疆哈密天山北路墓地出土人骨的稳定同位素分析》,《西域研究》,2010年第2期。)
- Zhang, Q.C., Li, S.Y., 2006. Xinjiang Nileke xian Qiongkeke yi hao mu di gu dai ju min de shi wu jie gou fen xi [Analysis of Food Sturcture of Ancient Inhabitants in Nr. 1 Cemetery of Qiongkeke]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 4, pp. 78-81. (张全超, 李溯源:《新疆尼勒克县穷科克一号墓地古代居民的食物结构分析》,《西域研究》,2006年第4期。)
- Zhang, Q.C., Wang, M.H., Jin, H.Y., Zhu, H., 2005. Xinjiang Hejing xian Chawuhugoukou si hao mu di chu tu ren gu hua xue yuan su de han liang fen xi [Analysis of Chemical Elements of Human Bone in Bronze Age from Cemetery Nr. 4 of Chawuhugoukou, Xinjiang]. *Renlei xuebao [Acta Anthropo Ogica Sinica]*, vol., 24, Nr. 4. (张全超, 王明辉, 金海燕, 朱泓:《新疆和静县察吾呼沟口四号墓地出土人骨化学元素的含量分析》,《人类学报》,2005年第24卷第4期。)
- Zhang, Q.C., Zhu, H., Jin, H.Y., 2006. Xinjiang Luobunaoer Gumugou qing tong shi dai ren gu wei liang yuan su de chu bu yan jiu [Analysis of Trace Elements in Bronze Age Human

- Bone from Gumugou Cemetery in Luobunaoer, Xinjiang]. *Kaogu yu Wenwu*, vol. 6, pp. 99-103. (张全超, 朱泓, 金海燕:《新疆罗布淖尔古墓沟青铜时代人骨微量元素的初步研究》,《考古与文物》,2006年第6期。)
- Zhang, Q.C., Zhu, H., 2011. Xinjiang Gumugou mu di ren gu de wen ding tong wei su fen xi—Zao qi Luobupo xian min yin shi jie gou chu tan [Carbon and Nitrogen Stable Isotope Analysis of the Human Bones from the Gumugou Cemetery in Xinjiang: A Preliminary Exploration of the early Population Dietary in Lop Nur]. *Xiyu Yanjiu [The Western Regions Studies]*, vol. 3, pp. 91-96. (张全超, 朱泓:《新疆古墓沟墓地人骨的稳定同位素分析—早期罗布泊先民饮食结构初探》,《西域研究》,2011年第3期。)
- Zhang, S.S., 1990. Slow development and cultural communication of the Paleolithic industries in North China. *Acta Anthropologica Sinica*, vol. 9, pp: 322-334.
- Zhang, W.X., Zhang, Q., McSweeney, K., Han, T., Man, X.Y., Yang, S.Y., Wang, L., Zhu, H., Zhao, Q.C., Wang, Q., 2020. Violence in the first millennium BCE Eurasian steppe: Cranial trauma in three Turfan Basin populations from Xinjiang, China. *American journal of physical anthropology*, pp. 1-14. DOI: 10.1002/ajpa.24194.
- Zhang, X., Good, I., Laursen, R., 2008. Characterization of dyestuffs in ancient textiles from Xinjiang. *Journal of Archaeological Science*, vol. 35, 1095-1103.
- Zhang, X.L., Qiu, S.H., Zhang, J., Guo, W., 2014. Xinjiang Duogang mu di chu tu ren gu de tan dan wen ding tong wie su fen xi. *Nanfang Wenwu*, vol. 3, pp. 79-59. (张雪莲, 仇士华, 张君, 郭物:《新疆多岗墓地出土人骨的碳氮稳定同位素分析》,《南方文物》,2014年第3期。)
- Zhang, X.Y., Luo, Y.B., 2014. Zhong guo luo tuo xun hua qi yuan de kao gu xue guan cha [Archaeological Observation on the Origin of Domesticated Camels in China]. *Gujin Nongye*, vol. 1, pp. 47-55. (张小云, 罗运兵:《中国骆驼驯化起源的考古学观察》,《古今农业》,2014年第1期。)
- Zhang, X.Y., Wei, D., Wu, Y., Nie, Y., Hu, Y.W., 2016. Xinjiang Xiabandi mu di ren gu de C N wen ding tong wei su fen xi: 3500 nian qian dong xi fang wen hua jiao liy de qi shi [Carbon and nitrogen stable isotope ratio analysis of Bronze Age humans from the Xiabandi cemetery, Xinjiang, China: Implications form cultural interactions between the East and West]. *Kexue tongbao [Chin Sci Bull]*, vol. 61, Nr. 32, pp. 3509-3519. (张昕煜, 魏东, 吴勇, 聂颖, 胡耀武:《新疆下坂地墓地人骨的 C, N 稳定同位素分析: 3500

- 年前东西方文化交流的启示》，《科学通报》，2016年第61卷第32期。)
- Zhang, Y., Meyers, P. A., Liu, X.T., Wang, G.P., Ma, X.H., Li, X.Y., Yuan, Y.X., Wen, B.L., 2016. Holocene climate changes in the central Asian mountain region inferred from a peat sequence from the Altai Mountains, Xinjiang, northwestern China. *Quaternary Science Reviews*, vol. 152, pp:19-30.
- Zhang, Y.F., Mo, D.W., Hu, K., Bao, W.B., Li, W.Y., Abuduresule, I., Storzum, M.J., Kidder, T.R., 2017. Holocene environmental changes around Xiaohe Cemetery and its effects on human occupation, Xinjiang, China. *J. Geogr. Sci*, vol. 27, Nr. 6, pp. 752-768.
- Zhang, Y.Z., 1987. Tianshan A'lagou kao gu kao cha yu yanjiu. *Xibei Shidi*, vol. 3. (张玉忠：《天山阿拉沟考古学考察与研究》，《西北史地》，1987年第3期。)
- Zhang, Y.Z., 2007. Xinjiang Bu'erjin xian chu tu de gan lan xing tao guan. *Wenwu*, vol. 1. (张玉忠：《新疆布尔津县出土的橄榄形陶罐》，《文物》，2007年第1期。)
- Zhang, Z.P., 1987. Qijia wen hua yan jiu (xia). *Kaogu Xuebao*, vol. 2. (张忠培：《齐家文化研究(下)》，《考古学报》，1987年第2期。)
- Zhao, H.X., Li, Q.H., Liu, S., Gan, F.X., 2013. Characterization of microcrystals in some ancient glass beads from china by means of confocal Raman microspectroscopy. *Journal of Raman Spectroscopy*, vol. 44, Nr. 4, pp. 643-649.
- Zhao, H.Y., Zhou, W.J., Du, H., Cheng, P., Jia, P., Gong, W., 2020. Human dietary complexity in Tianshan region and the influence of climate on human paleodiet. *Radiocarbon*, vol. 62, Nr.5, pp. 1489-1502.
- Zhao, K.L., Li, X.Q., Zhou, X.Y., Dodson, J., Ji, M., 2012. Xinjiang Xintala yi zhi nong ye huo dong te zheng ji qi ying xiang de zhi wu zhi biao ji lu [Characteristic of agricultural activities and its impact on the environment at Xintala site, Xinjiang, reconstructed from archaeological plant remains]. *Di si ji yan jiu [Quaternary Sciences]*, vol. 32, Nr. 2, pp. 219-225. (赵克良, 李小强, 周新郢, John Dodson, 纪明：《新疆新塔拉遗址农业活动特征及其影响的植物指标记录》，《第四纪研究》，2012年第32卷第2期。)
- Zhao, K.L., Li, X.Q., Zhou, X.Y., Dodson, J., Ji, M., 2013. Impact of agriculture on an oasis landscape during the late Holocene: Palynological evidence from the Xintala site in Xinjiang, NW China. *Quaternary International*, vol. 311, pp. 81-86.
- Zhao, X., Rodrigues, A.T., You, Y., Wang, J.X., Ma, J., Ren, M., Yuan, J., Yang, D.Y., 2014. Xinjiang Shirezigou yi zhi chu tu jia ma de DNA yan jiu [Ancient DNA analysis of

- ancient horse remains from Shirezigou site, Xinjiang, China]. *Di si ji yan jiu [Quaternary Sciences]*, vol. 34, Nr.1, pp. 187-195. (赵欣, Antonia T Rodrigues, 尤悦, 王建新, 马健, 任萌, 袁靖, 杨东亚:《新疆石人子沟遗址出土家马的 DNA 研究》,《第四纪研究》,2014 年第 34 卷第 1 期。)
- Zhao, Y., 2014. Xinjiang Qiemo Zaghunluq 49 hao mu chu tu bo li bei de nian dai wen ti. *Kaogu yu Wenwu*, 4, 77-80. (赵永:《新疆且末扎滚鲁克 49 号墓出土玻璃杯的年代问题》,《考古与文物》,2014 年第 4 期。)
- Zhao, Y.B., Zhang, Y., Li, H.J., Cui, Y.Q., Zhu, H., Zhou, H., 2014. Ancient DNA evidence reveals that the Y chromosome haplogroup Q1a1 admixed into the Han Chinese 3,000 years ago. *American Journal of Human Biology*, vol. 26, pp. 813-821.
- Zhao, Z.Q., 2016. *Xinjiang Balikun Shirezigou yi zhi qun chu tu bo li zhu de cheng fen ti xi yu zhi zuo gong yi yan jiu [The Chemical Composition and Manufacture Process of the Glass Beads Excavated from Shirezigou Sites in Balikun County, Xinjiang]*. Master Thesis of Northwest University. (赵志强:《新疆巴里坤石人子沟遗址群出土玻璃珠的成分体系与制作工艺研究》,西北大学 2016 年硕士学位论文。)
- Zhongguo kao gu xue hui, 1985. *Zhongguo kao gu xue nian jian*. Wenwu Press. (中国考古学会:《中国考古学年鉴》,文物出版社 1985 年。)
- Zhou, J.L., 1994. Chu lun Chawuhu wen hua cai tao. *Xinjiang Wenwu*, vol. 2, pp. 60-70. (周金玲:《初论察吾呼文化彩陶》,《新疆文物》,1994 年第 2 期。)
- Zhou, J.L., 1998. Xinjiang Chawuhugou gu mu fa jue ji qi yan jiu. *Xiyu yanjiu [The Western Regions Studies]*, vol. 2, pp. 38-45. (周金玲:《新疆察吾呼沟古墓发掘及其研究》,《西域研究》,1998 年第 2 期。)
- Zhou, J.L., 2000. Hejing Baileqi'er mu di fa jue yu yan jiu. *Xinjiang Wenwu*, vol. 1 & 2, pp. 41-45. (周金玲:《和静拜勒其尔墓地发掘与研究》,《新疆文物》,2000 年第 1&2 期。)
- Zhou, W.H., 2016. Xinjiang Wupu mu di chu tu gan zao pi ge wen wu de lue bian yu bao hu [Deterioration and conservation of archaeological dry leather]. *Wenwu bao hu yu kao gu ke xue [Sciences of Conservation and Archaeology]*, vol., 28, Nr. 1, pp. 47-53. (周文晖:《新疆五堡墓地出土干燥皮革文物的劣变与保护》,《文物保护与考古科学》,2016 年第 28 卷第 1 期。)
- Zhu, B.Q., Yu, J.J., Qin, X.G., Rioual, P., Xiong, H.G., 2012. Climatic and Geological factors contributing to the natural water chemistry in an arid environment from watersheds in

- Northern Xinjiang, China. *Geomorphology*, vol. 153-154, pp. 102-114.
- Zhu, H., Zhang, X., Li, W.Y., Abuduresule, Y., 2018. Bioarchaeological analysis of Bronze Age populations in the Xiaohe cemetery using dental nonmetric traits. *Asian Archaeology*, vol. 1, pp. 111-121.
- Zhu, Y.P., 2016. *Xinjiang Shanshan xian Yanghai mu di chu tu bo li zhu de cheng fen ti xi he zhi zuo gong yi yan jiu [The Chemical Composition and Manufacture Process of the Glass Beads Excavated from Yanghai cemetery in Shanshan County, Xinjiang]*. Master Thesis of Northwest University. (朱瑛培:《新疆鄯善县洋海墓地出土玻璃珠的成分体系和制作工艺研究》, 西北大学 2018 年硕士学位论文。)
- Zhu, Z.Y., Gao, L., 2015. Xinjiang Jiushiqi, Xishiqi yan jiu de cheng jiu wen ti yu zhan wang [The Achievements, Problem and Prospects of Paleolithic Microlithic Study in Xinjiang]. *Bianjiang kaogu yanjiu [Res China's Front Archaeol]*, vol. 18, pp: 93-104. (朱之勇, 高磊:《新疆旧石器, 细石器研究的成就, 问题与展望》,《边疆考古研究》, 2015 年第 18 期。)

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Di qiu hua xue 地球化学
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Dongfang Press 东方出版社
Guangxi min zu da xue xue bao 广西民族大学学报
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Xinjiang she hui ke xue [Soc Sci Xinjiang] 新疆社会科学
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Yi shu tan suo 艺术探索
Zhi shi chan quan Press 知识产权出版社
Zhongguo guo jia bo wu guan guan kan [Journal of National Museum of China] 中国国家博物馆馆刊
Zhongguo Wenwu Bao 中国文物报
Zhongguo yin yue xue (ji kan) [Musicology in China] 中国音乐学(集刊)
Zhonghua Shuju 中华书局
Zhongya Xuekan 中亚学刊
Zhongyang min zu da xue xue bao 中央民族大学学报
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Institutions

- Aksu Bureau of Cultural Relics 阿克苏文物局
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Paleontology and Paleanthropology of Chinese Academy of Science 中国科学院古脊椎动物与古人类研究所

Geographical Names

Adunqiaolu 阿敦乔鲁	Junggar Basin 准噶尔盆地	哈台山地
Aidinghu 艾丁湖	Kaerdun 喀尔墩	Sidaogou 四道沟
Aisikexiaer 艾斯克霞尔	Kaidu River 开都河	Shanshan 鄯善
Alagou 阿拉沟	Kalasu River 喀拉苏河	Shengjindian 胜金店
Altai Mountain 阿尔泰山	Karakoram 喀喇昆仑山	Shirenzigou 石人子沟
Altun Mountain 阿尔金山	Kashi 喀什	Shuangzha E'bo 双闸鄂博
Ancient Yarguhl City 交河故城	Ke'ermuqi 克尔木齐	Shuidonggou 水洞沟
Baicheng 拜城	Kezier (Kizil) 克孜尔	Subeixi 苏贝希
Baishitou 白石头	Keriyar River 克里雅河	Suodunbulake 索墩布拉克
Baileqi'er 拜勒其尔	Khunjerab Pass 红其拉甫山口	Tacheng (Tarbaghatay) 塔城
Balikun 巴里坤	Kongque River 孔雀河	Taklimakan Deser 塔克拉玛干沙漠
Banjiegou 半截沟	Korla 库尔勒	Tarim Basin 塔里木盆地
Bayingolin 巴音郭楞	Kuche 库车	Tashkurgan 塔什库尔干
Bogda Snow Peak 博格达雪峰	Kunlun Mountain 昆仑山	Tianshanbeilu 天山北路
Boertala 博尔塔拉	Kurtuktag Mountain 库鲁克塔格山	Tianshan Mountain 天山
Bosten Lake 博斯腾湖	Lanzhouwanzi 兰州湾子	Tongdiandong 通天洞
Chabuchaer 察布查尔	Liushui 流水	Tuobeiliang 托背梁
Chaiwopu 柴窝堡	Lop Nur 罗布泊	Turfan 吐鲁番
Changji 昌吉	Loulun 楼兰	Tuyugou 吐峪沟
Chawuhu (goukou) 察吾乎(沟口)	Luanzagangzi 乱杂岗子	Ulugh Mutagh Snow Peak 木孜塔格峰
Cherchen (Qarqan) River 车尔臣河	Luntai 轮台	Urumchi 乌鲁木齐
Dabancheng 达坂城	Luotuoshi 骆驼石	Wupu 五堡
Dongheigou 东黑沟	Miaoergou 庙尔沟	Xiabandi 下坂地
Duogang 多岗	Mohuchahan 莫乎查汗	Xiangbaobao 香宝宝
Ertix River 额尔齐斯河	Mulei 木垒	Xiaohe 小河
Gaojia E'bo 高家鄂博	Muzhate River 木扎特河	Xigou 西沟
Gumugou 古墓沟	Nanwan 南湾	Xintala 新塔拉
Hami (Kumul) 哈密	Nileke 尼勒克	Yanbulaq 焉不拉克
Hanqigou 寒气沟	Nijia E'bo 倪家鄂博	Yeniuquan Spring 野牛泉
Heigouliang 黑沟梁	Pamir Plateau 帕米尔高原	Yanghai 洋海
Hejing 和静	Qaramay 克拉玛依	Yanqi Basin 焉耆盆地
Heshuo 和硕	Qiemuerqieke 且木尔切克	Yiwu 伊吾
Hongshankou 红山口	Qijiaojing 七角井	Yuegongtai-Xiheigou 岳公台-西黑沟
Huangtian 黄田	Qiemu (Charchan) 且末	Yueya River 月牙河
Ili 伊犁	Qiongkeke 穷科克	Yu'ergou 鱼儿沟
Jiernai 吉尔乃	Qunbake 群巴克	Yuledusi 裕勒都斯
Ji'ertzankale (Jirzankal) 吉尔赞喀勒	Ordos 鄂尔多斯	Yutian 于田
Jimusaer 吉木萨尔	Ruoqiang (Charqilik) 若羌	Zaghunluq 扎滚鲁克
Jirentai Goukou 吉仁台沟口	Sangeqiao 三个桥	
Jirigale 吉日朶勒	Saensayi 萨恩萨依	
	Saur-Tarbagatai 萨吾尔-塔尔巴	

Table 1. Paleolithic sites discovered in Xinjiang in 2004. Gao, et al., 2018

No.	Site Name	Site No.	Geography Coordinate	Location	Findings
1	Lasite yi hao	LST 01	47°53.9'41"N, 88°07'154"E	Left bank of Kelanhe River, Lasite Village, north Altai	Stone core, stone flake, stone piece
2	Lasite er hao	LST 02	47°54.231"N, 88°6'700"E	Right bank of Kelanhe River, Lasite Village, North Altai	Stone core (2×), stone flake, stone scraper (3×)
3	Tangba hupan	HP	47°38'10.9"N, 88°16'01.7"E	Terrace of Tangba Lake, Hongdun Town, Altai City	Stone core, stone flake (5×), stone piece
4	Fuhaixian Dingshan	DS	46°37'3.8"N, 87°56'43.4"E	Right water trench on the Dingshan Mountain, 182 tuan, Kalamagai Township, Fuhai County	Stone core (3×), stone flake (5×), stone scraper, stone piece (4×)
5	Fuyun yi hao	FY 1	46°58'59.9"N, 89°29'52.4"E	Left bank of Ehe River, Fuyun County	Stone core, stone flake (8×), chopping tool, stone scraper, stone piece (3×)
6	Fuyun er hao	FY 2	46°59'01.1"N, 89°30'07.7"E	T1 ground on left bank of Ehe River, Fuyun County	Stone flake, chopping tool
7	Fuyun san hao	FY 3	46°58'39"N, 89°30'59"E	Left bank of Ehe River, Fuyun County	Stone core, stone flake
8	Fuyun si hao	FY 4	46°59'31"N, 89°33'32.3"E	T2 top on left bank of Ehe River, Fuyun County	Stone flake, chopping tool
9	Fuyun wu hao	FY 5	46°59'24.0"N, 89°33'33.2"E	T2 top gravel layer on left bank of Ehe River, Fuyun County	Stone core
10	Fuyun lig hao	FY 6	46°59'39.5"N, 89°29'50.3"E	Northwest of right bank of Ehe River	Stone core, stone flake (2×)
11	Wuyabai	WYB	46°15'21.2"N, 89°43'31.4"E	Left bank of Wulunguhe River, Fuyun County	Stone core (5×), stone flake (9×), two-end tool, stone scraper, stone piece
12	Saertuohai	Sartokay	46°15'21.2"N, 89°43'31.4"E	Left bank of Wulunguhe River, Fuyun County	Stone core, stone flake, stone scraper (2×)
13	Qiakuerte	Qahurt	46°20'51.5"N, 89°32'0.371"E	Right bank of Wuhe River, Qiakuerte Village, Fuyun County	Stone flake (2×)
14	Ertai yi hao	ET01	46°3'29.7"N, 90°9'40.3"E	Left bank of Nanlunhe River, Ertai Village, Qinghe County	Stone core, stone flake (9×)
15	Ertai er hao	ET02	46°3'50.7"N, 90°8'54.6"E	Right bank of Beilunhe River, Ertai Village, Qinghe County	Stone core (5×), stone flake (24×), stone scraper (7×)
16	Muhuertai	MHT	46°38.250'N 86°01.718'E	G217 Road in Kaerjiao Township, Jimunai County	Stone core, stone flake
17	Tuolangge	TLG	47°13'40.2"N, 88°32'31"E	G216 Road in Fuhai County	Stone flake (5×), stone scraper
18	Chuanba yi hao	Chuanba 1	43°44'46.1"N, 89°46'44.2"E	No. 7 in Chuanba Village, Banjiegou Town, Qitai County	Stone core, stone flake (3×), chopping tool, stone piece (2×)
19	Chuanba er hao	Chuanba 2	43°45'33.0"N, 89°47'02.5"E	No. 6 in Chuanba Village, Banjiegou Town, Qitai County	Stone core (2×)
20	Luotoshi	LTS	46°38.041'N, 86°05.254'E	Heshituoluogai Town, Hebukesai County	Stone artifacts
21	Fenghuotai	FHT	42°53'5.1"N, 89°55'18.5"E	Aidinghu Lake, Erpu Town, Turfan Basin	Stone artifacts
22	Mutougou	MTG	42°53'5.1"N, 89°55'18.5"E	T2 on left bank of Bozikelihe River, Yuanyi Village, Shengjin Town, Turfan City	Stone core (3×)
23	Yuanyicun	YYC	42°55'5.3"N, 89°33'43.2"E	T2 on right bank of Bozikelihe River, Yuanyi Village, Shengjin Town, Turfan City	Stone core, stone flake (3×), stone piece
24	Huoyanshan erpu	EP	42°53'1.5"N, 89°31'27"E	Erpu Village Erpy Town, Turfan City	Stone core

Table 2

Tomb No.	Dimension of Tomb Chamber L×W-D (cm)	Tomb Orientation (°)	Gender & Age	Burial Form	Tomb Type	Burial Objects										Time Phase	Remarks	
						Pottery	Bronze	Lithic Tool	Bone Tool	Wooden Tool	Iron Object	Golden Object	Woolen	Cowry	Animal Bones			
1	20312×9-91	335	Adult		I											Goat talus (1×)	1	Disturbed
2	137×86-57	5	Unknown		III	III Double-handled Jug (1×); II Single-handled Jar (1×); III Single-handled Jar (1×)											3	Disturbed, beams between mud-bricks
3	105×70-47	330	Adult		III		II Bronze Earrings (2×)										3	Disturbed
4	1741×36-109	330	Male, 25±; Female, 13-15		I	Small Jar (1×); III Double-handled Jar (1×)										Goat talus (1×)	1	Disturbed
5	114×85-40	80	Male, 25±	Twice burial	II												1	Disturbed
6	114×90-74	168	Male, > 50; Female, adult	Male, right flexed; Female, left flexed	III	II single-handled Jar (1×)		Stone bead (1×)						Cowry (1×)			3	
7	89×60-34	351	14-15	twice burial	III	I Single-handled Jar (1×)				II wooden plate (1×)					Goat talus (1×)	3	Disturbed	
8	49×33-13	341	4=6	Bend; up flexed	III			Stone accessories (2×)									3	
9	56×39-27	326	1±		III			Stone bead (1×)									3	Disturbed
10	57×36-9	65	Infant	Side left flexed	II			Stone bead (×50)									2	Disturbed
11	120×87-30	6	Female, 30-35	Upward left flexed	II	Basin (2×)											2	
12	242×3-17	24	Infant		III												3	Disturbed
13	50×35-20	332	Infant	twice burial	II	II Single-handled small Cup (1×)	II Bronze earring (1×); III Bronze earring (1×)										2	
14	113×74-34	332	> 25		III	II Single-handled small Cup (2×); II Single-handled Jar (2×); II Bowl (2×)											3	Disturbed
15	110×95-40	345	Adult		III		II Bronze knife (1×); II Bronze Kou (1×)										3	Disturbed, beams between mud-bricks
16	1681×12-57	335	Male, 30-35	twice burial	II	II Double-handled Jug (1×); II Single-handled Cup (1×)											2	Disturbed, cover beams
17	462×5-25	349			III		II Bronze knife (1×); Bronze mirror (1×)										3	
18	17212×0-100	335	Female, 40-45		I	I Double-handled Jar (1×);									Goat talus (1×)	1	Disturbed	
19	47×32-20	349	Kid		III		Bronze needle (1×)										3	Disturbed; break M22
20	1401×02-53	353	Male, adult; Female, 20-25; Kid.	Male, upward left flexed	II	II Single-handled Dou (1×);			Bone Needle (1×)								2	Disturbed, cover beams
21	117×68-?	0	Female, > 45	Bend, left flexed	II												2	
22	140×73-33	354	Male, adult	Twice burial	III		Bronze tube (1×)	Stone bead (1×)									3	Disturbed, beams between mud-bricks
23	104×90-30	169	Male, 25-30	Upward left flexed	II	I Double-handled Jar (1×);	Bronze ornament (1×)										2	Cover beams
24	100×60-22	335	Male, 18±		III												3	
25	61×41-14	340	Kid		III	III Double-handled Jug (1×)											3	Disturbed
26	45×33-20	174	2±	Side right flexed	III												3	Disturbed
27	?		Male, 25-30	Side right flexed	II	II Single-handled Cup (1×)	Bronze tube (1×); Bronze mirror (1×); III Bronze earring (1×)	Stone bead (1×)									2	
28	122×80-30	351	6±		III		Bronze plate (1×)										3	Disturbed
29	?		Female, adult		II		III Bronze knife (2×); I Bronze engraving knife (1×); II Bronze engraving knife (1×); Bronze awl (1×)										2	Disturbed
30	2401×50-14	222	Male, 35-40	Upward straght	II	II Dou (1×); III Double-handled Jug (1×); II Single-handled small Cup (1×); II Single-handled Jar (1×); II Double-handled Jug (1×); II Single-handled Jar (1×); IV Single-handled Jar (1×); II Bowl (1×); I Pottery Spinning Wheel (1×);	Bronze plate (1×); Bronze ring (1×)										2	
31	1501×11-96	344	Male, 18-22; Female (2×), 35-45	One female is side left flexed	I		II Bronze Kou (1×)	Stone accessories (1×); Stone bead (1×)			Iron knife (1×)						1	Disturbed, cover beams
32	362×2-30	54	Infant		III		II Bronze earring (1×); Bronze tube (1×)										3	Disturbed
33	1841×42-90	187	Female, 25±	Side right flexed	I												1	
34	40×40-30	350	Infant		III												3	Disturbed
35	1851×40-67	170	Male, adult	Side right flexed	I		III Bronze knife (1×); Bronze awl (2×); Bronze accessories (2×)										1	
36	135×75-19	170	Kid	Side right flexed	III	II Single-handled Cup (1×)	II Bronze Earring (1×)										3	Disturbed, with batten
37	17712×1-117	350	Unknown		I			Stone pestle (1×)									1	Disturbed
38	1601×10-83	4	Male, 50-60		II	II Single-handled Jar (1×)											2	Disturbed
39	62×37-23	357	Kid	Side right flexed	III	IV Single-handled Jar (1×)											3	

40	168×83-80	345	Male, 14-15; Female (×3): adult, 20-25, > 45; Kid, 3-4		III	I Single-handled Cup (1×); II Single-handled Jar (1×)			Bone bead (1×)	II wooden bucket (1×)						3	Disturbed
41	1941×70-81	341	Male (2×), 25-30; Female, 40-50		I											1	Disturbed, cover beams
42	138×67-50	350	Male, 25-30		II			Stone bead (1×)	Bone accessories (×3)							2	Disturbed
43	1551×12-62	346	Male, 35-40	Twice burial	II		Bronze tube (1×)							Goat talus (1×)		2	
44	1691×49-167	332	Male (×4): old, > 35; > 35; 18-20; Female (×3), adult; Kid 10±		I	II Single-handled small Cup (1×); I Bowl (1×)										1	Disturbed
45	1701×30-96	346	Male, 30-35; Female, 45±		II	I Single-handled Cup (1×)	II Bronze Kou (1×); Bronze tube (×3)	Stone bead (×5)	Bone bead (×7)	I wooden plate (1×)						2	Disturbed
46	111×69-26	354			II	II Bowl (1×); II Double-handled Jar (1×)	Bronze mirror (1×)									2	Disturbed
47	54×34-30	32	Kid	Twice burial	III	II Single-handled small Cup (1×)			Bone needle (1×); Bone ornament (1×)	III wooden bucket (2×); Wooden awl; I wooden spinning wheel (1×)						3	Cover beams
48	110×67-25	343	Male, 35-45; 25±		III			Stone bead (1×)	Bone ornament (1×)							3	Disturbed
49	115×79-50	167	Male, 25±	Upward flexed	II		I Bronze Arrow head (1×); I Bronze engraving knife (1×); I Bronze earring (1×); II Bronze Kou (1×)									2	Cover beams
50	70×51-21	345	Infant		II		I Bronze knife (1×); II Bronze Arrow head (1×); III Bronze Arrow head (1×); I Bronze engraving knife (1×); I Bronze Kou (1×); Bronze bead (1×); Bronze accessories (×3)									2	Disturbed
51	402×1-19	130	Infant	Side left flexed	III	II Single-handled small Cup (1×)	Bronze spinning wheel (1×); Bronze mirror (1×)									3	Cover beams
52	102×73-35	0	Female, adult	Side left flexed	III	II Double-handled Jar (1×)	II Bronze Kou (1×)									3	Reed mat
53	?		Male, 13-14	Side left flexed	II	II Double-handled Jug (2×)				II wooden bucket (2×); III wooden spoon (×3); Wooden awl (1×)						2	
54	160×98-100	350	Female, > 45		II	I Spinning wheel (1×)	II Bronze knife (1×); Bronze accessories (2×)	Stone bead (1×)	Bone bead (1×)	Wooden awl (1×); I Wooden spinning wheel (1×)						2	Disturbed, cover beams
55	1631×42-56	0	Male (2×), > 45; Female (2×), 45-55	Twice burial	I											1	Disturbed, cover beams
56	64×40-32	338	Kid	Twice burial	II	I Single-handled small Cup (1×)										2	Cover beams and reed mat
57	1581×13-122	340	Female, 35-50		I		II Bronze knife (1×); III Bronze knife (1×); I Bronze Arrow head (1×); II Bronze Arrow head (1×); IV Bronze Arrow head (1×); I Bronze engraving knife (×3); II Bronze engraving knife (1×); I Bronze earrings (2×); I Bronze Kou (×3); II Bronze Kou (1×); Bronze awl (1×); Bronze tube (1×); Bronze accessories (2×);	Stone bead (1×)								1	Disturbed

58	16112×6-95	287	Male, adult		I		II Bronze earring (1×); III Bronze earring (1×); Bronze needle (1×); Bronze ornament (1×)	Stone pestle (1×)	Bone bead (1×)								1	Disturbed
59	132×50-82	293	Male, adult		II												2	Disturbed
60	112×84-52	344	Female, 15-18	Bend, right flexed	II		II Double-handled Jar (1×)										2	
61	1451×03-140	344	Adult		I		II Single-handled small Cup (1×)										1	Disturbed
62	113×80-60	340	Unknown		II		II Single-handled Cup (1×)			Bone awl (×3); Bone needle (1×)							2	Disturbed
63	2161×40-190	340	Male (×3): 25-35, 35-40, 45-50; Female (×5): 18-22, 30-35, 30-35, 35-50, adult; Kid		I		II Bowl (1×)		Bone bead (1×)								1	Disturbed
64	1931×52-138	333	Male, 30-40; Female (2×): adult, 35-40; Kid, 1-5		I		I Bowl (1×); I Dou (1×); I Double-handled Jug (1×); I Single-handled Cup (1×); II Single-handled Jar (2×)		Grinding stone (1×)								1	Disturbed
65	80×55-40	330	Infant		III											Goat talus (1×)	3	Disturbed
66	2172×06-137	330	Male (×3): 35-45, 40-45, 40-45; Female (2×): > 35, 40-50; Kid, 4±		I		I Bowl (1×); II Single-handled small Cup (1×); I Single-handled Jar (1×); II Pottery spinning wheel (1×)			Bone ornament (1×)							1	Disturbed
67	2101×68-155	328	Male (×5): 18-20, 25-35, 25-35, adult, adult; Female, 18-20		I		I Bowl (1×); I Single-handled Jar (1×)		Grinding stone (1×); Stone bead (1×)	Bone ornament (1×)							1	Disturbed
68	2601×92-200	153	Male 25 +-; female, adult; child	Male, side right flexed	I		I Bowl (1×); I Single-handled Jar (1×)		Stone pestle (1×); Grinding stone (1×); Stone bead (2×)				Golden ring (1×)				1	Disturbed
69	2361×75-190	348	Male (×3): 15-17, 25-35, 30-35; Female (×4): 25-30, > 30, 35-40, > 45		I		I Bowl (1×); I Dou (1×); Four-handled Jar (1×)							Cowry (1×)			1	Disturbed
70	2301×70-217	325	Male (2×): adult, > 50; Female (×3), adult		I		I Single-handled Cup (×3); II Single-handled Cup (1×); II Single-handled small Cup (1×)										1	Disturbed
71	1961×43-108	333	Male (2×): 25-30, 30±; Female (×3): 30-35, 35-40, 40-45		I		II Single-handled small Cup (1×)	II Bronze earring (1×); III Bronze earring (1×)			I Wooden plate (1×)				Goat talus (1×)		1	Disturbed, cover beams
72	1981×55-98	333	Male (2×): 25-30, adult; Female (2×): 25-35, adult		I		I Single-handled Cup (1×); I Single-handled Jar (1×)		Stone mortar (1×)			Iron piece (×3)					1	Disturbed, cover beams
73	1911×30-110	341	Unknown		I		I Bowl (1×)	II Bronze knife (1×); II Bronze Kou (1×)	Millstone (1×)								1	Disturbed
74	149×83-135	330	Male (2×): 25-30, 30±; Female, adult		I					Bone spinning wheel (1×)							1	Disturbed
75	2782×27-172	153	Male (2×): adult, 35-45; Female (×3): 25±, 25-35, > 40; Kid (2×): 8-10; Unknown(2×): 35-40, 45-55	Male and Kid are side right flexed	I		Bow, Dou(2×), I Double-handled Jug (1×); II Double-handled Jug (1×); III Double-handled Jug (1×); I Single-handled Cup (2×); I Single-handled Jar (2×); Yu	II Bronze knife (1×); Bronze mirror (1×)	Stone pestle (1×); Grinding stone (1×); Stone bead (×36)	Bone bead (1×)	I Wooden status (2×); I Wooden bucket (2×); Wooden awl (1×)	Iron sword (1×); Iron ring (1×); Iron piece (1×)	Golden earring (1×)	Woolen fabrics (2×)		Goat talus (1×)	1	Disturbed
76	2401×40-172	333	Male (×4): 35±, 35-40, 35-40, > 50; Female (2×): 35-55, 45-65	Twice burial	I		I Double-handled Jug (1×); II Double-handled Jug (1×)									Goat talus (1×)	1	Disturbed, cover beams

Table 4

Site	Lab No.	Sample No.	Material	¹⁴ C age BP	Calibrated dates (cal BCE)		Source	Calibrated dates (cal BCE), calibration performed using: https://c14.arch.ox.ac.uk/oxcal/OxCal.html	
					(68.2%)	(95.4%)		(68.3%)	(95.4%)
Yanbulaq-1	ZK-2186	86XHYP1M64	Coffin wood	2970±55	1306-1103		IACASS, 1991	1278-1110 (67.3%) 1064-1060 (1.0%)	1383-1341 (6.5%) 1311-1016 (89.0%)
Yanbulaq-2	ZK-2187	86XHYP70	Coffin wood	3300±75	1684-1515		IACASS, 1991	1681-1653 (7.8%) 1642-1498 (60.5%)	1764-1760 (0.2%) 1750-1420 (95.3%)
Yanbulaq-3	ZK-2188	86XHYP45	Coffin wood	3130±65	1500-1323		IACASS, 1991	1495-1477 (6.7%) 1456-1374 (39.7%) 1352-1300 (21.9%)	1515-1223 (95.4%)
Yanbulaq-4	ZK-2189	86XHYP3M54	Coffin wood	2580±55	805-662		IACASS, 1991	810-750 (41.6%) 685-667 (7.3%) 636-588 (17.0%) 579-571 (2.3%)	892-880 (0.6%) 834-540 (94.8%)
Yanbulaq-5	ZK-2190	86XHYP55	Coffin wood	3050±55	1410-1262		IACASS, 1991	1396-1257 (61.9%) 1246-1228 (6.4%)	1430-1156 (92.9%) 1148-1126 (2.6%)
Yanbulaq-6	ZK-2191	86XHYP47	Coffin wood	3420±80	1878-1641		IACASS, 1991	1876-1843 (9.2%) 1822-1796 (6.4%) 1778-1618 (52.7%)	1924-1518 (95.4%)
Yanbulaq-7	ZK-2192	86XHYP36	Coffin wood	3310±55	1680-1522		IACASS, 1991	1630-1506 (68.3%)	1740-1711 (4.5%) 1697-1492 (87.4%) 1481-1451 (3.6%)
Yanbulaq-8	ZK-2193	86XHYP31	Coffin wood	2980±55	1312-1127		IACASS, 1991	1366-1360 (1.5%) 1288-1117 (66.8%)	1390-1336 (9.4%) 1322-1044 (84.9%) 1031-1018 (1.1%)
Yanbulaq-9	ZK-2194	86XHYP20	Coffin wood	3610±55	2111-1899		IACASS, 1991	2034-1890 (68.3%)	2139-1873 (89.5%) 1846-1818 (3.4%) 1801-1776 (2.5%)
Yanbulaq-10	ZK-2195	86XHYP3M14	Reed	2410±80	762-398		IACASS, 1991	746-690 (14.8%) 665-644 (5.6%) 562-559 (0.7%) 551-398 (47.3%)	778-374 (95.4%)
Yanbulaq-11	ZK-2196	86XHYP7	Wood	3250±90	1645-1432		IACASS, 1991	1620-1426 (68.3%)	1748-1370 (91.4%) 1356-1296 (4.0%)
Yanbulaq-12	ZK-2197	86XHYP64	Wood	2600±85	830-661		IACASS, 1991	894-877 (3.4%) 836-743 (34.4%) 691-664 (7.1%) 646-549 (23.4%)	923-464 (94.6%) 436-421 (0.9%)
Tianshanbeilu-1	ZK-2789	M128	Human bone	2038±170	452 BC-388 AD		IACASS, 1996	348-311 (5.0%) 206 BC-170 AD (61.1%) 184-202 AD (2.2%)	452-446 (0.1%) 416-405 (95.3%)
Tianshanbeilu-2	ZK-2788	M081	Human bone	2398±135	811-185		IACASS, 1996	756-680 (14.5%) 670-606 (11.5%) 596-388 (42.3%)	810-170 (95.4%)
Tianshanbeilu-3	ZK-2791	M214	Human bone	2618±101	995-430 BC		IACASS, 1996	904-746 (44.5%) 690-665 (5.3%) 644-550 (18.5%)	992-459 (94.2%) 440-419 (1.3%)
Tianshanbeilu-4	ZK-2794	M416	Human bone	2790±83	1192-804 BC		IACASS, 1996	1043-1034 (2.4%) 1017-832 (65.9%)	1198-1172 (2.0%) 1163-1142 (1.7%)
Tianshanbeilu-5	ZK-2792	M228	Human bone	2902±86	1382-855 BC		IACASS, 1996	1218-982 (66.9%) 946-940 (1.3%)	1382-1342 (2.8%) 1309-897 (91.4%) 868-846 (1.2%)
Tianshanbeilu-6	ZK-2790	M198	Human bone	7385±110	6445-6049 BC		IACASS, 1996	6380-6214 (49.0%) 6188-6170 (4.5%) 6146-6091 (14.7%)	6440-6056 (94.6%) 6044-6030 (0.9%)
Tianshanbeilu-7	Beta-429482	M599	Human bone	3530±30	1943-1763 BC		Wang, et al., 2017	1922-1873 (29.1%) 1846-1817 (21.1%) 1802-1776 (18.1%)	1945-1764 (94.1%) 1759-1750 (1.4%)
Tianshanbeilu-8	Beta-416251	M290	Human bone	3230±30	1608-1432 BC		Wang, et al., 2017	1516-1492 (29.6%) 1483-1450 (38.7%)	1540-1425 (95.4%)
Tianshanbeilu-9	Beta-416252	M315	Human bone	3190±30	1514-1412 BC		Wang, et al., 2017	1498-1472 (32.8%) 1464-1434 (35.4%)	1506-1414 (95.4%)
Tianshanbeilu-10	Beta-419186	M354	Human bone	3040±30	1397-1216 BC		Wang, et al., 2017	1382-1341 (26.6%) 1310-1258 (35.7%) 1244-1232 (5.9%)	1401-1216 (95.4%)
Tianshanbeilu-11	Beta-442006	M268	Human bone	3390±30	1751-1619 BC		Tong, et al., 2020	1736-1716 (14.5%) 1693-1626 (53.7%)	1862-1855 (0.7%) 1766-1758 (0.8%) 1753-1611 (93.1%) 1574-1564 (1.0%)
Tianshanbeilu-12	Beta-442002	M249	Human bone	3320±30	1683-1521 BC		Tong, et al., 2020	1616-1540 (68.3%)	1680-1654 (4.9%) 1642-1509 (90.5%)

Tianshanbeilu-13	Beta-441985	M101	Human bone	3310±30	1661-1509 BC	Tong, et al., 2020	1612-1536 (68.3%)	1668-1656 (1.5%) 1634-1504 (93.9%)
Tianshanbeilu-14	Beta-442004	M263	Human bone	3310±30	1661-1509 BC	Tong, et al., 2020	1612-1526 (68.3%)	1668-1656 (1.5%) 1634-1504 (93.9%)
Tianshanbeilu-15	Beta-441995	M219	Human bone	3290±30	1633-1501 BC	Tong, et al., 2020	1608-1576 (29.2%) 1562-1554 (6.2%) 1546-1512 (32.8%)	1622-1501 (95.4%)
Tianshanbeilu-16	Beta-441993	M167	Human bone	3270±30	1623-1460 BC	Tong, et al., 2020	1606-1581 (17.4%) 1544-1501 (50.8%)	1616-1496 (89.3%) 1478-1456 (6.2%)
Tianshanbeilu-17	Beta-442000	M244	Human bone	3250±30	1613-1451 BC	Tong, et al., 2020	1536-1495 (51.2%) 1478-1456 (17.1%)	1610-1574 (10.1%) 1564-1441 (85.4%)
Tianshanbeilu-18	Beta-442011	M476	Human bone	3250±30	1613-1451 BC	Tong, et al., 2020	1536-1495 (51.2%) 1478-1456 (17.1%)	1610-1574 (10.1%) 1564-1441 (85.4%)
Tianshanbeilu-19	Beta-442008	M288	Human bone	3210±30	1595-1418 BC	Tong, et al., 2020	1502-1446 (68.3%)	1518-1422 (95.4%)
Tianshanbeilu-20	Beta-442016	M683	Human bone	3200±30	1526-1417 BC	Tong, et al., 2020	1498-1444 (68.3%)	1512-1416 (95.4%)
Tianshanbeilu-21	Beta-441996	M223	Human bone	3190±30	1514-1412 BC	Tong, et al., 2020	1498-1472 (32.8%) 1464-1434 (35.4%)	1506-1414 (95.4%)
Tianshanbeilu-22	Beta-441983	M076	Human bone	3170±30	1505-1396 BC	Tong, et al., 2020	1496-1476 (20.6%) 1458-1417 (47.7%)	1504-1396 (95.4%)
Tianshanbeilu-23	Beta-441984	M084	Human bone	3130±30	1495-1300 BC	Tong, et al., 2020	1440-1388 (54.4%) 1338-1320 (13.9%)	1496-1474 (4.9%) 1460-1370 (65.0%) 1355-1298 (25.5%)
Tianshanbeilu-24	Beta-441991	M132	Human bone	3100±30	1431-1282 BC	Tong, et al., 2020	1417-1379 (33.8%) 1345-1306 (34.5%)	1434-1278 (95.4%)
Tianshanbeilu-25	Beta-441998	M230	Human bone	3090±30	1427-1277 BC	Tong, et al., 2020	1412-1375 (29.1%) 1350-1302 (39.2%)	1425-1270 (95.4%)
Tianshanbeilu-26	Beta-441989	M125	Human bone	3080±30	1418-1264 BC	Tong, et al., 2020	1406-1371 (25.0%) 1355-1296 (43.3%)	1421-1263 (95.4%)
Tianshanbeilu-27	Beta-441994	M210	Human bone	3080±30	1418-1264 BC	Tong, et al., 2020	1406-1371 (25.0%) 1355-1296 (43.3%)	1421-1263 (95.4%)
Tianshanbeilu-28	Beta-442020	M445	Human bone	3080±30	1418-1264 BC	Tong, et al., 2020	1406-1371 (25.0%) 1355-1296 (43.3%)	1421-1263 (95.4%)
Tianshanbeilu-29	Beta-441987	M111	Human bone	3070±30	1415-1236 BC	Tong, et al., 2020	1396-1332 (41.3%) 1326-1286 (27.0%)	1416-1260 (94.8%) 1240-1236 (0.6%)
Tianshanbeilu-30	Beta-441986	M103	Human bone	3060±30	1411-1231 BC	Tong, et al., 2020	1389-1337 (36.0%) 1322-1274 (32.2%)	1412-1256 (91.1%) 1246-1227 (4.3%)
Tianshanbeilu-31	Beta-442007	M280	Human bone	3060±30	1411-1231 BC	Tong, et al., 2020	1389-1337 (36.0%) 1322-1274 (32.2%)	1412-1256 (91.1%) 1246-1227 (4.3%)
Tianshanbeilu-32	Beta-441980	M047	Human bone	3050±30	1401-1226 BC	Tong, et al., 2020	1386-1339 (32.0%) 1316-1264 (36.2%)	1404-1222 (95.4%)
Tianshanbeilu-33	Beta-441990	M126	Human bone	3050±30	1401-1226 BC	Tong, et al., 2020	1386-1339 (32.0%) 1316-1264 (36.2%)	1404-1222 (95.4%)
Tianshanbeilu-34	Beta-441999	M241	Human bone	3050±30	1401-1226 BC	Tong, et al., 2020	1386-1339 (32.0%) 1316-1264 (36.2%)	1404-1222 (95.4%)
Tianshanbeilu-35	Beta-442001	M247	Human bone	3050±30	1401-1226 BC	Tong, et al., 2020	1386-1339 (32.0%) 1316-1264 (36.2%)	1404-1222 (95.4%)
Tianshanbeilu-36	Beta-441988	M122	Human bone	3040±30	1397-1217 BC	Tong, et al., 2020	1382-1341 (26.6%) 1310-1258 (35.7%) 1244-1232 (5.9%)	1401-1216 (95.4%)
Tianshanbeilu-37	Beta-441978	M017	Human bone	3030±30	1396-1135 BC	Tong, et al., 2020	1376-1349 (18.0%) 1302-1254 (35.6%) 1248-1226 (14.6%)	1399-1200 (95.2%) 1138-1135 (0.3%)
Tianshanbeilu-38	Beta-442003	M253	Human bone	3010±30	1377-1126 BC	Tong, et al., 2020	1371-1355 (7.5%) 1296-1212 (60.7%)	1386-1338 (15.1%) 1316-1156 (75.9%) 1146-1126 (4.5%)
Tianshanbeilu-39	Beta-442005	M267	Human bone	3000±30	1374-1118 BC	Tong, et al., 2020	1286-1198 (61.6%) 1171-1164 (2.6%) 1142-1132 (4.1%)	1380-1344 (9.4%) 1306-1124 (86.1%)
Tianshanbeilu-40	Beta-442014	M500	Human bone	2990±30	1281-1058 BC	Tong, et al., 2020	1270-1194 (52.9%) 1175-1160 (7.3%) 1144-1129 (8.0%)	1376-1350 (4.9%) 1301-1120 (90.5%)
Tianshanbeilu-41	Beta-441979	M018	Human bone	2950±30	1260-1051 BC	Tong, et al., 2020	1218-1117 (68.3%)	1260-1051 (95.4%)
Tianshanbeilu-42	Beta-442009	M384	Human bone	2930±30	1220-1025 BC	Tong, et al., 2020	1201-1140 (37.0%) 1134-1107 (16.5%) 1096-1080 (8.1%) 1068-1056 (6.7%)	1222-1016 (95.4%)
Tianshanbeilu-43	Beta-442015	M682	Human bone	2930±30	1220-1025 BC	Tong, et al., 2020	1201-1140 (37.0%) 1134-1107 (16.5%) 1096-1080 (8.1%) 1068-1056 (6.7%)	1222-1016 (95.4%)

Tianshanbeilu-43	Beta-442012	M481	Human bone	2910±30	1209-1011 BC		Tong, et al., 2020	1190-1179 (5.0%) 1158-1146 (5.9%) 1128-1047 (54.1%) 1028-1020 (3.2%)	1210-1012 (95.4%)
Tianshanbeilu-44	Beta-441997	M224	Human bone	2880±30	1192-939 BC		Tong, et al., 2020	1112-1012 (68.3%)	1196-1172 (3.5%) 1162-1143 (2.8%) 1130-972 (85.8%) 956-932 (3.3%)
Tianshanbeilu-45	Beta-441981	M053	Human bone	2870±30	1127-931 BC		Tong, et al., 2020	1111-1004 (68.3%)	1187-1180 (0.9%) 1154-1149 (0.6%) 1126-929 (94.0%)
Hanqigou-1	ZK-2870	93TBHM4	Wood	2205-2143±93	2358-2040		Xinjiang & Hami, 1997	462-438 (0.7%) 420 BC-17 AD (94.7%) 395 BC-30 AD (94.2%) 41-60 AD (1.2%)	
Wupu-1	WB79-12	S291601-1	Wood	2990±65	1380-1127		IACASS, 1991	1374-1351 (6.4%) 1301-1121 (61.9%)	1406-1046 (94.4%) 1030-1018 (1.1%)
Wupu-2	WB79-13	S291601-2	Wood	2840±80	1003-828		IACASS, 1991	1120-905 (68.3%)	1221-821 (95.4%)
Wupu-3	WB79-14	S291601-3	Wood	3010±85	1404-1127		IACASS, 1991	1388-1338 (13.7%) 1320-1125 (54.5%)	1442-1008 (95.4%)
Wupu-4	WB79-15	S291601-4	Wood	3030±85	1414-1162		IACASS, 1991	1405-1196 (63.0%) 1172-1162 (2.3%) 1142-1130 (2.9%)	1492-1481 (0.7%) 1451-1042 (93.5%) 1036-1016 (1.3%)
Wupu-5	Poz-57373	130414/36 (86HWM: 2-00752)	Barley spikelets	2515±30	775-747 (15.4%) 685-666 (10.4%) 642-555 (42.4%)	793-727 (26.6%) 710-705 (1.8%) 695-541 (66.9%)	Schröder, et al., 2016	772-748 (14.9%) 686-666 (12.6%) 640-568 (40.7%)	786-720 (24.4%) 708-662 (18.7%) 652-543 (52.4%)
Wupu-6	Poz-57371	130414/35 (86HWM: 2-00752)	Brome grass seeds	2480±30	750-728 (11.1%) 717-706 (3.6%) 694-679 (5.6%) 671-542 (47.9%)	774-482 (94.9%) 441-434 (0.5%)	Schröder, et al., 2016	756-718 (14.5%) 708-680 (11.2%) 670-661 (3.3%) 654-606 (18.0%) 596-543 (21.3%)	772-476 (95.4%)
Wupu-7	Poz-57374	130414/37 (86HWM: 2-00752)	Non-identified plant stem	2470±30	753-682 (27.1%) 669-612 (20.8%) 593-538 (20.3%)	768-476 (92.4%) 464-453 (1.2%) 445-431 (1.8%)	Schröder, et al., 2016	752-682 (28.8%) 668-632 (14.0%) 624-610 (4.4%) 592-539 (20.2%) 526-524 (0.9%)	766-465 (93.4%) 436-422 (2.1%)
Wupu-8	Poz-57375	130414/38 (86HWM: 2-00752)	Burdock burr	2465±30	751-683 (26.9%) 669-636 (12.4%) 626-614 (3.5%) 592-516 (25.4%)	764-430 (95.4%)	Schröder, et al., 2016	820-792 (68.3%)	895-874 (5.5%) 836-776 (90.0%)
Wupu-9	Poz-72744	130414/30 (86HWM: 1-00751)	Sewing wool thread	2500±30	767-744 (11.1%) 687-665 (10.8%) 644-552 (46.4%)	788-537(95.4%)	Schröder, et al., 2016	766-745 (10.0%) 690-665 (12.2%) 644-550 (46.0%)	778-538 (94.7%) 528-520 (0.8%)
Wupu-10	Poz-57377	130415/55 (86HWM3: 1)	Wood	2825±30	1012-927 (68.2%)	1108-1105 (0.2%) 1081-1065 (1.3%) 1056-901 (93.9%)	Schröder, et al., 2016	1010-929 (68.3%)	1107-1096 (1.0%) 1081-1068 (1.2%) 1056-901 (93.3%)
Wupu-11	Poz-57378	130415/52 (86HWMNN: 1)	Blue wool thread	2465±30	752-686 (25.8%) 667-636 (11.6%) 622-614 (2.4%) 595-515 (28.3%)	760-682 (27.8%) 671-480 (56.7%) 469-414 (10.9%)	Schröder, et al., 2016	752-683 (27.8%) 668-633 (12.9%) 622-612 (3.0%) 592-516 (24.6%)	761-458 (91.6%) 442-418 (3.8%)
Wupu-12	Poz-57381	130416/79	Wood	3050±30	1385-1331 (39.6%) 1326-1291 (23.8%) 1279-1271 (4.8%)	1409-1258 (92.7%) 1233-1218 (2.7%)	Schröder, et al., 2016	1386-1339 (32.0%) 1316-1264 (36.3%)	1404-1222 (95.4%)
Wupu-13	Poz-57382	130416/80	Wood	2715±35	896-829 (68.2%)	924-806 (95.4%)	Schröder, et al., 2016	898-864 (33.9%) 854-820 (34.4%)	925-806 (95.4%)
Wupu-14	Beta-514314	86HWM53: 9	Textile	2820±30	/	3004-2848 BP	Wang, et al., 2021	1007-929 (68.3%)	1106-1098 (0.5%) 1079-1069 (0.7%) 1056-898 (94.2%)
Wupu-15	Beta-514315	86HWM55	Textile	2720±30	/	2867-2760 BP	Wang, et al., 2021	898-827 (68.3%)	918-810 (95.4%)
Wupu-16	Beta-514316	86HWM14	Textile	2480±30	/	2723-2431 (94.9%) BP	Wang, et al., 2021	756-718 (14.5%) 708-680 (11.2%) 670-661 (3.3%) 654-606 (18.0%) 596-543 (21.3%)	772-476 (95.4%)
Wupu-17	Beta-514317	86HWM70	Textile	2460±30	/	2621-2378 (65.9%) BP	Wang, et al., 2021	750-685 (27.3%) 667-636 (11.8%) 588-578 (3.0%) 572-512 (21.1%) 502-484 (4.9%)	758-678 (29.3%) 671-452 (60.5%) 446-416 (5.7%)
Wupu-18	UBA-34170	Collect sample	Foxtail millet straw	2569±33	/	2759-2696 (70.0%) BP	Wang, et al., 2021	803-756 (60.2%) 679-671 (4.4%) 605-598 (3.7%)	808-748 (66.4%) 688-665 (8.5%) 642-566 (20.6%)
Wupu-19	UBA-34172	Collect sample	Cake	2472±51	/	2720-2365 BP	Wang, et al., 2021	758-678(24.9%) 672-537 (39.6%) 531-517 (3.8%)	771-452 (89.7%) 446-416 (5.7%)

Wupu-20	UBA-34173	Collect sample	Cake	2551±33	/	2752-2687 (51.7%) BP	Wang, et al., 2021	796-752 (40.2%) 684-668 (9.9%) 634-622 (5.4%) 614-590 (12.8%)	802-742 (45.5%) 692-664 (13.3%) 646-548 (36.7%)
Shirenzigou-1	BA111913	F007①	Wood	/		1200-1000	Ren, 2012	/	/
Shirenzigou-2	BA111912	F007②	Sheep bone	/		720-370	Ren, 2012	/	/
Shirenzigou-3	BA061060	F007H1	Charcoal	/		1214-923	Ren, 2012	/	/
Shirenzigou-4	BA111914	F007H6	Animal bone	/		170 BC-60 AD	Ren, 2012	/	/
Shirenzigou-5	BA110571	F007H11	Sheep bone	/		1050-910	Ren, 2012	/	/
Shirenzigou-6	BA110575	F007H19	Sheep bone	/		1220-1020	Ren, 2012	/	/
Shirenzigou-7	BA111915	F007H19	Naked barley	/		980-820	Ren, 2012	/	/
Shirenzigou-8	BA110574	F007H25	Sheep bone	/		1200-1000	Ren, 2012	/	/
Shirenzigou-9	BA111916	F007H24	Sheep bone	/		1010-830	Ren, 2012	/	/
Shirenzigou-10	BA110568	F007H31②	Horse bone	/		1320-1120	Ren, 2012	/	/
Shirenzigou-11	BA111918	F007HD3	Sheep manure	/		1050-890	Ren, 2012	/	/
Shirenzigou-12	BA061058	F007Y1	Charcoal	/		1131-897	Ren, 2012	/	/
Shirenzigou-13	BA061062	F007Z2	Charcoal	/		1129-905	Ren, 2012	/	/
Shirenzigou-14	BA110573	F001H39	Sheep bone	/		1010-930	Ren, 2012	/	/
Shirenzigou-15	BA111911	F002H46	Animal bone	/		1270-1050	Ren, 2012	/	/
Shirenzigou-16	BA110572	F002H57	Sheep bone	/		1220-1010	Ren, 2012	/	/
Shirenzigou-17	BA110578	F004H112	Sheep bone	/		650-540	Ren, 2012	/	/
Shirenzigou-18	BA111888	F003③	Animal bone	/		390-340	Ren, 2012	/	/
Shirenzigou-19	BA111909	F004②	Animal bone	/		370-190	Ren, 2012	/	/
Shirenzigou-20	BA111892	F005②-1	Animal bone	/		200-50	Ren, 2012	/	/
Shirenzigou-21	BA111893	F005③	Animal bone	/		405-365	Ren, 2012	/	/
Shirenzigou-22	BA111894	F005④	Animal bone	/		830-350	Ren, 2012	/	/
Shirenzigou-23	BA111895	F005④-1	Jaw bone	/		830-730	Ren, 2012	/	/
Shirenzigou-24	BA111927	F001T0719II③	Animal bone	/		180-40	Ren, 2012	/	/
Shirenzigou-25	BA111928	F001T0719II②	Animal bone	/		360-50	Ren, 2012	/	/
Shirenzigou-26	BA111936	F001H16	Animal bone	/		390-200	Ren, 2012	/	/
Shirenzigou-27	BA111950	F001H25	Wood	2560±25		810-560	Ren, 2012	796-758 (64.9%) 678-673 (3.4%)	804-749 (70.7%) 686-666 (8.2%) 636-586 (14.8%) 582-570 (1.8%)
Shirenzigou-28	BA111951	F001H33①	Animal bone	2090±25		180-40	Ren, 2012	149-134 (12.0%) 116-51 (56.2%)	174-41 (94.2%) 9-1 (1.2%)
Shirenzigou-29	BA111952	F001H53	Wood	2705±30		910-800	Ren, 2012	898-866 (31.2%) 846-812 (37.0%)	909-806 (95.4%)
Shirenzigou-30	BA111953	F001T0720II-1⑤ a	Animal bone	2095±30		210-20	Ren, 2012	152-53 (68.3%)	196-40 (93.9%) 10BC-1AD (1.5%)
Shirenzigou-31	BA111954	F001T0720IV-1⑨ b	Animal bone	2100±25		200-40	Ren, 2012	154-92 (50.2%) 76-54 (18.1%)	194-187 (1.1%) 177-44 (94.4%)
Shirenzigou-32	BA111955	F001T0721I-2③d	Animal bone	2070±25		180-10	Ren, 2012	148-138 (5.1%) 110-42 (59.3%) 8-2 (3.9%)	166-33 (86.8%) 16BC-6AD (8.6%)
Shirenzigou-33	Beta-440291	F001H045	Naked barley	2150±30		356-61	Ren, 2012	346-316 (19.3%) 204-148 (38.6%) 136-112 (10.3%)	353-284 (27.8%) 228-92 (63.1%) 76-54 (4.6%)
Shirenzigou-34	BA111922	F002④	Animal bone	/		70 AD-330 AD	Ren, 2012	/	/
Shirenzigou-35	BA111923	F002⑤	Animal bone	/		400-230	Ren, 2012	/	/
Shirenzigou-36	BA111924	F002ZD6	Wood	/		400-200	Ren, 2012	/	/
Shirenzigou-37	BA111925	F003ZD1	Wood	/		390-200	Ren, 2012	/	/
Shirenzigou-38	BA111926	F003H17	Animal bone	/		160 BC-60 AD	Ren, 2012	/	/
Shirenzigou-39	BA111934	F004④	Animal bone	/		120 BC-90 AD	Ren, 2012	/	/
Shirenzigou-40	BA111935	F004④	Wood	/		330-200	Ren, 2012	/	/
Shirenzigou-41	BA111947	F004ZD35	Wood	/		330-200	Ren, 2012	/	/
Shirenzigou-42	BA111896	IVM1	Human bone	/		1030 AD-1220 AD	Ren, 2012	/	/
Shirenzigou-43	BA111900	IVM8R1	Human bone	/		390-200	Ren, 2012	/	/
Shirenzigou-44	BA111937	IIIM1⑥	Animal bone	/		390-200	Ren, 2012	/	/
Shirenzigou-45	BA111957	IM1	Human bone	/		410-350	Ren, 2012	/	/
Shirenzigou-46	BA111958	IM1	Beam wood	/		1020-890	Ren, 2012	/	/

Shirezigou-47	BA111959	IM2	Human bone	/	340 AD-540 AD	Ren, 2012	/	/
Shirezigou-48	BA111960	IM2	Beam wood	/	895-800	Ren, 2012	/	/
Shirezigou-49	BA111961	IVM19 ⑦	Human bone	/	410-340	Ren, 2012	/	/
Shirezigou-50	BA111962	IVM20	Human bone	/	40 BC-70 AD	Ren, 2012	/	/
Shirezigou-51	BA061058	06BSDIVGT⑤aZ 1: C1	Charcoal	2845±45	1191-1176 (1.1%) 1160-1143 (1.3%) 1131-897 (93%)	Chen, et al., 2013	1102-1100 (0.5%) 1054-926 (67.7%)	1196-1173 (1.8%) 1161-1144 (1.4%)
Shirezigou-52	BA061060	06BSDIVGT①H 1: C8	Charcoal	2885±50	1188-1179 (2.5%) 1256-1236 (2.3%) 1214-923 (93.1%)	Chen, et al., 2013	1112-1014 (68.3%)	1200-1142 (9.2%) 1131-977 (84.4%) 951-936 (1.9%)
Shirezigou-53	BA061062	06BSDIVGT⑥Z2 : C	Charcoal	2850±40	1129-905 (95.4%)	Chen, et al., 2013	1054-930 (68.3%)	1187-1180 (0.7%) 1154-1148 (0.5%) 1126-905 (94.3%)
Shirezigou-54	BA061090	06BSDIVM011	Human bones	2325±55	729-691 (3.1%) 543-345 (69.3%) 322-205 (23.1%)	Chen, et al., 2013	478-356 (53.7%) 280-232 (14.5%)	728-700 (2.0%) 663-650 (1.1%) 546-345 (68.5%) 318-202 (23.9%)
Shirezigou-55	BA061091	06BSDIVM012	Human bones	2235±40	309-202 (95.4%)	Chen, et al., 2013	376-350 (15.8%) 294-208 (52.4%)	392-196 (95.4%)
Shirezigou-56	BA061092	06BSDIVM012	Human bones	2215±55	395-160 (94.1%) 132-117 (1.3%)	Chen, et al., 2013	368-342 (12.0%) 322-200 (56.3%)	396-148 (93.2%) 136-112 (2.2%)
Shirezigou-57	Beta-435992	/	Barley Grain	2150±30	356-61	Liu, et al., 2017	346-316 (19.3%) 204-148 (38.6%) 136-112 (10.3%)	353-284 (27.8%) 228-92 (63.1%) 76-54 (4.6%)
Nanwan-1	WB81-40	S291401-1	Wood	2960±80	1253-932	IACASS, 1991	1284-1048 (68.3%)	1406-978 (94.3%) 951-936 (1.1%)
Nanwan-2	WB81-41	S291401-2	Wood	2955±80	1211-926	IACASS, 1991	1276-1046 (66.8%) 1028-1020 (1.5%)	1400-975 (93.9%) 953-934 (1.5%)
Nanwan-3	WB81-42	S291401-3	Wood	2935±75	1151-917	IACASS, 1991	1257-1246 (2.8%) 1228-1042 (60.4%) 1036-1016 (5.0%)	1384-1340 (4.4%) 1312-928 (91.0%)
Nanwan-4	WB84-06	S291401-4	Wood	3085±70	1389-1130	IACASS, 1991	1428-1261 (68.3%)	1501-1190 (92.2%) 1178-1158 (1.7%) 1146-1128 (1.6%)
Nanwan-5	WB84-24	S291401-5	Wood	3090±70	1389-1130	IACASS, 1991	1430-1264 (68.3%)	1502-1194 (93.1%) 1175-1160 (1.1%) 1144-1130 (1.2%)
Nanwan-6	WB84-25	S291401-6	Wood	2855±70	1003-838	IACASS, 1991	1120-924 (68.3%)	1221-891 (91.0%) 882-834 (4.5%)
Nanwan-7	WB84-26	S291401-7	Wood	3045±70	1310-1055	IACASS, 1991	1403-1218 (68.3%)	1490-1484 (0.3%) 1448-1108 (93.7%) 1095-1081 (0.8%) 1068-1056 (0.7%)
Nanwan-8	WB84-27	S291401-8	Wood	3410±70	1685-1518	IACASS, 1991	1872-1846 (7.3%) 1814-1805 (2.0%) 1774-1616 (58.9%)	1888-1532 (95.4%)
Nanwan-9	WB84-28	S291401-9	Wood	3165±70	1428-1266	IACASS, 1991	1508-1384 (60.1%) 1340-1316 (8.2%)	1610-1574 (2.7%) 1563-1261 (92.7%)
Nanwan-10	WB84-29	S291401-10	Wood	3030±70	1266-1034	IACASS, 1991	1398-1204 (67.5%) 1138-1135 (0.8%)	1432-1054 (95.4%)
Nanwan-11	WB84-35	S291401-11	Wood	3045±65	1306-1063	IACASS, 1991	1398-1221 (68.3%)	1446-1111 (95.3%) 1062-1060 (0.1%)
Nanwan-12	WB84-48	S291401-12	Wood	2945±65	1151-928	IACASS, 1991	1258-1244 (4.1%) 1231-1050 (64.2%)	1384-1340 (4.4%) 1312-978 (90.1%) 950-936 (0.9%)
Nanwan-13	WB84-49	S291401-13	Wood	3220±65	1500-1323	IACASS, 1991	1598-1593 (1.5%) 1541-1418 (66.8%)	1665-1659 (0.3%) 1631-1378 (91.9%) 1346-1305 (3.3%)
Nanwan-14	WB84-50	S291401-14	Wood	3080±65	1380-1127	IACASS, 1991	1420-1264 (68.3%)	1498-1471 (2.7%) 1464-1193 (90.1%) 1176-1160 (1.3%) 1144-1129 (1.3%)
Nanwan-15	WB84-51	S291401-15	Wood	3200±65	1442-1315	IACASS, 1991	1533-1410 (68.3%)	1620-1372 (88.7%) 1352-1300 (6.8%)
Nanwan-16	WB84-52	S291401-16	Wood	3080±65	1380-1127	IACASS, 1991	1420-1264 (68.3%)	1498-1471 (2.7%) 1464-1193 (90.1%) 1176-1160 (1.3%) 1144-1129 (1.3%)
Nanwan-17	WB84-53	S291401-17	Wood	3215±65	1448-1319	IACASS, 1991	1539-1415 (68.3%)	1627-1376 (91.4%) 1348-1304 (4.0%)
Nanwan-18	WB84-54	S291401-18	Wood	3145±65	1418-1262	IACASS, 1991	1498-1382 (55.7%) 1341-1311 (12.6%)	1534-1256 (94.1%) 1246-1228 (1.3%)

Tuobeiliang-1	BA111929	F1	Goat/sheep bone	/	520-390		Northwest University, et al., 2014	/	/
Tuobeiliang-2	BA111931	M15	Human bone	/	360-270		Northwest University, et al., 2014	/	/
Tuobeiliang-3	BA111933	M4	Human bone	/	40 BC-130 AD		Northwest University, et al., 2014	/	/
Yanghai-1	BA04538	IM90	Cannabis	2475±30	760-680 (23.8%) 670-610 (21.3%) 600-520 (23.3%) 753-702 (68.2%)	770-480 (89.4%) 470-410 (6.0%) 771-477 (95.4%)	Lv, et al., 2017	754-681 (27.7%) 670-608 (20.7%) 594-542 (19.9%)	770-471 (94.2%) 434-423 (1.3%)
Yanghai-2	BA05520	IM90	Wooden stick	2480±40	760-680 (22.7%) 670-520 (45.5%)	770-480 (87.3%) 470-410 (8.1%)	Lv, et al., 2017	758-716 (14.3%) 710-678 (10.9%) 673-542 (43.0%)	773-464 (93.2%) 436-421 (2.2%)
Yanghai-3	BA07172	IIM169	Grape vine	2245±35	390-350 (22.9%) 300-230 (44.9%) 220-210 (1.2%)	400-340 (28.9%) 330-200 (66.5%)	Lv, et al., 2017	384-352 (21.5%) 290-226 (40.9%) 220-210 (5.8%)	394-343 (28.4%) 321-201 (67.1%)
Yanghai-4	BA07170	IIM13	Caper seed	2620±35	820-780 (68.2%)	850-760 (95.4%) 690-670 (1.5%)	Lv, et al., 2017	810-780 (68.3%)	894-874 (2.5%) 835-764 (92.9%)
Yanghai-5	BA05519	IM130	Wood	2760±40	970-950 (4.0%) 940-840 (44.9%)	1010-820 (95.4%)	Lv, et al., 2017	968-960 (3.9%) 931-833 (64.4%)	1002-821 (95.4%)
Yanghai-6	BA05521	IM163	Wooden stick	2570±40	810-750 (49.3%) 690-660 (11.4%) 640-590 (7.5%)	820-730 (55.2%) 690-660 (13.8%) 650-540 (26.4%)	Lv, et al., 2017	805-753 (51.8%) 682-668 (7.0%) 628-625 (1.3%) 610-593 (8.1%)	811-739 (56.1%) 694-662 (10.6%) 648-547 (28.8%)
Yanghai-7	BA05522	IIM81	Wooden stick	2250±40	390-350 (24.8%) 300-230 (42.6%) 220-210 (0.9%)	400-200 (95.4%)	Lv, et al., 2017	388-352 (23.9%) 288-227 (39.4%) 220-210 (5.0%)	396-340 (30.1%) 324-200 (65.4%)
Yanghai-8	BA05525	IM21	Wooden stick	2550±40	800-740 (34.5%) 690-660 (12.9%) 650-590 (20.8%)	810-710 (41.2%) 700-530 (54.2%)	Lv, et al., 2017	796-750 (33.0%) 685-667 (9.9%) 636-588 (22.7%) 578-572 (2.6%)	805-725 (40.4%) 704-662 (14.9%) 651-544 (40.2%)
Yanghai-9	BA05526	IIM65	Wooden stick	2770±40	980-890 (48.0%) 880-840 (20.2%)	1010-820 (95.4%)	Lv, et al., 2017	978-951 (14.8%) 936-894 (29.4%) 877-836 (24.1%)	1010-822 (95.4%)
Yanghai-10	BA05530	IIM163	Wooden stick	2240±40	390-350 (19.7%) 330-210 (48.5%)	400-200 (95.4%)	Lv, et al., 2017	382-351 (18.7%) 290-209 (49.5%)	394-197 (95.4%)
Yanghai-11	BA05531	IM5	Wooden stick	2690±40	895-865 (21.5%) 860-805(46.7%)	920-790 (95.4%)	Lv, et al., 2017	897-868 (26.6%) 844-806 (41.7%)	916-796 (95.4%)
Yanghai-12	BA05532	IIM76	Wooden stick	2190±40	360-280 (42.0%) 260-190 (26.2%)	390-160 (95.4%)	Lv, et al., 2017	356-280 (40.6%) 232-176 (27.7%)	382-148 (93.4%) 134-116 (2.0%)
Yanghai-13	BA05533	IIM53	Wooden stick	2200±40	360-270 (42.2%) 260-200 (26.0%)	390-170 (95.4%)	Lv, et al., 2017	359-276 (41.7%) 261-244 (7.5%) 234-197 (19.1%)	386-156 (95.4%)
Yanghai-14	BA05534	IIM63	Wooden stick	2500±40	770-720 (15.2%) 700-540 (53.0%)	790-480 (89.7%) 470-410 (5.7%)	Lv, et al., 2017	770-736 (13.5%) 695-664 (12.6%) 649-546 (42.1%)	787-478 (95.4%)
Yanghai-15	LZ14251	IM130	Wood	2700±30	/	902-806 (95.4%)	Lv, et al., 2017	896-870 (28.6%) 841-810 (39.7%)	906-806 (95.4%)
Yanghai-16	LZ14248	IM21	Wooden stick	2585±25	/	808-763 (95.4%)	Lv, et al., 2017	798-776 (68.3%)	810-759 (95.1%) 677-674 (0.4%)
Yanghai-17	LZ14255	IIM81	Wood	2200±25	/	360-198 (95.4%)	Lv, et al., 2017	356-339 (11.2%) 325-280 (32.0%) 254-249 (2.7%) 232-199 (22.3%)	363-176 (95.4%)
Yanghai-18	LZ14272	IIM65	Bone	2465±20	439-434 (0.5%)	673-482 (61.2%)	Lv, et al., 2017	750-686 (34.9%) 666-638 (13.7%) 588-580 (2.6%) 570-538 (14.5%) 528-520 (2.6%)	757-678 (36.6%) 671-468 (57.5%) 434-422 (1.3%)
Yanghai-19	LZ14247	IM19	Wood	2775±30	/	998-841 (95.4%)	Lv, et al., 2017	979-950 (18.7%) 937-896 (33.8%) 870-842 (15.8%)	1003-843 (95.4%)
Yanghai-20	LZ14249	IM48	Wood	2740±25	965-964 (0.2%)	929-822 (99.8%)	Lv, et al., 2017	906-890 (14.9%) 882-834 (53.4%)	930-816 (95.4%)
Yanghai-21	LZ14250	IM58	Wood	2430±30	589-575 (1.5%)	570-404 (71.1%)	Lv, et al., 2017	718-710 (3.8%) 660-654 (2.9%) 542-416 (61.6%)	750-686 (18.2%) 666-638 (7.8%) 588-579 (0.9%) 571-404 (68.7%)
Yanghai-22	LZ14252	IM150	Wood	2820±30	/	1052-899 (95.4%)	Lv, et al., 2017	1007-929 (68.3%)	1106-1098 (0.5%) 1079-1069 (0.7%) 1056-898 (94.2%)
Yanghai-23	LZ14253	IM158	Wood	2475±35	464-450 (1.6%)	445-429 (2.0%)	Lv, et al., 2017	755-680 (27.1%) 670-608 (21.4%) 595-540 (19.8%)	770-464 (93.3%) 436-421 (2.2%)
Yanghai-24	LZ14254	IIM73	Wood	2830±30	1082-1063 (1.9%)	1057-905 (98.1%)	Lv, et al., 2017	1014-928 (68.3%)	1107-1096 (1.3%) 1082-1068 (1.7%) 1056-904 (92.4%)

Yanghai-25	LZ14274	IIM5	Bone	2335±20	/	408-382 (95.4%)	Lv, et al., 2017	404-392 (68.3%)	412-382 (95.4%)
Yanghai-26	LZ14273	IIM80	Bone	2100±25	/	187-49 (95.4%)	Lv, et al., 2017	154-92 (50.2%) 76-54 (18.1%)	194-187 (1.1%) 177-44 (94.4%)
Yanghai-27	LZ14256	IIM11	Wood	2220±25	370-334 (16.9%)	328-203 (83.1%)	Lv, et al., 2017	360-348 (8.0%) 312-272 (25.8%) 264-242 (14.3%) 236-206 (20.1%)	382-338 (18.7%) 325-198 (76.8%)
Yanghai-28	LZ14270	IIM15	Bone	2375±20	508-496 (3.8%)	493-396 (96.2%)	Lv, et al., 2017	465-436 (25.4%) 422-396 (42.9%)	516-394 (95.4%)
Yanghai-29	LZ14264	IM84	Bone	2545±30	508-496 (3.8%)	645-548(36.7%)	Lv, et al., 2017	792-752 (37.5%) 684-668 (10.9%) 634-622 (5.9%) 614-591 (13.9%)	798-743 (42.0%) 691-664 (14.3%) 646-548 (39.2%)
Yanghai-30	LZ14265	IM99	Bone	2465±25	462-454 (0.9%)	444-430 (1.8%)	Lv, et al., 2017	751-684 (29.8%) 668-634 (13.1%) 621-614 (2.0%) 590-537 (19.2%) 530-518 (4.1%)	758-678 (33.2%) 672-464 (60.0%) 436-421 (2.3%)
Yanghai-31	LZ14266	IM100	Bone	2495±25	/	772-539 (95.4%)	Lv, et al., 2017	758-744 (7.6%) 691-665 (11.1%) 646-550 (49.5%)	774-540 (95.4%)
Yanghai-32	LZ14267	IM105	Bone	2530±30	690-659 (14.4%)	649-543 (48.0%)	Lv, et al., 2017	780-749 (22.0%) 686-666 (12.3%) 638-586 (28.9%) 582-570 (5.1%)	794-731 (30.3%) 699-662 (16.9%) 650-544 (48.2%)
Yanghai-33	LZ14268	IM132	Bone	2670±30	894-863 (15.9%)	859-798 (84.1%)	Lv, et al., 2017	891-881 (9.1%) 834-801 (59.2%)	900-856 (25.1%) 850-794 (70.3%)
Yanghai-34	LZ14269	IM145	Bone	3600±20	2021-1989 (20.8%)	1983-1895 (79.2%)	Lv, et al., 2017	2016-1998 (15.8%) 1978-1925 (52.4%)	2026-1991 (22.6%) 1986-1891 (72.8%)
Yanghai-35	Poz43696	IM157	Wool/Pants	2935±30	1212-1056 (68.2%)	1261-1041 (95.4%)	Lv, et al., 2017	1210-1109 (62.0%) 1092-1085 (3.2%) 1065-1058 (3.1%)	1256-1248 (1.0%) 1226-1042 (91.7%) 1035-1016 (2.8%)
Yanghai-36	Poz43694	IM21	Wool/Cloak	2870±30	1114-1003 (68.2%)	1188-931 (95.4%) 1103-938 (95.4%)	Lv, et al., 2017	1111-1004 (68.3%)	1187-1180 (0.9%) 1154-1149 (0.6%) 1126-929 (94.0%)
Yanghai-37	Poz43695	IM21	Wool/Pants	2855±30	1056-940 (68.2%)	1122-931 (95.4%) 1074-935 (95.4%)	Lv, et al., 2017	1102-1100 (0.7%) 1054-976 (58.2%) 952-934 (9.4%)	1118-926 (95.4%)
Yanghai-38	Poz43708	IM21	Wool/Left leg wrapping	2825±35	1016-922 (68.2%)	1113-900 (95.4%) 1038-926 (95.4%)	Lv, et al., 2017	1016-922 (68.3%)	1110-900 (95.4%)
Yanghai-39	Poz43709	IM21	Wool/Right leg wrapping	2810±40	1009-912 (68.2%)	1110-843 (95.4%) 1038-926 (95.4%)	Lv, et al., 2017	1010-910 (68.3%)	1107-1096 (1.0%) 1081-1068 (1.2%) 1056-891 (86.0%) 882-835 (7.2%)
Yanghai-40	Poz57391	Nr. 1 collection	Textile	2565±30	800-671 (68.2%)	806-556 (95.4%)	Lv, et al., 2017	801-756 (59.9%) 679-671 (4.5%) 605-598 (3.8%)	806-748 (66.9%) 687-666 (8.5%) 642-567 (20.0%)
Yanghai-41	Poz57395	Nr. 1 collection	Textile	2610±35	812-780 (68.2%)	839-601 (95.4%)	Lv, et al., 2017	806-781 (68.3%)	891-882 (0.7%) 832-756 (93.0%) 680-670 (0.9%) 606-596 (0.9%)
Yanghai-42	Poz57397	Nr. 1 collection	Textile	2525±30	784-567 (68.2%)	795-540 (95.4%)	Lv, et al., 2017	778-749 (18.7%) 686-666 (12.4%) 640-569 (37.2%)	791-726 (27.9%) 701-662 (17.5%) 651-544 (50.1%)
Yanghai-43	Poz57398	Nr. 1 collection	Textile	2635±30	819-794 (68.2%)	888-774 (95.4%)	Lv, et al., 2017	816-791 (68.3%)	892-880 (2.6%) 833-776 (92.9%)
Yanghai-44	Poz59925	IIM18	Textile	2250±30	389-211 (68.2%)	398-202 (95.4%)	Lv, et al., 2017	386-353 (25.9%) 285-228 (42.3%)	392-347 (30.5%) 314-204 (64.9%)
Yanghai-45	UBA21943	06IM4	Millet	2446±35	738-690 (27.3%) 663-648 (7.4%) 548-479 (37.2%) 470-211 (28.2%)	753-685 (24.1%) 668-610 (13.7%) 598-408 (62.2%)	Lv, et al., 2017	744-690 (20.0%) 664-645 (7.3%) 550-458 (33.5%) 442-418 (7.5%)	754-681 (23.9%) 670-608 (14.8%) 594-409 (56.7%)
Yanghai-46	Beta440290	IIM213	Naked Barely	2430±30	726 -710 (3.0%) 704-695 (3.7%) 540-211 (61.5%)	750-683 (19.6%) 668-638 (6.6%) 590-404 (69.2%)	Lv, et al., 2017	718-710 (3.8%) 660-654 (2.9%) 542-416 (61.6%)	750-686 (18.2%) 666-638 (7.8%) 588-579 (0.9%) 571-404 (68.7%)
Subeixi-1	WB81-61	S292302	Wood	2225±70-2160±70	360-110	IACASS, 1991		384-341 (16.9%) 323-200 (51.4%)	403-97 (94.3%) 71-57 (1.2%)
								355-282 (24.1%) 231-100 (41.9%) 68-60(2.3%)	387-43 (95.4%)
Subeixi-2	WB82-05	S292302	Wood	3145±75-3060±75	1422-1227	IACASS, 1991		1501-1378 (52.2%) 1348-1304 (16.0%)	1607-1581 (1.4%) 1545-1216 (94.1%)
								1413-1224 (68.3%)	1498-1112 (95.4%)
Subeixi-3	/	F1		/	360±85	Xinjiang & Tulufan, 2002		/	/

Subeixi-4	/	IIIM15	Wood	/	330±80		Xinjiang & Tulufan, 2002	/	/
Subeixi-5	/	IIIM15	Wooden Couch	/	530±85		Xinjiang & Tulufan, 2002	/	/
Subeixi-6	/	IM13	Wooden Couch	/	445±80		Xinjiang & Tulufan, 2002	/	/
Yuergou-1	BA091340	XJ-1 (F1)	Stem of an annual herb	2295±50	410-350 (40.3%) 290-230 (27.9%)	510-460 (2.1%) 420-200 (93.35%)	Jiang, et al., 2013	405-354 (39.5%) 283-230 (28.8%)	478-338 (48.9%) 326-198 (46.6%)
Yuergou-2	BA091341	XJ-2 (F1)	Charred wood	2460±35	750-680 (23.2%) 600-500 (27.5%)	760-680 (25.2%) 670-410 (70.2%)	Jiang, et al., 2013	751-684 (24.5%) 668-635 (11.1%) 620-614 (1.5%) 590-511 (24.4%) 506-481 (6.7%)	758-678 (27.8%) 672-416 (67.7%)
Yuergou-3	BA08428	2008TTAM1	Plant	2385±35	510-390 (68.2%)	740-690 (7.3%) 660-650 (1.2%) 550-390 (87.0%)	Jiang, et al., 2013	514-500 (7.2%) 486-399 (61.0%)	734-696 (5.5%) 664-650 (2.6%) 546-392 (87.4%)
Alagou-1	BK77003	M1-1	Wood	2590±90	800-432		IACASS, 1991	890-882 (1.3%) 834-732 (32.2%) 698-663 (8.8%) 650-545 (26.1%)	313-456 (93.5%) 444-418 (1.9%)
Alagou-2	WB77-14	M1-2	Wood	2485±80	762-398		IACASS, 1991	772-537 (65.1%) 531-518 (3.2%)	787-411 (95.4%)
Alagou-3	WB77-21	M4	Lumber	2325±65	398-211		IACASS, 1991	514-498 (3.7%) 489-354 (49.3%) 284-230 (15.3%)	748-688 (5.0%) 666-642 (2.1%) 567-337 (62.8%) 38-198 (25.6%)
Alagou-4	WB77-24	M32	Rotted Wood	2415±80	516-386		IACASS, 1991	747-689 (15.2%) 665-644 (5.6%) 563-558 (1.0%) 553-401 (46.4%)	778-383 (95.4%)
Alagou-5	WB77-25	M30-1	Rotted Wood	2330±65	398-211		IACASS, 1991	516-356 (56.2%) 280-232 12.1%)	749-687 (5.8%) 666-640 (2.5%) 569-340 (64.7%) 324-199 (22.4%)
Alagou-6	WB77-26	M28	Coffin Wood	2565±130	800-400		IACASS, 1991	829-514 (66.2%) 500-486 (2.1%)	989-393 (95.4%)
Alagou-7	WB77-27	M21	Rotted Wood Piece	2200±80	357-73		IACASS, 1991	375-172 (68.3%)	401-47 (95.4%)
Alagou-8	WB78-02	M30-2	Rotted Wood	2065±80	162-66		IACASS, 1991	193-189 (0.9%) 176BC-28AD (64.9%) 46-57AD (2.4%)	357-278 (8.5%) 258-246 (0.6%) 283BC-125AD (86.4%)
Alagou-9	WB78-14	M37	Rotted Wood	2640±65	805-598		IACASS, 1991	899-861 (16.4%) 849-773 (51.8%)	972-956 (0.8%) 933-744 (83.0%) 691-664 (2.9%) 646-549 (8.7%)
Alagou-10	WB78-19	M55	Rotted Wood	2160±65	345-44		IACASS, 1991	354-284 (24.5%) 230-102 (42.4%) 66-61 (1.3%)	381-47 (95.4%)
Alagou-11	WB78-20	M42	Rotted Wood	2440±85	754-389		IACASS, 1991	749-686 (17.2%) 666-640 (7.2%) 569-410 (43.9%)	781-393 (95.4%)
Alagou-12	WB78-21	M67	Rotted Wood	2650±85	827-594		IACASS, 1991	927-757 (66.4%) 679-672 (1.2%) 604-599 (0.7%)	1014-541 (95.4%)
Alagou-13	WB78-22	M47	Lumber	1945±60	30-213 AD		IACASS, 1991	24-9 (1.4%) 8AD-132AD (57.4%) 140AD-160AD (6.2%) 190AD-210AD (3.3%)	49BC-231AD (95.4%)
Alagou-14	WB78-23	M81	Rotted Wood	2125±80	199 BC-24 AD		IACASS, 1991	351-291 (15.2%) 209-43 (53.0%)	383BC-26AD (95.4%)
Alagou-15	WB78-24	M3	Wooden Pole	2430±90	753-386		IACASS, 1991	749-686 (16.5%) 666-640 (6.9%) 569-405 (44.9%)	793-381 (95.4%)
Alagou-16	WB78-40	M58	Rotted Wood	2365±130	516-206		IACASS, 1991	751-684 (11.7%) 668-634 (5.8%) 622-613 (1.2%) 591-359 (45.6%) 277-261 (2.4%) 244-234 (1.5%)	801-154 (95.4%)
Alagou-17	ZK-0372	/	Wood	540±100	1312-1444 AD		IACASS, 1991	1302AD-1368AD (32.0%) 130AD-1449AD (36.2%)	1272AD-1524AD (90.1%) 1571AD-1631AD (5.3%)
Shengjiindian-1	BA08016	M15	Stomach content	2080±30	160-130 (16.0%) 120-40 (52.2%)	200-20 (94.3%) 10BC-1AD (1.1%)	Liu, et al., 2013	150-132 (10.9%) 118-46 (57.4%)	175-26 (89.4%) 19BC-8AD (6.1%)
Shengjiindian-2	BA08017	M10	Wheat stalk	2145±35	350-310 (17.0%) 210-110 (51.2%)	360-280 (25.6%) 260-50 (69.8%)	Liu, et al., 2013	344-318 (14.5%) 202-106 (53.8%)	353-284 (23.8%) 228-52 (71.6%)
Shengjiindian-3	BA08018	M26	Leather artifact	2115±35	200-90 (68.2%)	350-310 (5.2%) 210-40 (90.2%)	Liu, et al., 2013	174-92 (54.9%) 77-54 (13.4%)	346-316 (6.8%) 204-42 (88.6%)

Shengjindian-4	BA08019	M13	Wheat stalk	2115±35	200-90 (68.2%)	350-310 (5.2%) 210-40 (90.2%)	Liu, et al., 2013	174-92 (54.9%) 77-54 (13.4%)	346-316 (6.8%) 204-42 (88.6%)
Shengjindian-5	BA08020	M20	Leather artifact	2170±35	360-290 (37.3%) 240-170 (30.9%)	370-110 (95.4%)	Liu, et al., 2013	352-286 (36.6%) 228-217 (4.1%) 211-163 (27.6%)	361-241 (46.3%) 236-101 (48.2%) 67-60 (0.9%)
Shengjindian-6	BA10791	M2	Wood/plate	2115±35	/	348-45 (95%)	Li, et al., 2013	174-92 (54.9%) 77-54 (13.4%)	346-316 (6.8%) 204-42 (88.6%)
						360-280 (95%) (related ranges)			
Shengjindian-7	BA10792	M2	Wood/bow	2170±55	/	380-59 (95%)	Li, et al., 2013	356-280 (30.7%) 255-248 (1.8%) 232-150 (31.7%) 132-118 (4.1%)	376-91 (90.9%) 79-54 (4.6%)
						388-216 (95%) (related rangers)			
Shengjindian-8	BA10793	M2	Wood/Bow	2140±50	/	360-46 (95%)	Li, et al., 2013	346-316 (12.7%) 204-96 (49.4%) 73-56 (6.2%)	360-241 (26.6%) 236-42 (68.8%)
						377-186 (95%) (related rangers)			
Shengjindian-9	BA10794	M2	Wood/wedge	2185±35	/	377-166 (95%)	Li, et al., 2013	353-285 (40.1%) 228-175 (28.2%)	374-149 (93.7%) 134-117 (1.7%)
						379-216 (95%) (related rangers)			
Shengjindian-10	BA10795	M2	Wood/wedge	2155±25	/	356-106 (95%)	Li, et al., 2013	346-314 (25.7%) 204-154 (42.6%)	353-285 (33.0%) 228-216 (1.7%) 211-98 (59.1%) 70-58 (1.7%)
						360-176 (95%) (related rangers)			
Shengjindian-11	BA10796	M2	Wood/prosthesis	2135±25	/	350-57 (95%)	Li, et al., 2013	336-329 (4.4%) 198-107 (63.8%)	346-315 (12.7%) 204-89 (74.2%) 80-52 (8.6%)
						356-170 (95%) (related rangers)			
Shengjindian-12	BA10797	M2	Wood/prothesis	2145±45	/	359-51 (95%)	Li, et al., 2013	347-314 (15.1%) 204-100 (49.8%) 68-59 (3.4%)	358-276 (25.2%) 260-244 (1.9%) 234-47 (68.3%)
						375-184 (95%) (related rangers)			
Shengjindian-13	BA10799	M2	Bone/male rib	2190±35	/	347-137 (95%)	Li, et al., 2013	355-281 (41.9%) 231-176 (26.4%)	380-152 (95.2%) 127-124 (0.2%)
						315-150 (95%) (related rangers)			
Shengjindian-14	BA10800	M2	Bone/female rib	2235±30	/	389-204 (95%)	Li, et al., 2013	374-351 (15.2%) 290-209 (53.1%)	388-342 (24.2%) 321-201 (71.2%)
						290-115 (95%) (related rangers)			
Shengjindian-15	BA101092	M2	Leather/prosthesis	2300±25	/	406-235 (95%)	Li, et al., 2013	400-366 (68.3%)	406-356 (77.8%) 280-232 (17.7%)
						406-235 (95%) (related rangers)			
Shengjindian-16	UBA-21941	M20	<i>Panicum miliaceum</i> , caryopsis	2091±29	164-128 (39.3%) 121-88 (37.8%) 76-56 (22.9%)	192-44 (100%)	Jiang, et al., 2015	150-130 (14.4%) 120-51 (53.9%)	194-186 (1.0%) 178-39 (92.4%) 11BC-2AD (2.1%)
Shengjindian-17	UBA-21942	M8	<i>P. miliaceum</i> , caryopsis	2004±29	41BC-24AD (100%)	87-78 (1.4%) 55BC-68AD (98.6%)	Jiang, et al., 2015	42-8 (31.4%) 2BC-28AD (26.6%) 44AD-58AD (10.3%)	51BA-82AD (92.5%) 97AD-112AD (2.9%)
Shengjindian-18	UBA-21951	M9	<i>Triticum aestivum</i> , caryopsis	2074±30	156-136 (19.7%) 114-47 (80.3%)	178-36 (95.1%) 33-19 (2.4%) 13-1 (2.5%)	Jiang, et al., 2015	149-134 (9.2%) 116-42 (59.0%)	171-27 (87.1%) 19BC-8AD (8.4%)
Saenssayi-1	BA071283	2007WSM45	Wood	3890±35	2470-2340 (68.2%)	2480-2280 (93.8%) 2250-2230 (1.6%)	Xinjiang, 2013	2458-2341 (65.1%) 2316-2310 (3.2%)	2469-2283 (92.2%) 2250-2234 (2.3%) 2218-2210 (0.9%)
Saenssayi-2	BA071279	2007WSM89A	Wood	2860±40	1120-1100 (5.1%) 1090-970 (60.4%) 960-940 (2.7%)	1190-1170 (1.4%) 1160-910 (94.0%)	Xinjiang, 2013	1110-978 (62.6%) 950-936 (5.7%)	1192-1176 (1.9%) 1158-1146 (1.6%) 1128-914 (92.0%)
Saenssayi-3	BA071282	2007WSM76	Wood	2705±35	895-865 (25.8%) 860-815 (42.4%)	920-510 (95.4%)	Xinjiang, 2013	898-866 (30.8%) 848-812 (37.5%)	916-804 (95.4%)
Saenssayi-4	BA071284	2007WSM105	Wood	2545±40	800-740 (31.0%) 690-660 (12.8%) 650-590 (22.0%) 580-560 (2.3%)	810-530 (95.4%)	Xinjiang, 2013	794-750 (29.8%) 686-666 (10.5%) 637-588 (24.2%) 580-570 (3.8%)	804-724 (37.3%) 706-662 (15.8%) 651-544 (42.4%)
Saenssayi-5	BA071280	2007WSM88	Wood	2515±35	780-740 (13.2%) 690-660 (12.0%) 650-550 (44.9%)	800-520 (95.4%)	Xinjiang, 2013	774-746 (14.5%) 689-665 (12.5%) 644-562 (40.1%) 557-554 (1.2%)	791-539 (95.4%)
Saenssayi-6	BA071281	2007WSM135	Charcoal	2510±35	770-740 (11.9%) 690-660 (11.5%) 650-550 (44.9%)	800-510 (95.4%)	Xinjiang, 2013	772-746 (12.9%) 690-665 (12.3%) 644-551 (43.1%)	790-537 (94.4%) 530-518 (1.1%)
Saenssayi-7	BA071268	2007WAM51	Wood	1785±30	170AD-200AD (8.6%) 210AD-260AD (37.4%) 280AD-330AD (22.2%)	130AD-340AD (95.4%)	Xinjiang, 2013	238AD-256AD (20.5%) 284AD-326AD (47.8%)	210AD-352AD (95.4%)
Luanzagangzi-1	UBA-9066	④	Charcoal	2777±23	999-890	975-953	Jia, et al., 2011	1003-891 (76.7%) 881-836 (18.6%)	978-950 (21.2%) 936-898 (40.8%) 865-853 (6.3%)

Luanzagangzi-2	UBA-9065	⑤	Charcoal	2877±26	1188-1182	1112-1099	Jia, et al., 2011	1190-1178 (1.5%) 1157-1147 (1.2%) 1128-975 (90.0%) 954-934 (2.8%)	1110-1010 (68.3%)
Luanzagangzi-3	UBA-9067	G1	Charcoal	2819±23	1038-1034	1003-969	Jia, et al., 2011	1046-1030 (3.5%) 1020-906 (91.9%)	1004-965 (38.7%) 960-930 (29.6%)
Luanzagangzi-4	UBA-9064	⑥	Charcoal	2870±23	1125-975	1111-1102	Jia, et al., 2011	1124-974 (91.5%) 954-933 (4.0%)	1108-1092 (9.6%) 1084-1066 (10.8%) 1058-1006 (47.9%)
Luanzagangzi-5	UBA-9063	⑦	Charcoal	2883±24	1189-1180	1113-1099	Jia, et al., 2011	1191-1176 (2.2%) 1158-1146 (1.7%) 1128-982 (91.1%) 946-940 (0.5%)	1110-1014 (68.3%)
Luanzagangzi-6	UBA-9062	⑧	Charcoal	2948±24	1261-1110	1251-1243	Jia, et al., 2011	1256-1246 (1.6%) 1227-1052 (93.8%)	1211-1122 (68.3%)
Luanzagangzi-7	UBA-9061	⑨	Charcoal	3000±24	1372-1343	1304-1211	Jia, et al., 2011	1377-1350 (6.7%) 1302-1156 (82.7%) 1146-1127 (6.0%)	1282-1202 (67.0%) 1138-1135 (1.3%)
Luanzagangzi-8	UBA-9060	⑩	Charcoal	2917±23	1210-1019	1189-1180	Jia, et al., 2011	1210-1042 (90.4%) 1036-1016 (5.1%)	1190-1178 (6.8%) 1158-1146 (7.7%) 1128-1052 (53.8%)
Qiongkeke-1	/	M11	Wood	/	984-830		Xinjiang, 2002	/	/
Qiongkeke-2	/	M52	Wood	/	1040-906		Xinjiang, 2002	/	/
Jirentai Goukou-1	BA160864	2015NJT2: 2	Animal Bone	3285±30	1628-1500		Wang, et al., 2017	1608-1576 (26.4%) 1561-1554 (5.1%) 1546-1508 (36.8%)	1622-1498 (95.4%)
Jirentai Goukou-2	BA160865	2015NJT2: 3	Animal Bone	3195±35	1593-1407		Wang, et al., 2017	1498-1438 (68.3%)	1518-1410 (95.4%)
Jirentai Goukou-3	BA160892	2015NJM75: 1	Human Bone	2985±25	1230-1055		Wang, et al., 2017	1262-1196 (53.9%) 1172-1163 (6.0%) 1142-1130 (8.4%)	1370-1357 (1.7%) 1291-1121 (93.8%)
Jirentai Goukou-4	BA160883	2015NJM49: 1	Human Bone	2935±20	1210-1056		Wang, et al., 2017	1207-1112 (68.3%)	1216-1052 (95.4%)
Jirentai Goukou-5	BA160869	2015NJT8: 1	Animal Bone	2850±25	1108-929		Wang, et al., 2017	1050-976 (58.3%) 952-935 (10.0%)	1110-926 (95.4%)
Jirentai Goukou-6	BA160868	2015NJT4: 1	Animal Bone	2775±35	1004-837		Wang, et al., 2017	980-948 (19.1%) 938-896 (31.8%) 872-840 (17.4%)	1007-832 (95.4%)
Jirentai Goukou-7	BA160885	2015NJM54: 1	Human Bone	2400±30	730-399		Wang, et al., 2017	514-496 (10.6%) 490-404 (57.7%)	732-697 (6.1%) 664-650 (3.0%) 546-397 (86.4%)
Jirentai Goukou-8	BA160877	2016NDM5: 1	Wood	2380±35	729-391		Wang, et al., 2017	513-501 (6.1%) 486-397 (62.1%)	726-701 (3.7%) 664-650 (2.2%) 546-390 (89.6%)
Jirentai Goukou-9	BA160881	2015NJM26: 1	Human Bone	2285±25	401-234		Wang, et al., 2017	396-361 (60.4%) 272-266 (5.3%) 239-236 (2.6%)	401-352 (63.0%) 286-228 (31.6%) 217-211 (0.9%)
Jirentai Goukou-10	BA160884	2015NJM52: 1	Human Bone	2240±25	387-207		Wang, et al., 2017	378-352 (19.1%) 286-228 (44.9%) 218-210 (4.3%)	387-346 (25.4%) 315-204 (70.0%)
Jirentai Goukou-11	BA160880	2015NJM14: 1	Ovicaprid Bone	2170±20	356-167		Wang, et al., 2017	348-312 (35.7%) 206-172 (32.5%)	356-280 (49.9%) 252-250 (0.2%) 232-151 (45.3%)
Jirentai Goukou-12	BA160887	2015NJM59: 1	Ovicaprid Bone	2140±35	354-54		Wang, et al., 2017	342-322 (11.3%) 201-104 (57.0%)	352-288 (20.4%) 226-220 (0.8%) 210-50 (74.3%)
Jirentai Goukou-13	BA160872	2015NJT12: 1	Animal Bone	1920±25	25AD-130AD		Wang, et al., 2017	66AD-132AD (53.8%) 140AD-159AD (9.6%) 190AD-200AD (4.9%)	29AD-42AD (3.5%) 59AD-207AD (92.0%)
Jirentai Goukou-14	BA160878	2015NJM2: 1	Ovicaprid Bone	1405±20	609AD-659AD		Wang, et al., 2017	610AD-618AD (15.7%) 640AD-655AD (52.6%)	604AD-660AD (95.4%)
Jirentai Goukou-15	BA160867	2015NJF3③	Animal Bone	3275±30	1640-1505 (93.8%)		Wang, et al., 2019	1606-1581 (20.1%) 1544-1504 (48.2%)	1618-1496 (91.6%) 1476-1458 (3.9%)
Jirentai Goukou-16	BA160863	2015NJF5③	Animal Bone	3185±30	1509-1411 (95.4%)		Wang, et al., 2019	1497-1474 (29.8%) 1460-1430 (38.5%)	1506-1411 (95.4%)
Jirentai Goukou-17	BA160871	2015NJF6③	Animal Bone	3250±30	1613-1491 (80.5%)		Wang, et al., 2019	1536-1495 (51.2%) 1476-1456 (17.1%)	1610-1574 (10.1%) 1564-1441 (85.4%)
Jirentai Goukou-18	USA-496699	2018NJY4③	Charcoal	4040±30	2631-2474 (93.4%)		Wang, et al., 2019	2621-2602 (9.6%) 2584-2557 (17.8%) 2541-2488 (40.9%)	2663-2651 (1.5%) 2632-2469 (93.9%)
Jirentai Goukou-19	USA-514311	2018NJY4	Charcoal	3960±30	2504-2399 (54.5%)		Wang, et al., 2019	2567-2529 (28.5%) 2496-2456 (38.0%) 2415-2410 (1.8%)	2571-2516 (32.8%) 2502-2400 (52.7%) 2383-2346 (10.0%)
Jirentai Goukou-20	USA-514312	2018NJY5	Charcoal	3990±30	2575-2466 (95.4%)		Wang, et al., 2019	2566-2530 (39.4%) 2495-2470 (28.9%)	2576-2460 (95.4%)

Jirentai Goukou-21	USA-496701	2018NQH15	Animal Bone	2920±30	1211-1020 (95.4%)	Wang, et al., 2019	1195-1174 (11.2%) 1161-1144 (10.0%) 1130-1051 (47.1%)	1214-1016 (95.4%)
Jirentai Goukou-22	USA-450555	2016NHF2	Animal Bone	3300±30	1640-1505 (95.4%)	Wang, et al., 2019	1612-1572 (37.1%) 1566-1532 (31.2%)	1628-1502 (95.4%)
Jirentai Goukou-23	USA-513858	2018NHF25⑩	Animal Bone	3260±30	1616-1493 (87.8%)	Wang, et al., 2019	1600-1586 (7.7%) 1543-1496 (52.6%) 1474-1460 (7.9%)	1612-1492 (81.6%) 1482-1450 (13.8%)
Jirentai Goukou-24	USA-513859	2018NHF27	Carbonized Grain	3120±30	1451-1291 (95.4%)	Wang, et al., 2019	1431-1384 (47.1%) 1340-1316 (21.2%)	1492-1482 (1.5%) 1450-1291 (94.0%)
Jirentai Goukou-25	USA-513857	2018GDQ②	Animal Bone	3270±30	1623-1496 (92.7%)	Wang, et al., 2019	1606-1581 (17.4%) 1544-1501 (50.8%)	1616-1496 (89.3%) 1478-1456 (6.2%)
Sidaogou-1	WB77-29	T5 (2)H50	Charcoal	2260±80	401-208	IACASS, 1991	400-342 (22.5%) 322-200 (45.8%)	538-528 (0.5%) 520-93 (93.9%) 75-55 (1.1%)
Sidaogou-2	WB77-30	T4 (3)	Charcoal	2400±65	756-399	IACASS, 1991	734-696 (10.4%) 663-650 (3.9%) 546-398 (53.9%)	761-386 (95.4%)
Sidaogou-3	WB77-31	T3 (3)	Charcoal	2270±80	403-210	IACASS, 1991	404-342 (24.0%) 322-201 (44.3%)	718-709 (0.4%) 661-654 (0.3%) 543-96 (94.1%) 72-57 (0.6%)
Sidaogou-4	WB77-32	T1 (4)	Charcoal	2360±65	512-391	IACASS, 1991	724-706 (3.7%) 662-652 (2.5%) 544-376 (62.1%)	756-680 (11.5%) 670-606 (7.1%) 596-353 (70.8%) 286-228 (5.6%) 218-210 (0.4%)
Sidaogou-5	WB77-33	T1 (4) H44	Charcoal	2320±65	409-379	IACASS, 1991	511-506 (1.1%) 480-352 (47.3%) 286-228 (18.2%) 218-210 (1.6%)	745-690 (4.1%) 665-644 (1.7%) 550-196 (89.6%)
Sidaogou-6	WB77-34	T2 (5)	Charcoal	2800±70	1036-896	IACASS, 1991	1046-1030 (4.3%) 1019-894 (52.1%) 876-837 (11.9%)	1187-1180 (0.5%) 1155-1148 (0.5%) 1126-810 (94.4%)
Sidaogou-7	WB77-35	H4	Charcoal	2510±80	796-432	IACASS, 1991	786-542 (68.3%)	798-416 (95.4%)
Sidaogou-8	WB78-27	T6	Charcoal	1990±60	92 BC-66 AD	IACASS, 1991	46 BC-84 AD (60.2%) 95 AD-116 AD (8.0%)	149-134 (1.3%) 114 BC-205AD (94.1%)
Sidaogou-9	ZK-1052	M2	Coffin Wood	1480±70	439 AD-642 AD	IACASS, 1991	540 AD-650 AD (68.3%)	430 AD-660 AD (95.4%)
Sidaogou-10	OZK664	/	Cereal Seed	3030±50	1411-1129	Dodson, et al., 2013	1386-1338 (21.0%) 1218-1216 (47.2%)	1413-1154 (91.4%) 1148-1126 (4.0%)
Sidaogou-11	OZK665	/	Cereal Seed	3080±60	1493-1132	Dodson, et al., 2013	1416-1270 (68.3%)	1496-1475 (1.9%) 1459-1196 (92.0%) 1172-1163 (0.7%) 1142-1131 (0.9%)
Suodunbulake-1	BK91062	90M7	Wood	2470±60	2105±70	Xinjiang, 1999	757-678 (24.1%) 671-604 (19.7%) 598-515 (24.4%)	770-416 (95.4%)
Suodunbulake-2	BK91063	90M10	Wood	2380±70	2405±80	Xinjiang, 1999	732-696 (8.8%) 663-650 (3.4%) 546-390 (56.1%)	766-360 (94.4%) 273-264 (0.6%) 242-236 (0.4%)
Suodunbulake-3	BK91064	90M33	Wood	2290±60	2295±70	Xinjiang, 1999	405-351 (31.9%) 290-209 (36.4%)	515-174 (95.4%)
Chawuhu-1	ZK-1328	IM4-1	Wood	2600±80	830-662	IACASS, 1991	892-880 (2.6%) 834-746 (36.1%) 690-665 (6.7%) 644-551(22.9%)	922-476 (95.2%) 431-426 (0.3%)
Chawuhu-2	ZK-1329	IM6-1	Wood	2610±75	830-664	IACASS, 1991	896-871 (6.1%) 840-749 (41.5%) 686-666 (5.2%) 639-570 (15.6%)	928-514 (94.9%) 500-486 (0.6%)
Chawuhu-3	ZK-1330	IM20-1	Wood	2580±75	818-598	IACASS, 1991	817-744 (31.3%) 691-664 (8.6%) 646-550 (28.4%)	899-476 (95.1%) 431-426 (0.3%)
Chawuhu-4	ZK-1331	IM25-1	Wood	2750±80	998-823	IACASS, 1991	982-946 (13.2%) 940-815 (55.1%)	1116-792 (95.4%)
Chawuhu-5	ZK-1332	IM29-1	Wood	2670±75	900-795	IACASS, 1991	910-786 (68.3%)	1013-748 (90.1%) 686-666 (1.4%) 640-568 (3.9%)
Chawuhu-6	ZK-1333	IM31-1	Wood	2690±90	970-796	IACASS, 1991	972-955 (4.2%) 933-786 (64.0%)	1110-746 (89.4%) 690-664 (1.5%) 644-551 (4.6%)
Chawuhu-7	ZK-1334	IM32-1	Wood	2550±90	806-449	IACASS, 1991	806-721 (24.9%) 707-662 (12.3%) 652-544 (31.0%)	891-881 (0.7%) 834-408 (94.8%)

Chawuhu-8	ZK-1335	IM59-1	Wood	2530±75	799-447	IACASS, 1991	794-725 (21.5%) 704-662 (12.7%) 651-544 (34.1%)	807-454 (92.0%) 444-417 (3.4%)
Chawuhu-9	ZK-1336	IM60-1	Wood	2450±80	770-405	IACASS, 1991	750-685 (17.9%) 666-637 (8.1%) 588-580 (1.9%) 570-452 (32.3%) 446-416 (8.0%)	775-400 (95.4%)
Chawuhu-10	ZK-2031	IM06B-1	Wood	2150±75	359-94	IACASS, 1991	352-286 (20.7%) 228-216 (3.0%) 211-92 (38.6%) 76-54 (6.0%)	388-35 (93.5%) 15BC-5AD (2.0%)
Chawuhu-11	ZK-2033	IM09-1	Wood	2740±90	998-813	IACASS, 1991	984-808 (68.3%)	1192-1176 (0.6%) 1158-1146 (0.6%) 1128-772 (94.3%)
Chawuhu-12	ZK-2036	IM025-1	Wood	2460±75	787-418	IACASS, 1991	752-682 (19.9%) 668-631 (10.4%) 624-610 (3.5%) 592-473 (32.2%) 433-424 (2.3%)	774-406 (95.4%)
Chawuhu-13	ZK-2037	IM30-1	Wood	2720±90	986-807	IACASS, 1991	981-947 (9.9%) 940-801 (58.4%)	1190-1178 (0.3%) 1157-1147 (0.3%) 1127-755 (94.1%) 680-670 (0.4%) 608-594 (0.4%)
Chawuhu-14	ZK-2038	IM035-1	Wood	2930±80	1266-1008	IACASS, 1991	1258-1244 (3.0%) 1230-1012 (65.3%)	1386-1338 (4.7%) 1317-920 (90.7%)
Chawuhu-15	ZK-2039	IM043-1	Wood	2550±70	802-454	IACASS, 1991	802-741 (24.2%) 692-664 (10.2%) 647-548 (33.8%)	818-460 (93.7%) 440-420 (1.7%)
Chawuhu-16	ZK-2040	IM045-1	Wood	2640±70	891-791	IACASS, 1991	901-771 (68.3%)	981-947 (2.0%) 940-734 (79.1%) 696-662 (3.7%) 650-546 (10.6%)
Chawuhu-17	ZK-2110	IIM2-1	Wood	2510±80	796-432	IACASS, 1991	786-542 (68.3%)	798-416 (95.4%)
Chawuhu-18	ZK-2111	IIM6-1	Wood	2380±70	753-394	IACASS, 1991	732-696 (8.8%) 663-650 (3.4%) 546-390 (56.1%)	766-360 (94.4%) 273-264 (0.6%) 242-236 (0.4%)
Chawuhu-19	ZK-2112	IIM15-1	Wood	2330±75	478-379	IACASS, 1991	540-353 (54.6%) 286-228 (13.7%)	752-683 (7.5%) 668-632 (3.5%) 624-612 (0.6%) 592-336 (60.5%) 330-197 (23.3%)
Chawuhu-20	ZK-2043	IIM13-1	Wood	1879±75	32AD-230AD	IACASS, 1991	67AD-241AD (68.3%)	41BC-8BC (3.0%) 1BC-262AD (83.6%) 276AD-341AD (8.8%)
Chawuhu-21	ZK-2044	IIM12-1	Wood	2090±70	342-2	IACASS, 1991	336-328 (2.0%) 198-34 (60.8%) 15BC-5AD (5.5%)	357-278 (11.4%) 258-246 (0.8%) 233BC-76AD (83.2%)
Chawuhu-22	ZK-2045	IIM13-2	Wood	1890±70	28AD-219AD	IACASS, 1991	69AD-233AD (68.3%)	40-9 (3.3%) 0AD-256AD (87.0%) 282AD-328AD (5.1%)
Chawuhu-23	ZK-2046	IIM14-1	Wood	1830±70	76AD-317AD	IACASS, 1991	125AD-255AD (53.9%) 286AD-325AD (14.3%)	32AD-40AD (0.6%) 60AD-402AD (94.8%)
Chawuhu-24	ZK-2047	IIM15B-1	Wood	1870±90	29AD-235AD	IACASS, 1991	33AD-38AD (1.0%) 61AD-250AD (62.6%) 294AD-314AD (4.7%)	46BC-382AD (95.4%)
Chawuhu-25	ZK-2048	IIM16-1	Wood	1800±70	128AD-333AD	IACASS, 1991	132AD-140AD (2.1%) 160AD-190AD (8.6%) 200AD-264AD (26.7%) 274AD-348AD (30.8%)	80AD-99AD (1.8%) 109AD-413 (93.6%)
Chawuhu-26	ZK-2049	IIM19-1	Wood	2050±95	200BC-52AD	IACASS, 1991	174BC-72AD (68.3%)	356-280 (7.5%) 232Bc-172AD (86.7%) 182AD-203AD (1.2%)
Gumugou-1	BK81042	M38	Woolen Fabric	3485±100	1875-1530	IACASS, 1991	1940-1682 (66.2%) 1653-1642 (2.0%)	2119-2096 (1.1%) 2038-1535 (94.3%)
Gumugou-2	BK81043	M38	Sheep Leather	3615±170	2123-1640	IACASS, 1991	2268-2260 (0.8%) 2204-1743 (67.5%)	2463-1601 (94.0%) 1584-1544 (1.4%)
Gumugou-3	BK81044	M38	Wood	3525±70	1878-1677	IACASS, 1991	1940-1750 (68.3%)	2110-2104 (0.3%) 2036-1669 (94.0%) 1656-1636 (1.1%)
Gumugou-4	BK81045	M4	Wood	3660±80	2032-1777	IACASS, 1991	2191-2182 (2.2%) 2142-1932 (66.1%)	2288-1873 (92.2%) 1845-1818 (1.8%) 1801-1776 (1.4%)

Gumugou-5	WB81-28	M12	Wood	4260±80	2886-2587		IACASS, 1991	3010-2978 (6.6%) 2966-2947 (3.3%) 2938-2848 (30.4%) 2811-2744 (18.8%) 2730-2694 (8.3%) 2684-2678 (0.9%)	3092-2620 (94.4%) 2604-2583 (1.1%)
Gumugou-6	ZK-1001	/	Leather	3580±70	1896-1782		IACASS, 1991	2031-1876 (57.5%) 1843-1821 (6.1%) 1796-1778 (4.6%)	2136-1744 (95.4%)
Gumugou-7	ZK-1003 (1)	M23	Coffin Wood	3650±60	2011-1782		IACASS, 1991	2134-2081 (20.3%) 2060-1941 (48.0%)	2201-1881 (95.2%) 1834-1830 (0.2%)
Gumugou-8	ZK-1003 (2)	M23	Woolen Fabric	2185±105	358-2		IACASS, 1991	378-147 (61.6%) 138-109 (6.6%)	476-432 (1.3%) 426 BC-70AD (94.2%)
Gumugou-9	OxA-28153	M4	Wheat grain	3488±23	1840-1878 (28.7%) 1792-1827 (26.8%) 1768-1785 (12.7%)	1746-1886 (95.4%)	Zhang, et al., 2017	1878-1862 (11.7%) 1856-1840 (11.0%) 1826-1766 (41.1%) 1758-1751 (4.3%)	1886-1742 (95.4%)
Xiaohe-1	BA05804	04XHBM23	Millet Seed	3545±40	2011-1756		Flad, et al., 2010	1946-1874 (42.6%) 1845-1818 (14.1%) 1800-1776 (11.6%)	2016-1998 (3.0%) 1978-1750 (92.4%)
Xiaohe-2	BA05805	04XHBM23	Felt Fragment	3415±40	1877-1618		Flad, et al., 2010	1749-1628 (68.3%)	1878-1840 (9.1%) 1825-1792 (4.6%) 1783-1612 (81.8%)
Xiaohe-3	BA05799	04XHM112: 17	Loin-cloth Fragment	3425±40	1879-1627		Flad, et al., 2010	1866-1852 (6.0%) 1769-1670 (54.2%) 1655-1637 (8.0%)	1878-1840 (12.0%) 1825-1791 (6.8%) 1783-1618 (76.7%)
Xiaohe-4	BA05803	04XHBM17: 12	Wheat Seed	3375±40	1755-1531		Flad, et al., 2010	1739-1712 (14.2%) 1696-1613 (54.0%)	1862-1858 (0.4%) 1764-1760 (0.4%) 1751-1534 (94.6%)
Xiaohe-5	BA05798	04XHM75: 16	Felt Hat Fragment	3365±40	1746-1531		Flad, et al., 2010	1736-1716 (9.9%) 1692-1611 (53.1%) 1574-1564 (4.3%) 1552-1550 (1.0%)	1746-1532 (95.4%)
Xiaohe-6	BA05802	04XHBM2: 12	Felt Hat Fragment	3360±40	1743-1531		Flad, et al., 2010	1734-1718 (7.1%) 1691-1608 (50.6%) 1576-1561 (7.1%) 1554-1546 (3.5%)	1744-1532 (95.4%)
Xiaohe-7	BA05794	02XHM2: 18-3	Wheat Seed	3305±40	1687-1498		Flad, et al., 2010	1616-1530 (65.7%) 1524-1520 (2.6%)	1728-1724 (0.5%) 1688-1498 (95.0%)
Xiaohe-8	BA05795	02XHM2: 18-7	Millet Seed	3200±40	1605-1401		Flad, et al., 2010	1502-1438 (68.3%)	1538-1400 (95.4%)
Xiaohe-9	BA05801	04XHM117	Cloak fragment	3355±40	1740-1530		Flad, et al., 2010	1731-1722 (4.1%) 1689-1606 (47.2%) 1581-1544 (17.0%)	1742-1706 (11.4%) 1701-1531 (83.6%) 1523-1520 (0.5%)
Xiaohe-10	BA05797	04XHM292	Cloak fragment	3350±50	1750-1511		Flad, et al., 2010	1688-1599 (44.8%) 1591-1542 (23.4%)	1747-1506 (95.4%)
Xiaohe-11	BA05790	03XHM12	Animal ear fragment	3305±30	1667-1504		Flad, et al., 2010	1612-1534 (68.3%)	1665-1659 (0.6%) 1631-1502 (94.9%)
Xiaohe-12	BA05789	03XHM12	Felt fragment	3290±30	1661-1497		Flad, et al., 2010	1608-1576 (29.2%) 1562-1554 (6.2%) 1546-1512 (32.8%)	1622-1501 (95.4%)
Xiaohe-13	BA05796	04XHM92: 23	Millet Seed	3290±40	1682-1464		Flad, et al., 2010	1611-1574 (28.2%) 1564-1510 (40.1%)	1677-1654 (2.3%) 1640-1492 (89.2%) 1480-1452 (4.0%)
Xiaohe-14	BA05792	03XHM29	Animal ear fragment	3290±40	1682-1464		Flad, et al., 2010	1611-1574 (28.2%) 1564-1510 (40.1%)	1677-1654 (2.3%) 1640-1492 (89.2%) 1480-1452 (4.0%)
Xiaohe-15	BA05791	03XHM29: 20	Wheat Seed	3225±30	1606-1427		Flad, et al., 2010	1510-1447 (68.3%)	1536-1425 (95.4%)
Xiaohe-16	BA05793	03XHM34: 14	Millet Seed	3240±40	1612-1433		Flad, et al., 2010	1536-1446 (68.3%)	1612-1572 (10.4%) 1566-1428 (85.0%)
Xiaohe-17	BA131749	M32	Cow pies	3205±25	1500-1445 (68.2%) 1610-1570 (14.4%)	1520-1425 (95.4%)	Qiu, et al., 2014	1500-1446 (68.3%)	1508-1425 (95.4%)
Xiaohe-18	BA131750	/	Cow pies	3250±30	1540-1490 (42.2%) 1480-1450 (11.6%)	1610-1440 (95.4%)	Qiu, et al., 2014	1536-1495 (51.2%) 1478-1456 (17.1%)	1610-1574 (10.1%) 1564-1441 (85.4%)
Xiaohe-19	UBA21939	M20	Common millet grains	3330±33	1640-1649 (9.7%) 1643-1604 (28%) 1586-1595 (1%)	1726-1725 (0.3%) 1691-1521 (95.1%)	Qiu, et al., 2014	1626-1536 (68.3%)	1731-1721 (1.8%) 1688-1516 (93.7%)
Xiaohe-20	UBA22086	M20	Wheat grains	3240±32	1597-1595 (1%) 1531-1453 (67.3%)	1607-1569 (13.8%) 1562-1438 (81.6%)	Qiu, et al., 2014	1533-1492 (41.8%) 1480-1452 (26.5%)	1608-1577 (6.0%) 1560-1554 (0.9%) 1546-1430 (88.6%)
Mohuchahan-1	BA131487	IIM21	Wood	2785±25	975-900 (68.2%)	1010-890 (87.0%) 880-840 (8.4%)	Xinjiang, 2016	983-901 (68.2%)	1007-894 (84.7%) 876-840 (10.7%)
Mohuchahan-2	BA131488	M105	Wood	2740±30	910-835 (68.2%)	980-950 (2.7%) 940-810 (92.7%)	Xinjiang, 2016	906-832 (68.3%)	971-956 (2.6%) 932-813 (92.8%)

Mohuchahan-3	BA131489	M40	Wood	2820±20	1005-965 (37.1%) 960-930 (31.1%)	1030-910 (95.4%)	Xinjiang, 2016	1005-967 (39.2%) 959-931 (29.1%)	1043-1034 (2.0%) 1016-910 (93.4%)
Mohuchahan-4	BA131490	IIM3	Charcoal	2820±20	1005-965 (37.1%) 960-930 (31.1%)	1030-910 (95.4%)	Xinjiang, 2016	1005-967 (39.2%) 959-931 (29.1%)	1043-1034 (2.0%) 1016-910 (93.4%)
Mohuchahan-5	BA131491	M83	Wood	2910±25	1190-1180 (3.3%) 1160-1140 (4.5%) 1130-1040 (60.4%)	1210-1010 (95.4%)	Xinjiang, 2016	1188-1180 (3.7%) 1156-1148 (4.6%) 1126-1048 (59.9%)	1203-1140 (23.1%) 1134-1014 (72.3%)
Mohuchahan-6	BA131492	M99	Wood	2715±20	895-865 (33.5%) 860-825 (34.7%)	905-815 (95.4%)	Xinjiang, 2016	898-866 (37.1%) 848-822 (31.2%)	904-814 (95.4%)
Mohuchahan-7	BA131493	M29	Wood	2750±20	915-890 (28.6%) 880-840 (39.6%)	970-960 (1.8%) 940-830 (93.6%)	Xinjiang, 2016	914-894 (21.4%) 876-836 (46.8%)	967-958 (1.3%) 931-827 (94.1%)
Mohuchahan-8	BA131494	M26	Wood	2660±25	830-800 (68.2%)	900-870 (5.9%) 850-790 (89.5%)	Xinjiang, 2016	914-894 (21.4%) 876-836 (46.8%)	967-958 (1.3%) 931-827 (94.1%)
Mohuchahan-9	BA131495	M75	Wood	2670±20	830-805 (68.2%)	895-870 (6.4%) 850-795 (89.0%)	Xinjiang, 2016	828-804 (68.3%)	896-871 (14.0%) 836-798 (81.5%)
Mohuchahan-10	BA131497	IIM106	Wood	2775±20	975-955 (15.8%) 945-895 (52.4%)	1000-840 (95.4%)	Xinjiang, 2016	976-952 (16.8%) 935-897 (43.0%) 867-851 (8.5%)	998-891 (76.2%) 881-836 (19.3%)
Mohuchahan-11	BA131498	M86	Charcoal	2735±40	915-830 (52.4%)	980-800 (95.4%)	Xinjiang, 2016	910-827 (68.3%)	982-946 (7.0%) 940-807 (88.5%)
Mohuchahan-12	BA131500	M128	Wood	2785±20	975-950 (21.5%) 945-900 (46.7%)	1010-890 (91.5%) 870-850 (2.9%)	Xinjiang, 2016	980-948 (28.9%) 938-902 (39.4%)	1006-896 (88.9%) 872-846 (6.5%)
Mohuchahan-13	BA131501	M139	Wood	2785±20	975-950 (21.5%) 945-900 (46.7%)	1010-890 (91.5%) 870-850 (2.9%)	Xinjiang, 2016	980-948 (28.9%) 938-902 (39.4%)	1006-896 (88.9%) 872-846 (6.5%)
Mohuchahan-14	BA131502	M126	Bone	2630±20	810-795 (68.2%)	825-785 (95.4%)	Xinjiang, 2016	808-795 (68.3%)	819-785 (95.4%)
Mohuchahan-15	BA131503	M128	Bone	2725±20	900-835 (68.2%)	915-820 (95.4%)	Xinjiang, 2016	897-867 (36.1%) 856-831 (32.1%)	911-816 (95.4%)
Mohuchahan-16	BA131504	IIM28	Bone	2700±20	895-875 (19.1%) 850-810 (49.1%)	900-810 (95.4%)	Xinjiang, 2016	896-873 (26.4%) 838-811 (41.8%)	900-808 (95.4%)
Mohuchahan-17	BA131505	IIM19	Bone	2670±25	835-800 (68.2%)	895-795 (95.4%)	Xinjiang, 2016	832-802 (68.3%)	899-862 (20.1%) 842-796 (75.3%)
Mohuchahan-18	BA131506	IIM23	Bone	2630±20	810-795 (68.2%)	825-785 (95.4%)	Xinjiang, 2016	808-795 (68.3%)	819-785 (95.4%)
Mohuchahan-19	BA131507	IIM63	Bone	1645±20	385AD-425AD (68.2%)	330AD-440AD (92.3%) 490AD-530AD (3.1%)	Xinjiang, 2016	402AD-434AD (60.5%) 468AD-472AD (2.6%) 518AD-528AD (5.2%)	364AD-440AD (72.5%) 454AD-479AD (7.5%) 495AD-535AD (15.5%)
Mohuchahan-20	BA131508	M114	Bone	2620±20	810-790 (68.2%)	820-780 (95.4%)	Xinjiang, 2016	806-792 (68.3%)	811-780 (95.4%)
Mohuchahan-21	BA131509	M54	Bone	2770±20	980-950 (10.4%) 940-890 (50.5%) 870-850 (7.2%)	980-850 (95.4%)	Xinjiang, 2016	970-956 (8.5%) 932-896 (41.3%) 871-843 (18.4%)	984-834 (95.4%)
Qunbake-1	ZK-2113	IM1-1	Wood	2500±70		792-432	IACASS, 1991	776-541 (68.3%)	792-452 (90.6%) 446-416 (4.9%)
Qunbake-2	ZK-2114	IM2-1	Wood	2720±100		990-810	IACASS, 1991	992-798 (68.3%)	1200-1141 (2.2%) 1133-749 (90.0%) 686-666 (0.8%) 639-569 (2.4%)
Qunbake-3	ZK-2115	IM3-1	Reed	2600±90		831-603	IACASS, 1991	894-875 (4.0%) 838-741 (33.3%) 692-664 (7.2%) 647-548 (23.7%)	926-457 (93.9%) 442-418 (1.5%)
Qunbake-4	ZK-2116	IM3-2	Wood	2620±75		832-665	IACASS, 1991	900-752 (58.5%) 682-668 (3.5%) 632-624 (1.7%) 611-592 (4.5%)	974-954 (0.8%) 934-537 (94.1%) 530-518 (0.5%)
Qunbake-5	ZK-2117	IM4-1	Wood	2420±80		764-400	IACASS, 1991	747-688 (15.4%) 666-642 (6.0%) 565-402 (46.9%)	776-386 (95.4%)
Qunbake-6	ZK-2143	IM9-1	Wood	2190±80		387-124	IACASS, 1991	373-162 (68.3%)	398-45 (95.4%)
Qunbake-7	ZK-2144	IM10-1	Wood	2480±95		793-408	IACASS, 1991	770-514 (66.4%) 497-489 (1.9%)	798-400 (95.4%)
Qunbake-8	ZK-2145	IM27-1	Wood	2550±80		804-452	IACASS, 1991	804-727 (24.8%) 700-662 (11.3%) 650-544 (32.1%)	823-416 (95.4%)
Qunbake-9	ZK-2146	IM34A-1	Wood	2380±75		754-393	IACASS, 1991	741-692 (11.1%) 664-647 (4.1%) 548-388 (53.1%)	770-356 (92.8%) 279-256 (1.6%) 248-232 (1.1%)
Qunbake-10	ZK-2288	IIM4-1	Wood	2570±80		813-593	IACASS, 1991	812-735 (28.1%) 695-663 (9.7%) 649-546 (30.4%)	896-870 (2.2%) 840-454 (91.0%) 444-416 (2.2%)
Qunbake-11	ZK-2289	IIM7-1	Wood	2600±75		829-662	IACASS, 1991	891-882 (2.0%) 834-747 (39.0%) 688-665 (6.7%) 643-564 (20.5%)	919-510 (94.3%) 505-482 (1.2%)

Qunbake-12	ZK-2290	IIM10-1	Wood	2440±75	767-404	IACASS, 1991	748-686 (17.2%) 666-641 (6.9%) 568-410 (44.2%)	770-400 (95.4%)	
Qunbake-13	ZK-2291	IIM12-1	Wood	2530±75	799-447	IACASS, 1991	794-725 (21.5%) 704-662 (12.7%) 651-544 (34.1%)	807-454 (92.0%) 444-417 (3.4%)	
Qunbake-14	ZK-2292	IIM18-1	Wood	2230±90	397-174	IACASS, 1991	392-194 (66.0%) 186-178 (2.2%)	516-41 (95.2%) 8-2 (0.2%)	
Kezier-1	XE-366	90BKM11	Wood	2705±90	1105-620	Ruan & Liu, 1999	976-952 (6.7%) 935-794 (61.5%)	1122-750 (92.5%) 685-666 (0.8%) 636-588 (1.9%) 580-570 (0.3%)	
Kezier-2	XE-367	90BKM14	Wood	2745±60	1100-795	Ruan & Liu, 1999	968-959 (3.6%) 931-818 (64.7%)	1044-1032 (1.1%) 1018-801 (94.3%)	
Kezier-3	XE-368	90BKM15 (A)	Wood	2900±60	1330-885	Ruan & Liu, 1999	1200-1141 (18.7%) 1133-1008 (49.6%)	1262-922 (95.4%)	
Kezier-4	XE-369	90BKM22	Wood	2810±60	1225-815	Ruan & Liu, 1999	1048-898 (65.7%) 862-852 (2.5%)	1125-818 (95.4%)	
Kezier-5	XE-372	90BKM22	Wood	2750±70	1100-795	Ruan & Liu, 1999	978-950 (10.5%) 936-818 (57.8%)	1106-1096 (0.7%) 1080-1068 (0.8%) 1056-795 (94.0%)	
Duogang-1	ZK-3083	99XBDM236	Coffin wood	2861±47	985-844	IACASS, et al., 2014	1112-978 (62.6%) 950-936 (5.7%)	1201-1142 (7.9%) 1132-906 (87.5%)	
Duogang-2	SP-3053	99XBDM216	Human bone	2619±24	810-790	IACASS, et al., 2014	807-791 (68.3%)	816-776 (95.4%)	
Duogang-3	ZK-3080	99XBDM220	Coffin wood	2720±50	824-795	IACASS, et al., 2014	904-816 (68.3%)	983-801 (95.4%)	
Duogang-4	ZK-3085	99XBDM108	Wood	2625±40	800-550	IACASS, et al., 2014	816-780 (68.3%)	900-865 (7.3%) 850-758 (87.8%) 678-674 (0.3%)	
Duogang-5	ZK-3082	99XBDM270	Wood	2574±39	790-520	IACASS, et al., 2014	806-755 (57.3%) 680-670 (5.2%) 607-595 (5.7%)	811-744 (61.1%) 691-664 (9.3%) 646-548 (25.1%)	
Duogang-6	ZK-3081	99XBDM266	Wood	2560±38	770-520	IACASS, et al., 2014	801-752 (44.8%) 683-668 (8.5%) 632-622 (4.2%) 612-592 (10.7%)	808-738 (49.3%) 794-662 (12.3%) 648-546 (33.9%)	
Duogang-7	ZK-3078	99XBDM201	Coffin wood	2532±55	765-408	IACASS, et al., 2014	790-744 (19.9%) 691-664 (10.9%) 646-550 (37.5%)	806-476 (95.3%) 428-426 (0.2%)	
Duogang-8	ZK-3084	99XBDM101	Charcoal	2440±41	520-390	IACASS, et al., 2014	739-694 (15.9%) 664-648 (5.6%) 547-416 (46.8%)	755-680 (22.2%) 670-607 (14.2%) 596-406 (59.0%)	
Duogang-9	ZK-3079	99XBDM215	Coffin wood	2451±50	482-393	IACASS, et al., 2014	748-686 (20.2%) 666-640 (8.2%) 568-458 (33.5%) 441-418 (6.3%)	758-678 (23.9%) 672-410 (71.5%)	
Xintala-1	OZM448	5-10 cm (Depth)	Charcoal	3395±30	3564-3707	Zhao, et al., 2013	1736-1716 (17.1%) 1694-1630 (51.2%)	1866-1852 (1.5%) 1769-1612 (93.9%)	
Xintala-2	OZM449	80-85 cm (Depth)	Charcoal	3515±30	3700-3869	Zhao, et al., 2013	1890-1870 (13.5%) 1848-1773 (54.8%)	1928-1747 (95.4%)	
Xintala-3	OZM450	150-160 cm (Depth)	Charcoal	3335±30	3475-3639	Zhao, et al., 2013	1628-1538 (68.3%)	1731-1721 (2.0%) 1688-1531 (92.8%) 1523-1520 (0.7%)	
Xintala-4	OZM451	290-300 cm (Depth)	Wheat seed	3460±35	3675-3831	Zhao, et al., 2013	1875-1844 (20.2%) 1820-1798 (12.5%) 1778-1738 (26.1%) 1713-1696 (9.5%)	1886-1684 (94.5%) 1652-1644 (0.9%)	
Xintala-5	OZL437	350-360 cm (Depth)	Wheat seed	3515±50	3683-3922	Zhao, et al., 2013	1900-1750 (68.3%)	2011-2001 (0.9%) 1973-1736 (91.2%) 1716-1693 (3.4%)	
Adunqiaolu-1	UBA-19166	XBWAM9-2	Wood	3347±31	1870-1846 (68.2%)	/	Cong, et al., 2017	1681-1653 (16.9%) 1642-1604 (26.6%) 1583-1544 (24.8%)	1736-1716 (5.9%) 1692-1534 (89.6%)
Adunqiaolu-2	UBA-19167	XBWAM9-1	Wood	3434±28	1769-1690 (68.2%)	/	Cong, et al., 2017	1868-1850 (9.7%) 1770-1688 (58.6%)	1875-1842 (14.2%) 1821-1797 (5.4%) 1778-1630 (75.7%)
Adunqiaolu-3	UBA-19165	XBWAF1-layer 4	Charcoal	3403±28	1743-1680 (68.2%)	/	Cong, et al., 2017	1740-1710 (24.3%) 1699-1666 (24.9%) 1658-1632 (19.1%)	1864-1854 (1.5%) 1767-1618 (93.9%)
Adunqiaolu-4	UBA-21985	XWASM4-2 (1)	Wood	3337±32	1728-1720 (68.2%)	/	Cong, et al., 2017	1665-1659 (2.9%) 1631-1538 (65.3%)	1734-1718 (3.3%) 1690-1518 (92.2%)
Adunqiaolu-5	UBA-19163	XBWAF1-layer 2	Charcoal	3331±38	1666-1604 (68.2%)	/	Cong, et al., 2017	1665-1659 (2.6%) 1631-1534 (65.7%)	1733-1719 (3.0%) 1690-1511 (92.4%)
Adunqiaolu-6	UBA-19164	XBWAF1-layer 3	Charcoal	3270±27	1606-1574 (68.2%)	/	Cong, et al., 2017	1606-1582 (15.6%) 1544-1501 (52.7%)	1615-1496 (90.6%) 1476-1457 (4.9%)

Adunqiaolu-7	UBA-21986	XWAM50-1-2	Charcoal	3266±34	1607-1571 (68.2%)	/	Cong, et al., 2017	1608-1576 (18.3%) 1561-1554 (3.4%) 1546-1498 (46.5%)	1616-1492 (84.6%) 1482-1450 (10.9%)
Adunqiaolu-8	UBA-19168	XBWAM1-1	Human bone	3253±27	1605-1581 (68.2%)	/	Cong, et al., 2017	1538-1496 (55.2%) 1476-1458 (13.0%)	1610-1576 (9.7%) 1562-1553 (1.8%) 1547-1446 (83.9%)
Adunqiaolu-9	XA-16899	XBWAF1	Charcoal	3346±25	1682-1614 (68.2%)	/	Cong, et al., 2017	1674-1654 (12.4%) 1640-1602 (29.2%) 1584-1544 (26.7%)	1732-1720 (3.1%) 1688-1537 (92.3%)
Adunqiaolu-10	XA-16900	XBWAF1	Charcoal	3320±34	1639-1533 (68.2%)	/	Cong, et al., 2017	1619-1536 (68.3%)	1686-1506 (95.4%)
Adunqiaolu-11	XA-17132	XWASM45-east-2	Burnt bone	3260±30	1607-1500 (68.2%)	/	Cong, et al., 2017	1600-1586 (7.7%) 1543-1496 (52.6%) 1474-1406 (7.9%)	1612-1492 (81.6%) 1482-1450 (13.8%)
Adunqiaolu-12	XA-17133	XWASM41 north	Burnt bone	3330±30	1661-1546 (68.2%)	/	Cong, et al., 2017	1624-1540 (68.3%)	1687-1517 (95.4%)
Adunqiaolu-13	XA-17134	XWASM43	Burnt bone	3346±30	1687-1612 (68.2%)	/	Cong, et al., 2017	1676-1654 (13.3%) 1641-1600 (28.7%) 1584-1544 (26.3%)	1736-1716 (5.3%) 1692-1533 (90.1%)
Adunqiaolu-14	UBA-30781	XWAF1-P5-2	Sheep dung	3189±37	1497-1433 (68.2%)	/	Jia, et al., 2017	1498-1432 (68.3%)	1530-1399 (95.4%)
Adunqiaolu-15	UBA-30783	XWAF1-P7	Sheep dung	3090±28	1409-1375 (68.2%)	/	Jia, et al., 2017	1412-1376 (29.0%) 1349-1302 (39.2%)	1424-1274 (95.4%)
Adunqiaolu-16	UBA-30786	XBWAF1	Dung	3251±33	1608-1461 (68.2%)	/	Dupuy, et al., 2019	1597-1594 (1.3%) 1540-1492 (48.2%) 1480-1452 (18.8%)	1612-1572 (12.7%) 1566-1441 (82.7%)
Adunqiaolu-17	UBS-30789	XBWAF1	Charcoal	3265±32	1608-1502 (68.2%)	/	Dupuy, et al., 2019	1607-1580 (16.2%) 1544-1498 (62.1%)	1616-1492 (84.7%) 1482-1451 (10.7%)
Adunqiaolu-18	XA19983	XBWAIIF1	Human bone	3355±30	/	1740-1535 (95.4%)	Chan & Cong, 2020	1728-1724 (1.4%) 1688-1609 (55.3%) 1576-1562 (7.8%) 1554-1546 (3.7%)	1736-1716 (8.1%) 1692-1539 (87.4%)
Adunqiaolu-19	XA19992	XBWAIIM5	Human bone	3120±30	/	1451-1291 (95.4%)	Chan & Cong, 2020	1431-1384 (47.1%) 1340-1316 (21.2%)	1492-1482 (1.5%) 1450-1291 (94.0%)
Adunqiaolu-20	XA19993	XBWAIIM10	Human bone	3010±30	/	1386-1128 (95.4%)	Chan & Cong, 2020	1371-1355 (7.5%) 1296-1212 (60.7%)	1386-1338 (15.1%) 1316-1156 (75.9%) 1146-1126 (4.5%)
Adunqiaolu-21	XA19984	XBWAIIM12	Charcoal	3225±30	/	1607-1429 (95.4%)	Chan & Cong, 2020	1510-1447 (68.3%)	1536-1425 (95.4%)
Adunqiaolu-22	XA19994	XBWAIIM13	Human bone	3115±25	/	1438-1299 (95.4%)	Chan & Cong, 2020	1425-1385 (44.9%) 1340-1316 (23.4%)	1444-1368 (58.2%) 1356-1296 (37.2%)
Adunqiaolu-23	XA19995	XBWAIIM14	Human bone	3100±25	/	1428-1293 (95.4%)	Chan & Cong, 2020	1416-1381 (34.0%) 1343-1308 (34.3%)	1428-1290 (95.4%)
Adunqiaolu-24	XA20005	XBWAIIM16	Human bone	3230±30	/	1608-1432 (95.4%)	Chan & Cong, 2020	1516-1492 (29.6%) 1483-1450 (38.7%)	1540-1425 (95.4%)
Adunqiaolu-25	XA20006	XBWAIIM20	Human bone	3180±25	/	1501-1415 (95.4%)	Chan & Cong, 2020	1496-1476 (26.5%) 1458-1426 (41.8%)	1501-1416 (95.4%)
Adunqiaolu-26	XA20007	XBWAIIM33	Human bone	3430±25	/	1873-1661 (95.4%)	Chan & Cong, 2020	1864-1854 (5.3%) 1767-1688 (63.0%)	1873-1844 (11.6%) 1817-1802 (2.7%) 1776-1630 (81.1%)
Adunqiaolu-27	XA20008	XBWAIIM34	Human bone	3140±25	/	1495-1308 (95.4%)	Chan & Cong, 2020	1445-1396 (64.2%) 1332-1326 (4.1%)	1496-1474 (7.4%) 1460-1390 (74.9%) 1343-1309 (13.1%)
Liushui-1	/	M4	Human Skeleton	2950±50	/	/	IACASS, 2006	1256-1248 (2.8%) 1226-1106 (55.0%) 1097-1079 (5.9%) 1070-1056 (4.6%)	1372-1354 (1.6%) 1297-1010 (93.8%)
Liushui-2	/	M12	Charcoal	2950±50	/	/	IACASS, 2006	1256-1248 (2.8%) 1226-1106 (55.0%) 1097-1079 (5.9%) 1070-1056 (4.6%)	1372-1354 (1.6%) 1297-1010 (93.8%)
Liushui-3	/	M15	Charcoal	2640±80	/	/	IACASS, 2006	916-756 (64.8%) 680-670 (1.7%) 606-596 (1.7%)	1003-718 (76.3%) 709-661 (5.4%) 654-542 (13.7%)
Liushui-4	/	M17	Charcoal	2890±40	/	/	IACASS, 2006	1154-1148 (2.1%) 1126-1007 (66.2%)	1211-976 (92.7%) 952-934 (2.8%)
Liushui-5	ZK-3202	M5	Charcoal	3947±40	/	/	IACASS, 2006	2562-2536 (12.2%) 2492-2436 (31.3%) 2425-2404 (10.4%) 2379-2349 (14.4%)	2571-2516 (19.1%) 2502-2337 (72.1%) 2326-2299 (4.3%)
Liushui-6	KIA29825	M16	Wood / Bronze tube	2790±25	976-906	1008-849	Wagner, et al., 2011	982-904 (68.3%)	1010-894 (88.0%) 875-841 (7.5%)
					967-897 (modeled dates)	994-843 (modeled dates)			
Liushui-7	KIA29826	M55	Wood / Bronze tube	2715±25	896-829	908-813	Wagner, et al., 2011	898-866 (35.7%) 850-821 (32.6%)	906-811 (95.4%)
Liushui-8	KIA29826A	M55	Tar pitch / Bronze tube	2635±35	824-793	895-770	Wagner, et al., 2011	822-788 (68.3%)	896-870 (6.8%) 838-772 (88.6%)

Liushui-9	KIA29827	M55	Wood / Bronze axe	2770±25	972-850	997-840	Wagner, et al., 2011	972-956 (10.0%) 932-896 (37.5%) 872-842 (20.8%)	990-833 (95.4%)
Liushui-10	KIA29828	M41	Wood / Bronze arrowhead	2705±25	895-816	902-810	Wagner, et al., 2011	896-870 (31.0%) 842-813 (37.3%)	902-808 (95.4%)
					890-814 (modeled dates)	901-805 (modeled dates)			
Liushui-11	KIA29829	M9	Wood / Bronze arrowhead	2485±30	758-541	772-417	Wagner, et al., 2011	756-726 (13.0%) 701-680 (9.2%) 670-663 (3.2%) 650-6-6 (19.6%) 596-545 (23.3%)	774-481 (95.4%)
					768-685 (modeled dates)	784-590 (modeled dates)			
Liushui-12	KIA29830	M7	Wood / Bronze arrowhead	2765±25	970-847	994-835	Wagner, et al., 2011	964-960 (1.6%) 930-894 (36.4%) 877-838 (30.3%)	986-831 (95.4%)
					926-843 (modeled dates)	971-831 (modeled dates)			
Liushui-13	BIn-5723	M12	Charcoal	2826±39	1022-919	1120-897	Wagner, et al., 2011	1042-1035 (3.5%) 1016-922 (64.8%)	1116-898 (94.6%) 866-856 (0.8%)
					984-887 (modeled dates)	1035-775 (modeled dates)			
Liushui-14	BIn-5724	M15	Charcoal	2497±24	761-549	772-524	Wagner, et al., 2011	760-744 (7.8%) 690-665 (12.0%) 645-550 (48.4%)	774-716 (20.3%) 711-541 (75.1%)
					768-679 (modeled dates)	780-585 (modeled dates)			
Liushui-15	BIn-5725	M17	Charcoal	2749±35	919-839	978-816	Wagner, et al., 2011	921-832 (68.3%)	982-814 (95.4%)
					916-821 (modeled dates)	974-739 (modeled dates)			
Liushui-16	BIn-5726	M26	Charcoal	2803±32	997-918	1045-849	Wagner, et al., 2011	1001-916 (68.3%)	1047-1027 (3.2%) 1021-894 (86.7%) 876-840 (5.5%)
					977-882 (modeled dates)	1010-774 (modeled dates)			
Zahunluq-1	/	M2	Poplar wood	2840±80	1010±15		Rashid & Hes, 2002	1120-905 (68.3%)	1221-821 (95.4%)
Zahunluq-2	/	M1	Willow branch	2743±63	/		Xinjiang, et al., 2003	968-960 (3.2%) 931-816 (65.1%)	1046 (1.6%) 1020 (93.8%)
Zahunluq-3	/	M4	Wooden stick/ willow branch	2339±59	/		Xinjiang, et al., 2003	538-530 (1.9%) 518-361 (64.0%) 272-266 (1.3%) 240-236 (1.1%)	748-688 (6.1%) 666-642 (2.6%) 568-346 (71.4%) 316-204 (15.3%)
Zahunluq-4	/	M14	Willow branch	2711±61	/		Xinjiang, et al., 2003	908-808 (68.3%)	1002-792 (95.4%)
Zahunluq-5	/	M24	Poplar wood/ willow branch	2846±61	/		Xinjiang, et al., 2003	1110-924 (68.3%)	1207-895 (92.0%) 874-840 (3.5%)
Zahunluq-6	/	M61	Wooden stick	3458±76	1508±76		Xinjiang, et al., 2003	1884-1685 (66.7%) 1650-1644 (1.5%)	1956-1598 (92.0%) 1592-1542 (3.4%)
Xiangbaobao-1	WB77-19	76TXM13	Wood	2465±70	2505±80		Peking University, 1978	755-680 (21.2%) 670-608 (16.9%) 595-480 (30.1%)	771-411 (95.4%)
Xiangbaobao-2	WB78-1	77TXM40	Wood (coffin cover)	4390±90	4885±185		IACASS, 1980	3314-3296 (3.4%) 3286-3240 (9.3%) 3104-2904 (55.6%)	3346-2886 (95.4%)
Xiangbaobao-3	WB78-12	77TXM17	Wood (coffin cover)	2600±90	2665±120		IACASS, 1980	894-875 (4.0%) 838-741 (33.3%) 692-664 (7.2%) 647-548 (23.7%)	926-457 (93.9%) 442-418 (1.5%)
Xiangbaobao-4	WB78-13	77TXM21	Wood (coffin cover)	2750±65	2850±105		Peking University, 1980	975-953 (8.8%) 934-820 (59.4%)	1052-797 (95.4%)
Xiabandi-1	BA06493	Cremation tomb	Charcoal	4055±45	2840-2810 (5.1%) 2660-2650 (2.1%) 2640-2490 (61.1%)	2860-2810 (10.3%) 2750-2720 (2.9%) 2700-2470 (82.2%)	Xinjiang, 2012	2832-2821 (3.0%) 2664-2650 (4.4%) 2633-2556 (35.9%) 2543-2488 (24.9%)	2852-2808 (9.1%) 2748-2726 (3.1%) 2698-2468 (83.3%)
Xiabandi-2	BA06488	AIIIM114	Wood	3525±35	1910-1860 (24.1%) 1850-1770 (44.1%)	1950-1750 (95.4%)	Xinjiang, 2012	1918-1914 (1.7%) 1900-1870 (19.0%) 1848-1773 (47.5%)	1946-1746 (95.4%)
Xiabandi-3	BA06489	AIIIM32	Wood	3475±40	1880-1740 (68.2%)	1900-1680 (95.4%)	Xinjiang, 2012	1878-1840 (22.4%) 1826-1743 (45.8%)	1918-1914 (0.3%) 1900-1684 (94.6%) 1651-1644 (0.5%)
Xiabandi-4	BA06491	AIIIM62	Wood	3425±45	1870-1840 (7.4%) 1780-1660 (60.8%)	1880-1620 (95.4%)	Xinjiang, 2012	1866-1851 (6.6%) 1770-1668 (52.4%) 1656-1634 (9.3%)	1881-1836 (13.0%) 1830-1615 (82.5%)
Xiabandi-5	BA06492	AIIIM37	Wood	3300±35	1620-1525 (68.2%)	1680-1490 (95.4%)	Xinjiang, 2012	1612-1531 (66.3%) 1522-1520 (1.9%)	1678-1654 (2.4%) 1641-1498 (93.0%)
Xiabandi-6	BA06485	AIIIM18	Wood	2645±35	830-790 (68.2%)	900-770 (95.4%)	Xinjiang, 2012	828-791 (68.3%)	898-863 (12.3%) 843-776 (83.1%)
Xiabandi-7	BA06486	AIM12	Charcoal	1860±35	80AD-110AD (7.9%) 120AD-220AD (60.3%)	70AD-240AD (95.4%)	Xinjiang, 2012	130AD-144AD (10.9%) 154AD-226AD (57.3%)	81AD-98AD (2.9%) 110AD-248AD (91.8%) 298AD-306AD (0.7%)
Xiabandi-8	BA06487	AIM10	Wood	1740±35	245AD-340AD (68.2%)	220AD-410AD (95.4%)	Xinjiang, 2012	250AD-295AD (30.1%) 310AD-365AD (36.6%) 372AD-375AD (1.6%)	244AD-403AD (95.4%)
Xiabandi-9	BA06484	AIIIM13	Wood	1425±40	600AD-655AD (68.2%)	550AD-670AD (95.4%)	Xinjiang, 2012	604AD-650AD (68.3%)	570AD-664AD (95.4%)

Xiabandi-10	BA06483	BVIM1	Wood	1350±35	640AD-690AD (68.2%)	610AD-720AD (85.4%) 740AD-770AD (10.9%)	Xinjiang, 2012	647AD-681AD (55.2%) 746AD-759AD (13.1%)	608AD-620AD (1.9%) 638AD-708AD (66.6%) 728AD-774AD (26.9%)
Xiabandi-11	BA06490	AHIM2	Wood	625±35	/	/	Xinjiang, 2012	1300AD-1327AD 928.2%) 1350AD-1394AD (40.1%)	1292AD-1400AD (95.4%)
Jierzankale-1	Beta-400296	M14-3	Arrow shaft	2570±30	2750-2700		Shen, et al., 2015	802-761 (68.3%)	808-748 (73.0%) 686-666 (6.9%) 638-568 (15.6%)
Jierzankale-2	Beta-400297	M15	Fire altar wood	2430±30	2540-2355		Shen, et al., 2015	718-710 (3.8%) 660-654 (2.9%) 542-416 (61.6%)	750-686 (18.2%) 666-638 (7.8%) 588-579 (0.9%) 571-404 (68.7%)
Jierzankale-3	Beta-354583	M1-1	Woolen textile (?)	2560±30	2750-2550		Wang, et al., 2016	798-756 (56.0%) 680-670 (6.0%) 606-596 (6.2%)	805-747 (60.5%) 688-664 (10.3%) 643-563 (24.7%)
Jierzankale-4	Beta-354584	M1-2	Wood	2510±30	2740-2470		Wang, et al., 2016	772-748 (13.6%) 688-666 (12.9%) 642-566 (41.9%)	786-541 (95.4%)
Jierzankale-5	Beta-360638	M10	Human bone	2450±30	2710-2360		Wang, et al., 2016	746-690 (23.4%) 664-644 (8.4%) 551-465 (32.0%) 436-422 (4.5%)	754-682 (26.0%) 670-608 (15.3%) 594-412 (54.1%)
Jierzankale-6	Beta-360540	M11	Human bone	2390±30	2650-2360		Wang, et al., 2016	513-500 (6.9%) 486-401 (61.4%)	724-706 (3.0%) 664-651 (2.1%) 545-394 (90.4%)
Jierzankale-7	Beta-360543	M12	Human bone	2390±30	2650-2350		Wang, et al., 2016	513-500 (6.9%) 486-401 (61.4%)	724-706 (3.0%) 664-651 (2.1%) 545-394 (90.4%)
Jierzankale-8	Beta-360547	M14-1	Wood	2370±30	2460-2340		Wang, et al., 2016	478-431 (32.5%) 426-394 (35.8%)	541-388 (95.4%)
Jierzankale-9	Beta-403048	M14-2	Harp wood	2450±30	2710-2360		Wang, et al., 2016	746-690 (23.4%) 664-644 (8.4%) 551-465 (32.0%) 436-422 (4.5%)	754-682 (26.0%) 670-608 (15.3%) 594-412 (54.1%)
Jierzankale-10	Beta-403044	M25	Human bone	2440±30	2705-2355		Wang, et al., 2016	734-696 (15.7%) 663-650 (5.8%) 546-458 (37.9%) 442-418 (8.9%)	751-684 (22.3%) 668-634 (9.8%) 622-613 (1.1%) 591-408 (62.3%)
Jierzankale-11	Beta-403051	M35	Wood	2410±30	2685-2350		Wang, et al., 2016	516-409 (68.3%)	742-692 (10.0%) 665-646 (4.4%) 550-398 (81.1%)
Jierzankale-12	Beta-403053	M50	Wood	2490±30	2730-2460		Wang, et al., 2016	759-734 (10.5%) 696-664 (12.3%) 649-546 (45.5%)	775-514 (94.2%) 500-486 (1.3%)

Table 5

Tomb No.	Surface Mound (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	Dimension of Stone Chamber L×W-D (cm)	No.of buried people	Gender	Year of Age	Burial Form	Burial Objects	Remarks
M1	Stone Piles	0-180	Rectangular vertical shaft	190×250-110	146×110-54	1	Unknown	Unknown	Unknown	Pottery Single-handled Jar (5×), Pottery Double-handled Jug, Bronze Ring, Stone Bead	The stone chamber is covered by large rocks; the human bones have rotted
M2	Stone Piles	337	Rectangular vertical shaft	260×152-134	145×108-54	1	Unknown	40±	Right side Flex	Stone Bead, Pottery Single-handled Jar, Bronze Hairpin	The human bones have rotted
M3	Stone Piles	84-264	Rectangular vertical shaft	200×190-146	160×190-97	1	Unknown	Unknown	Secondary Burial	Pottery Basin, Pottery Shallow Bowl, Silver Earring, Stone Bead	The human bones have rotted into powder
M4	Stone Piles Diameter: 486-494	126-306	Rectangular vertical shaft	270×230-126	190×184-88	2	M (1×); Kid (1×)	A (1×); Kid (1×)	Secondary Burial	Iron Piece, Iron Arrowhead, Iron Button, Pottery Piece	The human bones have rotted
M5	Stone Circle	120	Rectangular vertical shaft	258×192-136	227×200-108	1	Unknown	Unknown	Right side Flex	Stone Bead, Golden Piece, Iron Knife, Pottery Double-handled Jug sherd(2×), Pottery Jug sherd (2×), Pottery Shallow Bowl, pottery sherds (2×)	One standing rock on the middle of the stone circle; the human bones have rotted
M6	Stone Circle Diameter: 300-310	108-288	Round vertical shaft	117×134-126	104×105-96	1	F	A	Secondary Burial	Bronze Mirror, Iron Awl, Pottery Pot sherd, Pottery Single-handled Jar, Pottery Double-handled Jug (2×), Pottery Cup Dou, pottery sherds (2×)	
M7	Stone Piles Diameter: 514-580	116-296	Rectangular vertical shaft	234×220-140	164×156-100	1	Unknown	Unknown	Secondary Burial	Pottery Shallow Bowl, Pottery Double-handled Jug, Pottery Spinning Wheel, Bronze Bell (3×), Iron Knife, Glass Bead (8×), Agate Bead & Stone Bead String	
M8	Stone Circle Diameter: 400-422	133	Rectangular vertical shaft	240×170-140	220×120-110	4	M (2×); F (1×); Infant (1×)	A (3×); Infant	Right side Flex (2×); Secondary Burial	S/g head (5×), s/g foot (4×), Stone Bead, Pottery Single-handled Jar (2×), Pottery Jug (2×), Pottery sherds (6×), Iron Knife	One standing rock on the middle of the stone circle; the infant is found inside the human body C
M9	Stone Piles Diameter: 456	319	Rectangular vertical shaft	200×130-120	196×120-70	1	Unknown	Unknown	Secondary Burial	None	Few human bones remained
M10	Unknown	100-280	Rectangular vertical shaft	246×200-110	200×160-100		Unknown	Unknown	No bones	None	
M11	Stone Circle Diameter: 490	141-321	Rectangular vertical shaft	203×168-160	145×106-40	1	Unknown	Unknown	Unknown	Pottery Single-handled Jar (3×), Pottery Cup Dou, Pottery Double-handled Jar, Pottery sherds (6×), Stone Bead (2×)	Few human bones remained
M12	Stone Circle Diameter: 334	148-328	Rectangular vertical shaft	235×190-170	224×120-80	1	Unknown	Unknown	Unknown	Pottery Double-handled Jug, Pottery Single-handled Jar, colored Pottery sherds (3×), Iron Button, stone bead, Horse bone, s/g bone	One standing rock on the northwestern tomb; few human bones remained
M13	Unknown	27-207	Rectangular vertical shaft	196×140-120		1	Unknown	Unknown	Unknown	Iron Pieces (2×), Pottery sherd	No surface mound; few human bones remained
M14	Stone Piles Diameter: 694 Height: 21	156-336	Rectangular vertical shaft	204×170-140	190×146-120	4	M (1×); F (1×); Unknown (2×)	A (4×)	Secondary Burial	Pottery Spinning Wheel, Pottery single-handled Cup, Pottery Shallow Bowl sherd, Iron Tube, Iron Plaque (2×), Iron Knife (3×), Iron Arrowhead (2×), Iron Button (3×), Iron Circle (2×), Iron Bead, Golden Bead (8×), Golden Earring, Golden & Bronze Ornament, Bronze Bell, Bronze Bead, Silver Earring (2×), Glass Bead (1.5×), Bone Bead, Stone Bead & Agate Bead String, Horse head, s/g Leg (2×)	Two standing rocks on the western and northern side of the tomb respectively
M15	Unknown	126-306	Rectangular vertical shaft	300×232-220	290×204-142			No bones		None	The major part of the stone chamber have e×posed, might be robbed

L=length; W=width; D=depth; s/g =sheep/goat

Table 6 Yanghai Nr. I Cemetery

Tomb No.	Tomb Orientation (°)	Tomb Structure	Tomb type	Dimension of Tomb Chamber L×W-D (m)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Objects	Cultural Period	Remarks
I M1	102°	vertical rectangular shaft	C	0.98 × 0.59 - 0.41	/	1	F	10~13	wooden plate I, pottery double-handled jar, pottery single-handled jar A II, wooden spinning wheel I, silver earring, tube-shaped bead ornament 7	II	1 tibia of horse buried together
I M2	143°	vertical rectangular shaft	C	(1.37~1.45) × 0.75 - 0.62	cattail	1	F	20~25	wooden cup 2, pottery single-handled cup A II, wooden spinning wheel I	II	/
I M3	27°	vertical rectangular shaft, secondary platform on one side	B	1.19 × 0.73 - 0.88	/	1	F	25~35	pottery single-handled jar A II, A III; wooden spinning wheel I; wooden plate I; wooden walking stick	II	secondary platform: W: 0.12m, D: 0.3m
I M4	99°	vertical rectangular shaft	C	2.09 × 1 - 0.71	wooden bed	1	M	20~30	leather hat, cowry, leather bag, pottery single-handled pot I, wooden whipstick, wooden shallow bowl II, leather arm protector II, woolen textile	II	jarbone of s/g buried together
I M5	110°	vertical rectangular shaft, secondary platform all around	B	1.66 × 1.2 - 1.45	wooden bed	2	M	18~22	wooden supporting plank I, wooden arrow I 5, wooden nail 2, belt buckle, whetstone, bronze knife II, bronze gag I, bone gag-holder I 2, bone tube, pottery single-handled jar A II	II	secondary platform: W: 0.05~0.2m, D: 0.15m
							M	20~30			
I M6	110°	vertical rectangular shaft, secondary platform on two sides	B	1.97 × 0.92 - 1.4	wooden bed	2	F	20~30	wooden bow I, leather bridle, wooden whipstick, pottery jar with circular foot, wooden stick, pottery single-handled jar A II, wooden gag-holder I 2	II	secondary platform: W: 0.14m, D: 0.3m; 2 heads of s/g buried together.
							M	45~50			
I M7	120°	vertical rectangular shaft	C	1.82 × 0.9 - 1	wooden bed	1	F	30~40	pottery single-handled cup A II 2, B I; wooden shallow bowl II; wooden spinning wheel I; bone awl; woolen woven belt	II	/
I M8	108°	vertical rectangular shaft, secondary platform on two sides	B	2.08 × 1.08 - 0.98	rose willow, wooden sticks, reed mat	3	M	40~50	pottery ring-foot plate I; pottery single-handled jar A, B 2; pottery plate; wooden arrow I 9; leather box 2; wooden nail 2; wooden comb II 2; wooden button; pottery shallow bowl; whetstone; leather belt; check piece made of horn I; leather knife sheath; leather bow and arrow bag II; harp I; wooden spinning wheel I; wooden bow I; bone tube; wooden comb; long dress; plush rug; woolen woven belt; pottery single-handled cup C I	II	secondary platform: W: 0.16m, D: 0.3m
							unidentified	11~13			
							F	>50			
I M9	105°	vertical rectangular shaft	C	1.06 × 0.64 - 0.9	/	1	F	>55	pottery shallow bowl, wooden comb A II, wooden plate I	II	/
I M10	96°	vertical rectangular shaft, secondary platform on two sides	B	1.8 × (0.82~0.9) - 1.7	/	1	uniden-tified	unidentified	wooden arrow, leather belt, wooden nail 3	II	secondary platform: W: 0.2m, D: 0.5m
I M11	110°	vertical rectangular shaft, secondary platform on two long sides	B	2.3 × (0.96~1.12) - (1.9~1.98)	wooden bed	2	uniden-tified	adult	pottery single-handled cup A II, leather bridle 2, wooden arrow (arrowhead I) 10, fragment of pottery ware, pottery single-handled jar A II, complex bow I, wooden awl handle, bark, horse tooth, button made of tooth, check piece made of horn II 2, wooden nail 4, wooden supporting plank I, wooden spinning wheel I, wooden whip, wooden fireboard I, wooden button, wooden check piece II, wooden fire spindle, hair plait, wooden comb A II, wooden plate I	II	secondary platform: W: 0.17~0.2m, D: 0.46~0.5m; 1 head of s/g buried together.
							uniden-tified	6~7			
I M12	90°	vertical rectangular shaft, secondary platform all around	B	(2.48~2.97) × (1.48~1.78) - 2.8	/	4	M	45~55	comb made of horn, bead ornament 3, talus of s/g 2, fragment of pottery ware, wooden nail 3, bone shuttle, handle of pottery ware, woolen textile, tooth ware 2, gag-holder made of horn I, ox horn cup, bronze buckle, millet pie	II	secondary platform: W: 0.24~0.64m, D: 0.4~0.58m
							M	45~50			
							M	40~45			
							F	25~45			
I M13	121°	vertical rectangular shaft	C	0.84 × (0.49~0.56) - 0.53	hay	1	uniden-tified	3~4	pottery ring-foot plate II	III	/
I M14	112°	vertical rectangular shaft	C	1.43 × 0.72 - 0.9	reed mat, wooden bed	1	M	35~45	pottery shallow bowl, bone thumb-protector, pottery single-handled jar A III, woolen woven belt	III	/
I M15	145°	vertical rectangular shaft	C	(1.12~1.22) × 0.8 - 0.6	/	1	F	35~45	wooden bucket I, wooden spinning wheel I, pottery single-handled jar A, woolen textile	II	/
I M16	100°	vertical rectangular shaft, secondary platform on two sides	B	1.83 × (0.79~0.83) - 1.54	/	2	F	40~45	pottery single-handled cup A II; pottery single-handled jar A, A II, B; wooden spinning wheel I 2; wooden comb A II; clamshell ornament; woolen woven belt	II	secondary platform: W: 0.11~0.17m, D: 0.18m. 2 heads of s/g buried together.
							M	45~55			
I M17	112°	vertical rectangular shaft	C	1.15 × 0.73 - 0.41	/	1	M	25~35	pottery single-handled jar B; short-shafted leather boot (rotten)	III	/
I M18	115°	oval vertical shaft	A	1.22 × 0.87 - 1.76	/	1	M	adult	fragment of pottery ware, pottery single-handled jar A I, trousers, woolen woven belt 3	I	1 head of s/g buried together
I M19	115°	oval vertical shaft	A	1.6 × 0.92 - 1.14	wooden bed	1	M	adult	seashell 3, wooden whip, wooden basin I, bronze bell, bronze seashell-shaped ornament 2, bronze knife I, leg wrapping 2, woolen textile, wooden nail 2, bronze awl, woolen woven belt, bronze Dui (top cover) with wooden handle	I	1 head of s/g buried together
I M20	110°	vertical rectangular shaft, secondary platform on two long sides	B	2.24 × 1.2 - 1.48	wooden bed	3	F	20~30	wooden plate I, complex bow I, wooden arrows I 18, pottery single-handled jar B, pottery single-handled pot I, cowry, bead ornament 19	II	secondary platform: W: 0.16m, D: 0.29m
							M	13~14			
							M	10~13			
I M21	130°	oval vertical shaft, secondary platform all around	A	1st layer: 1.63 × 1.54; 2nd layer: 1.31 × 0.93 - 1.6	/	3	F (1st layer)	25±	leather bridle, cowry, bronze awl, bronze knife I, bronze earring, bronze axe, bronze button 9, leather arm-protector I, golden earring 2, wooden whipstick, bead ornament, bronze buttons 2, woolen woven belt 4, wooden shallow bowl I, bronze bell, leather boot I, woolen tessel 2, cloak, long trousers	I	secondary platform: W: 0.14~0.36m, D: 1.12m; 1 head of s/g buried together.
							uniden-tified (1st)	teenager (underage)			
							M (2nd layer)	40±			
I M22	132°	oval vertical shaft	A	1.32 × 0.75 - 0.69	/	1	M	adult	/	I	/
I M23	108°	vertical rectangular shaft, secondary platform on two long sides	B	2 × 0.8 - 1.4	reed, wooden bed	2	M	30~40	pottery single-handled jar A III, unidentified type; pottery single-handled cup A II 2; wooden bucket II; wooden comb A II; wooden spinning wheel I; pottery plate; wooden whipstick	II	secondary platform: W: 0.15m, D: 0.3m; 1 head of s/g buried together.
							F	adult			
I M24	90°	vertical rectangular shaft, secondary platform on two long sides	B	2.3 × 0.95 - 1.6	/	uniden-tified	uniden-tified	unidentified	wooden plate I, wooden spinning wheel I, fragment of pottery ware	II	secondary platform: W: 0.2~0.25m, D: 0.3m.
I M25	127°	vertical rectangular shaft, secondary platform on two long sides	B	2.7 × 1.6 - 1.7	wooden bed	5	F	18~25	button made of tooth 2; pottery single-handled jar A II, A III; wooden basin I; wooden plate I; wooden shallow bowl II; pottery ring-foot plate; pottery ring-foot jar	II	secondary platform: W: 0.24m, D: 0.6m; 2 heads of s/g buried together.
							F	17~22			
							M	20~25			
							F	adult			
I M26	90°	vertical rectangular shaft, secondary platform on two long sides	B	2.08 × 1.02 - 1.5	wooden bed	3	M	18~22	pottery single-handled jar A, A III 2; pottery shallow bowl; wooden spinning wheel I; leather bridle; leather boot I; leather coat; wollen shorts; long dress; woolen woven belt 3; leg of trousers	II	secondary platform: W: 0.13~0.18m, D: 0.41m.
							F	adult			
							F	35~45			
I M27	105°	vertical rectangular shaft	C	1.91 × 0.8 - 0.9	/	1	F	25~30	pottery double-handled jar, pottery shallow bowl 2, wooden spinning wheel I	II	bones of s/g buried together
I M28	108°	vertical rectangular shaft	C	1.13 × 0.54 - 0.65	/	1	uniden-tified	adult	wooden plate I, wooden spool, wooden supporting plank II, fragment of pottery cup	II	/
I M29	114°	vertical rectangular shaft	C	1.98 × 0.98 - 1.23	/	uniden-tified	uniden-tified	unidentified	check piece made of horn I, gag made of horn, wooden nail 4, wooden comb A II 2, pottery single-handled cup A II, wooden plate I, leather bridle, wooden button, wooden supporting plank I	II	/
I M30	100°	vertical rectangular shaft, secondary platform on two long sides	B	2 × 0.8 - 1.42	reed stems	1	M	adult	wooden bucket II, wooden fireboard I 2, wooden spinning wheel I, fragment of pottery ware, wooden comb A II, fragment of complex bow	II	secondary platform: W: 0.2m, D: 0.51m.
I M31	282°	vertical rectangular shaft	C	0.8 × 0.42 - 0.41	/	1	uniden-tified	8~10	woolen textile woven in Ke technique (keeping warp straight while cutting or shortening weft), woolen woven belt 2, cloak	II	/

I M32	77°	vertical rectangular shaft	C	1.13 × 0.84 - 0.59	/	1	F	25~30	pottery single-handled jar A II, woolen textile, leather sole	II	/
I M33	101°	oval vertical shaft with horizontal beam	A	1.22 × 0.91 - 0.88	/	1	M	28~30	bronze axe, bronze knife I, wooden shallow bowl I	I	1 head of s/g buried together
I M34	100°	vertical rectangular shaft	C	1.96 × 1.02 - 1.4	wooden bed	1	uniden-tified	unidentified	ox horn cup, pottery single-handled cup A II, fragment of wooden bucket II, bone spinning wheel, pottery bowl	II	/
I M35	100°	vertical rectangular shaft	C	0.93 × 0.53 - 0.7	/	2	F	adult	pottery shallow bowl, complex bow I, pottery single-handled cup A II, wooden comb A II	II	/
							M	12~13			
I M36	135°	vertical rectangular shaft	C	0.6 × 0.35 - 0.3	/	1	uniden-tified	teenager (underage)	pottery basin II, pottery single-handled jar B	II	/
I M37	118°	vertical rectangular shaft	C	1.16 × 0.56 - 0.45	reed mat, couch grass	1	M	40~45	pottery single-handled jar A III, wooden comb A II	II	/
I M38	130°	vertical rectangular shaft	C	1.4 × 0.73 - 1.25	/	2	F	adult	pottery single-handled jar A III, B; pottery double-handled jar; pottery single-handled pot II	II	/
							F	adult			
I M39	100°	vertical rectangular shaft	C	1.42 × 0.78 - 0.86	/	1	M	22~30	whetstone	II	/
I M40	115°	vertical rectangular shaft	C	1.13 × 0.51 - 0.7	reed mat	1	F	14~15	pottery single-handled cup A II, fragment of pottery ware	II	/
I M41	85°	vertical rectangular shaft	C	1.82 × 0.99 - 1.1	/	2	F	adult	pottery ring-foot jar, wooden shallow bowl I, bottom of wooden bucket, pottery bowl, wooden spinning wheel I	II	head of s/g and jarbone of horse buried together
							M	20~25			
							M	25~30			
I M42	112°	vertical rectangular shaft	C	1.62 × 1 - 1.2	reed, wooden sticks, wooden bed	2	F	20~25	pottery bowl; pottery single-handled cup A II, B II; wooden angular wood; wooden comb A II; wooden ware 2- wooden bow I; complex bow I; wooden supporting plank I; wooden arrow I 10; bronze arrow head II; bronze buckle for connecting straps on horse's head; pottery single-handled pot II; seashell; wooden nail; wooden headdress	II	/
I M43	115°	oval vertical shaft	A	1.32 × 0.72 - 0.81	/	1	F	18~22	wooden stick, pottery ring-foot plate, pottery single-handled jar A III, pottery shallow bowl, wooden spinning wheel I	II	/
I M44	105°	vertical rectangular shaft	C	1.67 × 1.06 - 1.52	reed curtain	2	M	18~22	check piece made of horn I	II	/
							M	17~20			
I M45	106°	vertical rectangular shaft	C	1.88 × 1.02 - 1.5	/	1	F	35~40	/	III	/
I M46	103°	vertical rectangular shaft	C	1.2 × 0.84 - 1	/	2	F	9~11	pottery plate with four feet	II	/
							M	8~10			
I M47	135°	vertical rectangular shaft, secondary platform on two short sides	B	1.1 × 0.82 - 0.99	/	2	uniden-tified	unidentified	fragment of pottery ware, pottery single-handled jar A III, wooden spinning wheel I, wooden comb A I	II	secondary platform: W: 0.1m, D: 0.3m.
							uniden-tified	unidentified			secondary platform: W: 0.2m, D: 0.4m.
I M48	135°	vertical rectangular shaft, secondary platform on two short sides	B	1.1 × 0.78 - 1.1	/	1	M	40~50	wooden hook, wooden bow I, wooden ware	II	
							F	25~30			
I M49	136°	vertical rectangular shaft	C	1.7 × 1.4 - 1.46	wooden sticks, wooden bed	2	M	35±	button made of tooth, pottery twined jar, pottery single-handled jar A III 2, wooden bucket I, wooden plate I, wooden walking stick, wooden spinning wheel I, whetstone, wooden whipstick, wooden spool, wooden nail 2	II	1 head of s/g buried together
I M50	102°	vertical rectangular shaft, secondary platform on two long sides	B	1.9 × 1.15 - 1.65	/	1	F	40~50	/	II	secondary platform: W: 0.17m, D: 0.52m.
I M51	50°	vertical rectangular shaft, secondary platform on one short side	B	0.6 × 0.44 - 0.56	/	1	uniden-tified	2~3	/	II	secondary platform: W: 0.1m, D: 0.2m.
I M52	127°	vertical rectangular shaft, secondary platform on one short side	B	1.08 × (0.78 ~ 0.87) - 1.38	/	1	M	20~30	bone awl, wooden stick, leather boot I, woolen textile	II	secondary platform: W: 0.2m, D: 0.68m.
I M53	102°	vertical rectangular shaft, secondary platform on one short side	B	0.63 × 0.56 × 0.7	/	1	uniden-tified	3~5	/	II	secondary platform: W: 0.2m, D: 0.4m.
I M54	96°	vertical rectangular shaft	C	1.9 × (0.76 ~ 0.96) - 1.52	wooden bed	1	M	adult	pottery single-handled cup B II; pottery <i>Fu</i> (cooking vessel) I, II; wooden gag-holder III	II	1 head of s/g buried together
I M55	109°	vertical rectangular shaft	C	1.23 × 0.7 - 1.01	wooden bed	1	F	50±	pottery double-handled pot, pottery single-handled cup C, pottery plate, wooden spinning wheel II, leather box, wooden comb A II	II	/
I M56	100°	vertical rectangular shaft	C	1.24 × 0.68 - 0.7	reed	1	F	15~17	pottery single-handled cup B I, wooden plate I, wooden spinning wheel I	II	/
I M57	130°	vertical rectangular shaft	C	1.4 × 0.98 - 0.9	reed stems, hay	2	M	30~40	wooden plate I, wooden whipstick, wooden bow I	II	1 head of sheep buried together
							uniden-tified	unidentified			
I M58	100°	vertical rectangular shaft	C	1.07 × (0.56 ~ 0.71) - 0.67	/	2	M	20~30	pottery single-handled pot II, pottery single-handled cup B I 2, wooden comb A II, wooden spinning wheel II, bone awl, wooden plate I, wooden bow I	II	/
							F	adult			
I M59	120°	vertical rectangular shaft	C	1.51 × 0.98 - 1.12	/	1	F	adult	pottery single-handled pot II, pottery basin II, food 2	II	/
I M60	82°	vertical rectangular shaft	C	1.14 × 0.68 - 1.07	reed cushion	1	F	18~22	pottery double-handled cup, pottery single-handled pot II, pottery single-handled cup B II, wooden shallow bowl II, wooden spinning wheel I, fragment of pottery ware, wooden comb A I, wooden bucket II, wooden nail 12, bone awl	II	1 head and 1 rear leg of s/g buried together
I M61	120°	vertical rectangular shaft, secondary platform on two long sides	B	1.23 × 0.66 - 0.52	straw mat	2	F	30~40	pottery single-handled jar A, pottery single-handled cup B I, wooden plate I	II	secondary platform: W: 0.1m, D: 0.16m.
							uniden-tified	5~6			
							F (1st layer)	adult			
I M62	124°	vertical rectangular shaft, secondary platform on two long sides	B	1.78 × (0.92 ~ 0.98) - 1.24	reed mat (1st layer), wooden bed (3rd layer)	3	F (2nd layer)	25~30	wooden bowl, wooden nail 5, stone ball, stone pestle, wooden plate I, pottery basin II, pottery single-handled pot I, pottery single-handled jar A II, cowry 6	II	secondary platform: W: 0.2m, D: 0.41m.
							M (3rd layer)	25~35			1 head of s/g buried together.
I M63	70°	vertical rectangular shaft	C	1.19 × 0.6 - 0.98	/	1	M	45~50	bronze knife IV, pottery single-handled pot II, stone pestle	III	/
I M64	140°	vertical rectangular shaft	C	0.76 × 0.61 - 0.33	/	1	uniden-tified	7±	/	II	/
I M65	105°	vertical rectangular shaft	C	1.21 × 0.66 - 0.66	/	1	F	adult	pottery single-handled jar II	II	/
I M66	90°	oval vertical shaft	A	1.20 × 0.7 - 0.64	/	1	F	adult	pottery <i>Fu</i> (cooking vessel) (damaged) I	I	1 head of s/g buried together
I M67	110°	oval vertical shaft with horizontal beam	A	1.82 × 1.2 - 1.12	wooden bed, thin rose willow sticks	1	M	25~30	woolen woven belt 4, bronze button 2, bronze bell and tube 4, wood branch, leather boot I 2, leather arm protector I, tattoo, cloak, long dress, trousers, woolen tassel	I	1 head of s/g buried together
I M68	100°	vertical rectangular shaft	C	1.50 × 0.72 - 1.12	/	2	M	40±	pottery single-handled jar A III, B; pottery single-handled pot II; bone spinning wheel	II	1 head of ox and 1 head of s/g buried together
							F	40±			
I M69	88°	vertical rectangular shaft	C	1.43 × 0.64 - 1.05	/	1	M	adult	/	III	1 head of s/g buried together
I M70	115°	vertical rectangular shaft	C	1.13 × 0.57 - 0.83	reed stems	1	M	adult	wooden arrow 2	III	/
I M71	70°	vertical rectangular shaft	C	1.28 × 0.61 - 0.64	wooden bed, wooden sticks	1	M	adult	/	II	1 head of s/g buried together
I M72	110°	vertical rectangular shaft	C	1.15 × 0.7 - 0.5	reed mat	1	F	20~25	bead ornament, pottery single-handled cup C, wooden comb A II, wooden plate I, pottery single-handled jar A	II	1 head of s/g buried together
I M73	75°	vertical rectangular shaft	C	1.02 × 0.67 - 0.53	reed stem, hay	1	uniden-tified	5~7	/	II	/
							M	middle age			
I M74	100°	vertical rectangular shaft	C	1.69 × 0.88 - 1.18	/	2	F	adult	pottery single-handled pot II; pottery single-handled cup A II 2, unidentified type; pottery ring-foot plate I; bottom of pottery ware; pottery basin II; pottery shallow bowl	II	1 head of s/g buried together
I M75	100°	vertical rectangular shaft	C	1.4 × (0.54~0.72) - 0.7	reed	1	F	adult	pottery single-handled jar, pottery stamp, bronze knife III, wooden handle of awl 3, wooden plate II, agate bead ornament 5	III	/
							M	35~45			
							F	30~40			
I M76	103°	vertical rectangular shaft, secondary platform on two long sides	B	2 × 1.4 - 1.63	/	3	M	mature	leather boot I, complex bow 1, leather arm protector II, shawl 2, fragment of long dress, woolen textile 2, woolen woven belt 4	II	secondary platform: W: 0.2m, D: 0.2m.
							M	18~25			1 head of s/g buried together.
I M77	110°	vertical rectangular shaft	C	1.14 × 0.6 - 0.56	reed mat	1	M	18~25	comb made of horn, wooden stick, fragment of wooden ware, wooden arrow 10	II	/

I M78	60°	oval vertical shaft	A	1.55 × 1.02 - 1.08	/	1	M	adult	agate bead ornament 4, seashell 4, bronze knife I, bronze button 13, bead ornament 6, bronze tube, turquoise bead ornament, fragment of pottery ware, woolen woven belt 3, woolen textile woven in Ke technique	I	1 head of s/g buried together
I M79	112°	vertical rectangular shaft, secondary platform on two long sides	B	1.76 × 1.07 - 1.31	/	2	M	adult	/	II	secondary platform: W: 0.11m, D: 0.4-0.45m.
I M80	108°	vertical rectangular shaft, secondary platform on one side	B	1.4 × 0.97 - 1.46	wooden bed	2	M	16~22	pottery single-handled jar A III, pottery double-handled cup, wooden spinning wheel I, wooden whip, bottom of wooden bucket, leather box, gag made of horn II, wooden comb A II, straw plaited item 2, bone awl, tattoo, piece of wooden bucket, woolen woven belt	II	secondary platform: W: 0.08m, D: 0.16m. 1 head of s/g buried together.
I M81	115°	vertical rectangular shaft	C	1.21 × 0.84 - 0.86	reed mat	1	M	underage	pottery single-handled cup A II	II	/
I M82	105°	vertical rectangular shaft	C	1.50 × 0.80 - 0.93	wooden bed, wooden sticks	1	M	adult	wooden bowl, pottery single-handled jar A IV, fragment of wooden bucket, pottery single-handled cup A III, wooden stick, wooden whipstick, complex bow I 2, wooden arrow I, leather boot II, leather belt, stone pestle	III	1 head of s/g buried together
I M83	125°	vertical rectangular shaft	C	1.34 × 0.78 - 0.99	reed mat, straw cushion (reed mat)	2	F	old	wooden bucket II, pottery basin II, pottery shallow bowl, wooden spinning wheel I, wooden fireboard I, pottery double-handled jar, pottery single-handled pot II, leather box, seashell, bone awl, wooden arrow head I, hair plait	II	1 head of s/g buried together
I M84	80°	vertical rectangular shaft, secondary platform on two long sides	B	1.4 × 0.8 - 1.2	/	uniden-tified	uniden-tified	unidentified	wooden bucket II, pottery ring-foot plate, fragment of pottery ware, wooden spinning wheel I, long dress, woolen woven belt 2	II	secondary platform: W: 0.11m, D: 0.16m.
I M85	110°	vertical rectangular shaft	C	1.52 × 0.96 - 1.23	wooden bed, thin rose willow sticks	1	M	35~40	wooden fireboard I, wooden fire spindle	II	1 head of s/g buried together
I M86	97°	vertical rectangular shaft, secondary platform on two long sides	B	1.62 × 0.96 - 1.55	/	1	M	adult	/	II	secondary platform: W: 0.1m, D: 0.3m.
I M87	100°	vertical rectangular shaft	C	1.51 × 0.8 - 0.9	reed mat	2	M	35~45	leather boot I, pottery double-handled jar, wooden bucket I, wooden nail 2, leather bow and arrow bag I, wooden plate I, pottery single-handled jar A II, pottery basin II, wooden comb A I, wooden spinning wheel I, bone button, wooden bow I, bone shuttle, leather belt, tatton, cloak, shawl, woolen textile 4, woolen woven belt 2, woolen rug	II	/
I M88	90°	vertical rectangular shaft	C	1.4 × 0.86 - 0.5	/	2	M	mature 11~13	pottery single-handled cup A II, wooden comb A II	II	/
I M89	100°	vertical rectangular shaft	C	0.92 × 0.6 - 0.51	reed	2	uniden-tified	unidentified	pottery single-handled cup A II, pottery single-handled jar B, fragment of pottery basin II	II	/
I M90	103°	vertical rectangular shaft, secondary platform on two long sides	B	2.2 × 1.4 - 2.09	wooden bed, thin wooden sticks	2	M	45~55	pottery single-handled cup (jar) A II, unidentified type; leather bag 2; wooden nail 12; wooden whip 2; leather bridle 7 (5); knob opener made of horn; basket woven by leather and straw; wooden arrow 5; wooden basin; wooden stick 3; harp I; woolen woven belt 9; leather thumb protector; leather bow and arrow bag II; fragment of pottery ware; woolen textile; long dress; fragment of plush rug	II	secondary platform: W: 0.15~0.2m, D: 0.7m.
I M91	110°	vertical rectangular shaft, secondary platform on two long sides	B	1.7 × (0.8~0.83) - 1.6	wooden bed	2	M	mature 9~10	pottery single-handled jar, wooden gag- holder II 2, wooden stick 10, wooden nail 3, wooden stick, leather cord, seashell, woolen string, woolen textile woven by Ke technique, woolen woven belt 2, fragment of woolen rug	II	secondary platform: W: 0.2m, D: 0.42m.
I M92	130°	vertical rectangular shaft	C	1.23 × 0.7 - 1.02	/	2	F	30~40	pottery cup without handle, woolen textile woven by Ke technique, woolen woven belt 2	II	/
I M93	88°	vertical rectangular shaft	C	1.34 × 0.8 - 1.52	straw mat	1	uniden-tified	underage	wooden comb A II, pottery single-handled cup A, bottom of pottery ware	II	/
I M94	108°	vertical rectangular shaft, secondary platform on two long sides	B	1.6 × 0.84 - 1.14	wooden bed, reed mat	1	M	adult	wooden plate II, bronze knife II, whetstone, wooden nail, wooden whipstick	II	secondary platform: W: 0.08~0.12m, D: 0.5m.
I M95	97°	vertical rectangular shaft, secondary platform on two long sides	B	2.21 × 1.4 - 1.52	wooden bed, reed mat	2	M	45~55	leather bow and arrow bag I, wooden arrow 5, wooden nail 5, wooden ware, fragment of dustpan, check piece made of horn I, wooden check piece II, wooden comb A II, small stone ball, pottery single-handled jar A III, cowry, wooden stirrer rod, bronze coiled slice, fragment of plush carpet 2, tip of hair plait, two-tone felt	II	secondary platform: north:W: 0.09~0.14m; south: W:0.19m, D: 0.4m.
I M96	84°	vertical rectangular shaft, secondary platform on two long sides	B	1.52 × 0.82 - 1.1	wooden bed, reed mat	1	F	30~40	pottery single-handled jar A III, bone button, agate bead ornament, bottom of pottery ware	II	secondary platform: W: 0.1m, D: 0.36m.
I M97	78°	vertical rectangular shaft, secondary platform on two long sides	B	1.9 × 1.12 - 1.5	wooden bed	1	M	50~60	wooden check piece II, button made of horn, bead ornament 5, cowry, wooden spinning wheel I, fragment of pottery ware	II	secondary platform: W: 0.14m, D: 0.31m.
I M98	106°	vertical rectangular shaft, secondary platform on one side	B	1.01 × 0.82 - 0.96	reed cushion	1	uniden-tified	underage	pottery single-handled pot II, bronze arrow head II	II	secondary platform: W: 0.23m, D: 0.36m.
I M99	81°	vertical rectangular shaft, secondary platform on one side	B	1.1 × 0.9 - (1.06~1.2)	/	2	M	45~55	pottery single-handled pot II; fragment of wooden bucket I, II; awl made of horn; wooden arrow 6; wooden nail 2; pottery single-handled jar A II; wooden spinning wheel I; pottery single-handled cup A II; wooden walking stick; leather knife sheath; leather bag; fragment of dustpan; leather belt; leather bridle; handle of wooden ware	II	secondary platform: W: 0.18m, D: 0.51m. 1 head of s/g buried together
I M100	107°	vertical rectangular shaft, secondary platform all around	B	1.8 × 1.75 - 1.02	reed cushion	3	M	adult	bone button, wooden supporting plank II 2, wooden arrow I 15, wooden stick, pottery shallow bowl, wooden button 2, wooden stick 3	II	secondary platform: W:0.14~0.18m, D: 0.12m.
I M101	93°	vertical rectangular shaft	C	1.81 × (1.13~1.21) - 1.31	/	3	M	adult	check piece made of horn I; hair plait 2; cowry 2; pottery single-handled cup B I, C I; wooden spinning wheel II	II	1 head of s/g buried together
I M102	87°	vertical rectangular shaft	C	1.66 × 1 - (1.27~1.42)	reed	1	M	mature	fragment of pottery ware, pottery single-handled jar A II, wooden nail, fragment of wooden bucket II, fragment of pottery Fu II, pottery single-handled cup A II, leather boot II	II	/
I M103	133°	vertical rectangular shaft, secondary platform on two sides	B	2 × 1.06 - 1.6	reed mat	2	uniden-tified (upper layer)	unidentified	straw mat (woven with leather strips and thin wooden sticks), wooden arrow shaft 3, leather sleeve, pottery single-handled jar A II, wooden bow I, wooden plate II, complex bow I, wooden stick, wooden button and leather string, fragment of pottery ware, pottery single-handled cup C I, wooden whipstick	II	secondary platform: W: 0.1~0.15m, D: 0.3m. 1 head of s/g buried together
I M104	120°	vertical rectangular shaft	C	1.3 × 0.8 - 1	/	1	M	25~30	pottery single-handled cup B II, wooden spinning wheel II, wooden check piece II, wooden whipstick	II	/
I M105	78°	vertical rectangular shaft	C	1.8 × 1.09 - 1.02	wooden bed	2	F	adult	pottery single-handled cup A II, B II; pottery double-handled cup; wooden plate II; wooden nail 5; wooden shallow bowl II; wooden plaque	III	1 head of s/g buried together
I M106	88°	vertical rectangular shaft	C	1.81 × 0.9 - 1.2	/	2	M	adult	complex bow I 2; wooden drill rod; wooden arrow I 2; pottery shallow bowl 2; wooden plate I, II; wooden nail; leather boot II 2, cowry 4, stone bead ornament, pottery single-handled cup A III, handle of pottery ware	III	1 head of s/g buried together
I M107	113°	vertical rectangular shaft, secondary platform on one side	B	1.25 × 0.87 - 0.8	hay cushion	1	F	40~50	pottery single-handled cup A II, wooden spinning wheel I, wooden comb A II, pottery single-handled jar A II, leather arm protector II, wooden stick, leather boot I, bone button 3	II	secondary platform: W: 0.14m, D: 0.55m.
I M108	98°	vertical rectangular shaft, secondary platform on one side	B	0.76 × 0.5 - 0.68	reed cushion woven by straw rope	1	uniden-tified	underage	leather boot I 2	II	secondary platform: W: 0.14m, D: 0.32m.
I M109	90°	vertical rectangular shaft	C	1.38 × 0.84 - 0.88	/	1	M	30~35	wooden arrow I 5, wooden comb B I, wooden hairpin, leather boot I 3, wooden nail, whetstone	II	/
I M110	90°	vertical rectangular shaft	C	1.26 × 0.68 - 1	/	1	M	20~25	wooden plate I, complex bow I, wooden arrow I	II	/
I M111	78°	vertical rectangular shaft	C	1.4 × 0.6 - 0.91	reed mat	1	F	adult	pottery single-handled cup B II, bone spinning wheel	II	/

IM112	80°	vertical rectangular shaft	C	1.02 × 0.72 - 0.77	wooden bed	1	uniden-tified	underage	pottery basin III	III	/
IM113	112°	vertical rectangular shaft, secondary platform all around	B	1.5 × 0.8 - 1.25	/	2	F	25~35	wooden spinning wheel I 2, wooden plate I, pottery single-handled jar A III, fragment of pottery ware 2, pottery bowl	II	secondary platform: short side: W: 0.2~0.24m, long side: W: 0.15m; D: 0.2m.
IM114	102°	vertical rectangular shaft	C	1.53 × 0.64 - 1.11	/	2	M	adult	pottery single-handled cup B I, wooden spinning wheel II, check piece made of horn II 2	III	/
IM115	80°	vertical rectangular shaft	C	1.5 × 1.02 - 1.27	wooden bed	1	F	adult	pottery single-handled cup B II, pottery spinning wheel	III	/
IM116	105°	vertical rectangular shaft	C	0.89 × 0.42 - 0.7	/	1	uniden-tified	6~7	wooden shallow bowl I	II	/
IM117	75°	vertical rectangular shaft	C	1.6 × 0.8 - 0.93	wooden bed	1	M	45~50	leather belt, wooden plate I, wooden javelin, wooden fire spindle, wooden supporting plank II, fragment of complex bow, cowry, wooden arrow shaft 2	II	leg bone of s/g buried together
IM118	80°	vertical rectangular shaft, secondary platform all around	B	1.3 × 0.8 - 0.92	/	2	F M	50± adult	wooden spinning wheel I, wooden comb A I, wooden arrow I, pottery double-handled jar, wooden bow I	II	secondary platform: short side: W: 0.1m, long side: W: 0.14m; D: 0.4m.
IM119	115°	vertical rectangular shaft	C	1.6 × 0.88 - 0.75	reed, wooden bed	1	M	adult	wooden shallow bowl II, wooden plate I, wooden whip, bone check piece I, wooden whipstick 2, wooden arrow, wooden ware 2, leather arm protector II, wooden nail 2, fragment of pottery ware, leather knife sheath	II	1 head of s/g buried together
IM120	105°	vertical rectangular shaft	C	1.3 × 0.78 - 0.99	reed mat	1	M	adult	/	II	/
IM121	120°	vertical rectangular shaft	C	1.3 × 0.78 - 1.3	reed, wooden sticks, wooden bed	1	F	adult	wooden plate I, pottery single-handled cup B II, wooden spinning wheel I	II	/
IM122	130°	oval vertical shaft	A	0.78 × 0.36 - 0.38	/	1	uniden-tified	underage	/	I	/
IM123	120°	vertical rectangular shaft	C	1.3 × 0.61 - 1.01	/	1	M	adult	pottery four-feet plate, wooden comb A II	II	/
IM124	120°	vertical rectangular shaft, secondary platform on one side	B	1.3 × 0.8 - 1.1	/	1	F	25~35	pottery single-handled pot I, wooden spinning wheel I, cowry	II	secondary platform: W: 0.2m, D: 0.4m.
IM125	115°	vertical rectangular shaft	C	1.25 × 0.65 - 0.89	/	1	uniden-tified	unidentified	wooden comb A II	II	1 head of s/g buried together
IM126	115°	vertical rectangular shaft	C	0.84 × 0.56 - 0.7	reed mat	1	uniden-tified	3±	pottery basin II	II	/
IM127	95°	vertical rectangular shaft	C	1.32 × 0.82 - (0.72~0.8)	reed	1	F	adult	pottery basin II, wooden comb A II, pottery double-handled jar, pottery single-handled cup, leather boot I 2	II	/
IM128	105°	vertical rectangular shaft	C	1.22 × 0.6 - 0.8	/	1	uniden-tified	underage	pottery basin II	II	1 head of s/g buried together
IM129	100°	vertical rectangular shaft, secondary platform on two long sides	B	1.62 × 0.6 - 1.12	/	1	F	adult	pottery cup without handle, wooden bucket II, pottery single-handled cup A II, pottery single-handled jar A, pottery basin II, pottery single-handled pot I, wooden comb A II	II	secondary platform: W: 0.2m, D: 0.6m.
IM130	123°	vertical rectangular shaft, secondary platform on two long sides	B	2.04 × 1.01 - 1.68	wooden bed	1	uniden-tified	6~7	pottery single-handled cup (damaged), seashell 4, bottom of pottery ware, wooden arrow shaft 5, bow string, ox horn, leather milk bag, leather bridle, fragment of leather dress, woolen textile 3, shawl, woolen textile woven in Ke technique 2, woolen woven belt 2, woolen rug	II	secondary platform: W: 0.15~0.2m, D: 0.38m. 1 head of ox and 5 heads of s/g buried together
IM131	118°	vertical rectangular shaft, secondary platform on two long sides	B	1.38 × 0.6 - 1.11	reed stems	2	F M	> 40 40~45	wooden arrow I, ox horn cup, pottery shallow bowl, pottery four-feet plate, horn of s/g 2, woolen thread ball	II	secondary platform: W: 0.12m, D: 0.19m.
IM132	82°	vertical rectangular shaft	C	1.96 × 1 - 1.53	wooden bed	1	M	30~35	pottery single-handled jar A II, pottery basin II, pottery single-handled pot I, pottery bowl, bone awl	II	jarbone of s/g buried together
IM133	95°	vertical rectangular shaft, secondary platform on three sides	B	2 × 0.96 - 2.17	wooden bed	2	F M	20~25 40~50	pottery single-handled pot I; wooden bucket II; pottery basin II; wooden arrow I 2, unidentified type 10; wooden comb A II 2; pottery single-handled cup C II; pottery bowl; wooden spinning wheel I 3; fragment of pottery ware; wooden button 2; bone awl; bottom of pottery ware; wooden whipstick; wooden spool; woolen textile 4; fragment of long dress; woolen woven belt, shawl	II	secondary platform: W: 0.2~0.25m, D: 0.62m.
IM134	110°	vertical rectangular shaft	C	0.8 × 0.5 - 0.6	reed mat	1	uniden-tified	underage	/	II	/
IM135	250°	vertical rectangular shaft, secondary platform on one side	B	0.75 × 0.56 - 0.39	reed mat	1	uniden-tified	3±	/	II	secondary platform: W: 0.15m, D: 0.2m.
IM136	77°	vertical rectangular shaft	C	1.2 × 0.66 - 0.5	straw cushion	1	F	40~50	pottery single-handled jar A II, pottery ring-foot jar, wooden spinning wheel II, pottery single-handled cup C I, wooden shallow bowl II, wooden nail 4, bone awl	II	/
IM137	98°	vertical rectangular shaft, secondary platform on two sides	B	1.58 × 0.82 - 0.98	/	2	M F	20~30 25~30	pottery ring-foot jar	II	secondary platform: W: 0.22m, D: 0.33m.
IM138	105°	vertical rectangular shaft, secondary platform on three sides	B	1.82 × 1 - 1.71	/	2	uniden-tified uniden-tified	unidentified unidentified	bottom of pottery ware, pottery bowl, wooden fire board I 2, pottery single-handled cup A I, pottery basin I, wooden plate I, wooden fire spindle 2, wooden supporting plank I, wooden arrow, wooden fire spindle, plush rug	II	secondary platform: W: 0.2~0.3m, D: 0.6m.
IM139	60°	vertical rectangular shaft, secondary platform on two sides	B	(1.71~1.9) × 0.88 - 1.34	straw mat, wooden bed	2	M F	adult adult	talc bead ornament 83, pottery wheel, wooden fireboard I, wooden arrow I 8	II	secondary platform: W: 0.11~0.19m, D: 0.15m.
IM140	110°	vertical rectangular shaft	C	1.23 × 0.8 - 0.4	/	1	F	25~30	pottery single-handled cup A I, wooden comb A I, wooden spinning wheel I, bone awl 2, wooden constructional part	I	/
IM141	110°	vertical rectangular shaft	C	1.46 × 1 - (0.84~0.92)	/	2	uniden-tified uniden-tified	unidentified unidentified	pottery bowl, wooden bow I, wooden arrow shaft, wooden ware, bone button, wooden comb A I, leather boot sole I, woolen textile 3, wooden stick, bronze earring	II	/
IM142	108°	vertical rectangular shaft, secondary platform all around	B	1.6 × 0.9 - 1.8	wooden bed	1	M	adult	pottery single-handled jar A III 2, stone button 2, wooden plate I, wooden whipstick, bone check piece I	II	secondary platform: W: 0.3m, D: 0.2m. 1 head of s/g and skeleton of dog buried together
IM143	110°	oval vertical shaft with horizontal beam	A	1.48 × 0.9 - 0.95	wooden bed	1	M	adult	bronze awl, wooden bow I, wooden stick, dustpan	I	/
IM144	105°	vertical rectangular shaft	C	1.2 × 0.72 - (0.36~0.79)	/	1	F	unidentified	bronze tube 4, wooden comb A I, pottery bowl, wooden stick	I	1 head of s/g buried together
IM145	112°	oval vertical shaft	A	1.4 × 1.3 - (0.72~0.81)	/	1	M	35±	bone needle, bone shuttle, wooden shallow bowl I, wooden stick, tattoo, long dress	I	/
IM146	120°	oval vertical shaft with horizontal beam	A	1.55 × 0.96 - (0.4~0.56)	felt	1	M	adult	wooden shallow bowl I, bone shuttle, stringed bead ornament, straw woven ornament 4, wooden stick, woolen textile, woolen textile woven in Ke technique 2	I	/
IM147	113°	vertical rectangular shaft, secondary platform on one short side	B	1.72 × 1 - (1.9~2)	/	1	M	adult	leather bow and arrow bag II, fragment of pottery ware, leather boot I 2	II	secondary platform: W: 0.17m, D: 0.4m.
IM148	90°	vertical rectangular shaft	C	1.44 × 0.92 - 1.27	straw mat, reed leaves, straw, wooden bed	3	uniden-tified(1st layer) F(2nd layer) M(2nd layer)	unidentified adult adult	pottery single-handled jar A III 2; wooden supporting plank II; complex bow I; wooden arrow I 11; wooden whipstick; pottery single-handled cup A II 2, B II; wooden spinning wheel I; button made of tooth; wooden stick 5; wooden comb A II; bead ornament; wooden nail 2	II	/
IM149	110°	oval vertical shaft with horizontal beam	A	1.3 × 0.9 - 1.02	felt	1	M	20~30	straw woven stringed ornament, wooden whipstick, wooden stick, long dress, woolen textile, woolen woven belt 5, wooden shallow bowl I, woolen tessell	I	/
IM150	105°	oval vertical shaft with horizontal beam	A	1.33 × 0.82 - 1.12	/	1	M	20~25	wooden shallow bowl, bronze axe, wooden arrow (with arrowhead I) 8, wooden stick, bronze arrowhead, wooden stick, leather arm protector I, wooden hook (with bronze arrowhead), wooden bow and arrow (wooden bow I), leather bow and arrow bag I, leather boot I 2, bronze arrowhead I	I	1 head of s/g buried together
IM151	95°	vertical rectangular shaft	C	1.1 × 0.71 - (0.72~0.86)	reed	1	uniden-tified	unidentified	wooden box, wooden stick, wooden stick	II	/
IM152	100°	oval vertical shaft with horizontal beam	A	1.23 × 0.82 - 0.94	felt	1	F	adult	pottery bowl, wooden comb A I, wooden stick	II	1 head of s/g buried together

I M153	102°	oval vertical shaft, secondary platform all around	A	1.04 × 0.61 - 0.85	/	1	F	adult	bone shuttle, wooden stick, wooden stick	I	with horizontal beam; secondary platform: W: 0.13~0.17m, D: 0.24m.
I M154	100°	oval vertical shaft with horizontal beam	A	1.32 × 0.71 - 0.82	felt	1	F	adult	pottery basin I, wooden comb A I, bronze earring 2, wooden stick 2, wooden stick 11	I	/
I M155	112°	vertical rectangular shaft	C	1.91 × 1.39 - (1.6~1.63)	/	3	F (1st layer)	adult	wooden spinning wheel I, II; pottery single-handled cup A II, B I; pottery bowl; pottery single-handled jar B; pottery double-handled cup; wooden plate II; wooden whip; headdress; iron hairpin; horn comb; wooden arrow; wooden nail; mussel ornament; wooden whipstick; leather bridle	III	with horizontal beam
							F (2nd layer)	adult			
							M (2nd layer)	adult			
I M156	100°	oval vertical shaft with horizontal beam	A	1.26 × 0.96 - 0.72	/	1	M	adult	handle of wooden awl, wooden comb A I, wooden stick	I	/
I M157	98°	vertical rectangular shaft, secondary platform on two sides	B	1.52 × 0.86 - 2.62	wooden bed	1	M	40±	wooden headdress, woolen woven belt 2, leather arm portector I, leather ball, leather boot I 2, horse tail tassel, wooden whipstick, leather bow and arrow bag II, wooden stick, bronze button, complex bow I, wooden plate I, bead ornament 7, long trousers, handle of wooden ware, straw woven ornament, woolen tassel 4	II	With horizontal beam. Secondary platform: W: 0.1m, D: 0.9m. A supplemental tomb located on the west: L:0.84m, W: 0.64m, D: 0.6m. 1 child around 1~2 years old buried in side position with limb curved and head facing to the east. 1 head of s/g buried together.
I M158	95°	vertical rectangular shaft	C	1.42 × 0.9 - 1.5	/	2	M	15~18	wooden bucket II 2; wooden comb A II, B I; wooden spinning wheel II 2; bone arrowhead 3; bead ornament 2; woolen woven belt; wooden stick	II	/
I M159	117°	vertical rectangular shaft	C	2 × 1.2 - 1.26	/	2	F	35~45			
							M	adult	bronze knife III, bronze tube 2, bone button	III	1 head of s/g buried together
I M160	110°	vertical rectangular shaft, secondary platform all around	B	1.5 × 0.7 - 1.82	/	1	M	adult			
									I M161	118°	vertical rectangular shaft, secondary platform on two long sides
I M162	118°	vertical rectangular shaft	C	1.2 × 0.6 - 0.88	/	1	F	adult	wooden bucket II, wooden plate I, bone tube, wooden spinning wheel I	II	/
I M163	120°	vertical rectangular shaft, secondary platform all around	B	1.92 × 1.47 - 1.82	reed, wooden bed	1	M	adult	wooden bucket II, handle of wooden walking stick, bronze gag I, check piece made of horn II 2, wooden supporting plank I, wooden stick 3, wooden arrow I 3, ox horn cup, bone button 3, conch ornament, gag made of horn, wooden check piece II	II	secondary platform: W: East: 0.39m, North: 0.3m, West: 0.5m, South: 0.43m; D: 0.42m. 1 head of s/g buried together.
I M165	80°	vertical rectangular shaft	C	1.4 × 0.93 - 1.4	reed mat, wooden bed	1	F	45~55	wooden nail 3, wooden arrow I, check piece made of horn I, pottery single-handled pot II	II	/
I M166	100°	vertical rectangular shaft	C	1.24 × 0.76 - 0.91	/	1	F	25~35	pottery basin II, bone awl	II	/
I M167	110°	vertical rectangular shaft	C	1.83 × 1.2 - 1.19	reed mat, hay, wooden bed	3	M	30~45	pottery single-handled jar A II, leather box, leather shoe, wooden spinning wheel II, pottery cup with spout 2, wooden stick 2, wooden nail 2, wooden stick 2, wooden ware 3, woolen textile woven in Ke technique, woolen textile 2, woolen woven belt	II	/
							F	adult			
							uniden-tified	unidentified			
I M168	100°	vertical rectangular shaft	C	1.26 × 0.8 - 1	reed	1	uniden-tified	unidentified	wooden whipstick, wooden stick	III	1 head of s/g buried together
I M169	90°	vertical rectangular shaft	C	1.4 × 0.8 - 1.09	reed	1	M	40~50	pottery bowl, pottery ring-foot plate I, wooden button	II	1 head of s/g buried together
I M170	77°	vertical rectangular shaft	C	(1.63~1.75) × (0.9~1.01) - (0.98~1.13)	reed mat	1	M	unidentified	wooden plate II, pottery single-handled jar A III, wooden bucket II	III	1 head of s/g buried together; plant seeds found on the bottom of tomb
I M171	130°	oval vertical shaft, secondary platform all around	A	1.3 × 0.8 - 1.3	/	1	F	25~35	bone comb, stone bead ornament 2, necklace, bronze earring, wooden stick	I	secondary platform: W: 0.3m, D: 0.2m.
I M172	82°	vertical rectangular shaft	C	1.18 × 0.76 - (0.96~0.99)	/	1	F	30~35	wooden comb A I, wooden stick	I	/
I M173	104°	oblong vertical bag-shaped shaft, secondary platform around	C	1.9 × 1 - (0.94~1.02)	/	1	M	25~35	pottery single-handled jar A II, wooden plate I, leather bow and arrow I, wooden dart, complex bow I, wooden arrow I 3, pottery Fu pot I, wooden stick	II	/
I M174	105°	oval vertical shaft	A	1.18 × 1 - 0.8	felt	1	F	adult	woolen textile woven in Ke technique, long dress, woolen textile, woolen woven belt	I	/
I M175	45°	oval vertical shaft with secondary platform	A	1.12 × 0.9 - 0.94	/	1	M	25~30	long dress, bead ornament 4	I	plane of secondary platform is in shape of crescent; W: 0.34m, D: 0.43m.
I M176	124°	vertical rectangular shaft with horizontal beam	B	1.17 × 0.82 - 1.24	reed mat	1	M	30~35	pottery single-handled jar A, bead ornament 2, wooden stick	II	with horizontal beam
I M177	102°	oval vertical shaft with horizontal beam	A	1.4 × 0.8 - (1.3~1.38)	/	1	M	25~35	wooden cup, glass bead ornament 2	I	/
I M178	111°	oval vertical shaft, secondary platform all around	A	0.97 × 0.6 - 0.71	/	1	F	20~25	cowry	I	secondary platform: W: 0.25~0.28m, D: 0.07~0.09m.
I M179	108°	oval vertical shaft with horizontal beam	A	1.5 × 0.88 - 1.32	/	1	F	30~40	pottery single-handled cup B I	II	/
I M180	100°	vertical rectangular shaft, secondary platform on two long sides	B	1.5 × 0.9 - 1.4	straw mat	1	F	20~30	wooden nail 5, bone awl, wooden comb A II, pottery single-handled pot II, pottery single-handled cup A II, handle of pottery ware	II	secondary platform: W: 0.1m, D: 0.39m.
I M182	106°	vertical rectangular shaft	C	1.25 × (0.5~0.74) - 0.8	reed mat	2	F (1st layer)	adult	pottery double-handled cup; bone spinning wheel; wooden comb A II; pottery single-handled cup A II, B II; pottery bowl	III	/
							M (2nd layer)	18~22			
I M183	117°	vertical rectangular shaft	C	0.9 × 0.46 - 0.8	/	1	M	adult	pottery basin III, pottery single-handled jar A IV, pottery shallow bowl, comb made of horn, wooden arrowhead, wooden bow I, woolen textile 6, wooden whip, woolen woven hat	III	/
I M184	140°	vertical rectangular shaft	C	1.35 × 0.59 - 0.42	/	1	uniden-tified	unidentified	pottery shallow bowl	III	1 head of s/g buried together
I M185	100°	vertical rectangular shaft	C	1.46 × 0.68 - 1.05	/	1	M	adult	wooden supporting plank III, wooden stick, wooden bow I, wooden arrow I 8	III	/
I M186	120°	vertical rectangular shaft	C	1.21 × 0.72 - 0.6	/	1	F	adult	wooden spinning wheel I, wooden plate I, wooden comb A II, wooden bucket II, pottery single-handled cup B II	III	/
I M187	105°	vertical rectangular shaft	C	1.31 × 0.84 - 1.1	reed stems	1	F	underage	pottery bowl, wooden spinning wheel II, pottery single-handled cup A II, wooden comb A II, pottery basin III, fragement of pottery ware, wooden bucket II	III	/
I M188	100°	vertical rectangular shaft	C	1.51 × 0.87 - 1.44	wooden bed	2	F	16~18	wooden plate I	II	/
							M	adult			
							M	40~50			

I M189	113°	vertical rectangular shaft	C	1.58 × 0.98 - 1.09	/	2	M	adult	wooden bowl, check piece made of horn II 2, leather bridle 2, wooden stick 2, bronze gag III, bow string, bronze ring ornament, wooden whipstick, wooden item, plush rug	III	/
I M190	105°	vertical rectangular shaft	C	1.32 × 0.82 - 1.61	/	1	F	> 55	pottery single-handed jar A V, leather boot II, fragment of pottery ware, bottom of pottery ware	IV	/
I M191	110°	vertical rectangular shaft	C	1.4 × 0.8 - 1.18	/	2	M	35~40	complex bow II, hair plait, bottom of pottery ware	III	/
I M192	92°	vertical rectangular shaft	C	1.29 × 0.88 - 1.11	/	1	F	25~35			
I M193	93°	vertical rectangular shaft	C	1.48 × 0.81 - 1.42	reed	2	M	middle age	wooden fireboard II, wooden fire spindle	III	/
I M194	90°	vertical rectangular shaft	C	1.4 × 1.08 - 1.3	/	4	M	20~30	wooden comb A II, hair plait, wooden spinning wheel I, complex bow I, wooden stick, leather boot I 2	II	/
							F	adult			
							M	35~40			
							F	18~25			
I M195	123°	vertical rectangular shaft	C	1.55 × 1 - (1~1.09)	hay	2	uniden-tified	adult	wooden comb A II, wooden arrow II 2, wooden bow II, wooden fire spindle, wooden item, complex bow I, pottery single-handed cup B I, leather boot II, wooden nail 6	II	/
							uniden-tified	adult			
							M	20~30			
I M196	93°	vertical rectangular shaft	C	1.4 × 0.78 - 0.8	felt	2	F	35±	pottery single-handed pot II, wooden plate II, leather boot II, whetstone 3, bronze knife III, handle of pottery ware, leather bow and arrow bag II 2, leather sleeve, leather arm protector III	III	/
							M	adult			
I M197	120°	vertical rectangular shaft	C	1.22 × 0.71 - 0.91	reed	1	M	17~22	wooden plate II, pottery single-handed cup B I, wooden whipstick, wooden comb A II, wooden spool, wooden button, stringed ornament 12, bronze button	II	1 head of s/g buried together
I M198	93°	vertical rectangular shaft	C	1.42 × 0.92 - 0.9	straw mat	2	M	16~18	wooden supporting plank III, wooden arrow II, leather boot (shaft) III, leather belt	III	/
I M199	120°	vertical rectangular shaft	C	1.42 × 0.92 - 0.9	straw mat	2	F	adult	pottery single-handed cup B I, wooden spinning wheel II, complex bow I (2 parts), fragment of dustpan, wooden comb A II	II	/
							M	35~40			
I M200	120°	vertical rectangular shaft	C	1.32 × 0.8 - 1.1	reed mat	1	F	40~45	pottery single-handed cup A IV, pottery jar with circular foot, hair plait, leather boot II 2	III	/
I M201	130°	vertical rectangular shaft	C	1.1 × 0.82 - 1.2	/	1	F	25~30	wooden comb A II, wooden item, bronze bell	II	fossa pattern poked on clay paste
I M202	115°	vertical rectangular shaft	C	1.51 × 0.83 - 1.2	wooden bed	1	F	25~35	pottery single-handed cup A II, C II; pottery ring-foot jar; wooden comb A II; bone awl; wooden nail; wooden box; cowry; piece of wooden bucket II	III	1 head of s/g buried together
I M203	110°	vertical rectangular shaft	C	1.5 × 0.9 - 1	reed	1	F	adult	wooden shallow bowl III, fragment of pottery ware	III	1 head of s/g buried together
I M204	100°	vertical rectangular shaft	C	1.44 × 1 - 1.32	wooden bed	2	M	middle age	wooden plate I, fragment of dustpan, wooden button, wooden nail, button made of giant clam	III	1 head of s/g buried together
							F	25~30			
I M205	120°	vertical rectangular shaft	C	1.64 × 0.98 - 1.2	straw mat	1	M	40~50	wooden bucket II; wooden shallow bowl II; pottery single-handed cup B II, CII; leather bridle; wooden comb A II; wooden whipstick; wooden stick 6; leather spinning wheel; ornament made of beast tooth	III	/
I M206	110°	vertical rectangular shaft	C	1.3 × 0.8 - (0.79~0.87)	wooden bed	2	M	45~55	wooden plate II, wooden whipstick	III	/
I M207	110°	vertical rectangular shaft	C	1.2 × 0.9 - 1.04	/	1	F	20~30			
I M208	115°	vertical rectangular shaft	C	1.3 × 0.88 - 1.4	/	2	F	14~16	pottery single-handed jar A III	III	/
							M	35~45			
I M209	130°	vertical rectangular shaft	C	1.48 × 0.84 - 1.03	wooden bed	1	M	25~30	pottery basin II, seashell 13, bead ornament 12, bronze bell 7, wooden check piece I 2, wooden whipstick, bronze button 2, leather bridle, wooden item, woolen woven belt, Y-shaped wood branch	II	1 head of s/g buried together
I M210	112°	oval vertical shaft with horizontal beam	A	1.2 × 0.7 - 0.8	/	1	M	20~25	wooden bow I 2, fragment of pottery ware, wooden nail, leather ball, leather arm protector I, leather bow and arrow bag (fragment), wooden bow, wooden whip, woolen textile woven in Ke technique 2, woolen tessel, woolen textile 2, woolen woven belt 5	I	/
I M211	114°	oval vertical shaft	A	0.78 × 0.53 - 0.26	/	1	uniden-tified	underage	/		/
I M212	95°	vertical rectangular shaft	C	1.43 × 0.89 - (1.28~1.49)	felt, fine straw, branches	1	F	25~35	hair plait, long dress 2, woolen textile, trousers, woolen woven belt 5, woolen textile woven in Ke technique 2	II	/
I M213	101°	oval vertical shaft	A	1.14 × 0.82 - 0.56	/	1	M	14~16	pottery shallow bowl, glass bead ornament 3, leather pouch, leather bow and arrow bag I, wooden stick, hair plait	I	/
I M214	130°	vertical rectangular shaft with horizontal beam	B	1.2 × 0.8 - 0.78	/	1	M	55~65	wooden stick, wooden stick, leather bridle, wooden comb A II, wooden whipstick, wooden whip, wooden supporting plank I, woolen textile	II	with horizontal beam
I M215	127°	oval vertical shaft	A	1.14 × 0.76 - (0.16~0.19)	/	1	M	adult	hair plait, tattoo on the back of hand 2, leather ball	I	/
I M216	119°	oval vertical shaft with horizontal beam	A	1.08 × 0.8 - 0.5	/	1	M	adult	pottery single-handed jar A I, leather boot I 2, tattoo on the back of hand	I	1 head of s/g buried together
I M217	117°	vertical rectangular shaft with horizontal beam; secondary platform on two long sides	B	1.18 × 0.76 - 0.54	/	1	M	adult	glass bead ornament 3 (4), wooden item	II	1 head of s/g buried together
I M218	99°	vertical rectangular shaft, secondary platform on two long sides	B	1.4 × 1.02 - 1.48	rose willow branches, reed mat, wooden bed	1	M	12~14	wooden bow I, wooden plate I, check piece made of horn II 2, wooden whipstick, glass bead ornament 2, bronze bell, cowry, wooden arrow I 2, wooden nail 3, arch-shaped wooden item 2, fragment of wooden ware	II	secondary platform: W: 0.18m, D: 0.3m. Surface of tomb's bottom processed. 1 head skull and limb bone of s/g buried together.
I M219	109°	vertical rectangular shaft, secondary platform on two long sides	B	1.35 × 0.82 - 0.85	hay, branches	1	F	adult	wooden spool, wooden bucket II, wooden comb A I, pottery single-handed jar A II	II	secondary platform: W: 0.1m, D: 0.19m.

Tomb No.	Tomb Orientation (°)	Tomb Structure	Tomb type	Dimension of Tomb Chamber L×W-D (m)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Objects	Cultural Period	Remarks
IIM1	82°	vertical rectangular shaft	C	1.18×0.68-0.86	/	1	F	adult	Wooden plate I, pottery bowl, wooden spinning wheel II, woolen textile	III	/
IIM2	113°	vertical rectangular shaft	C	1.4×0.64-1.18	Straw mat	1	M	40-50	Complex bow I, wooden basin, wooden plate I, wooden check piece III, wooden fire board II, wooden comb A II, wooden fire spindle, pottery ring-foot jar	III	/
IIM3	125°	vertical rectangular shaft	C	1.38×0.54-1.06	felt	1	unidentified	unidentified	Wooden spinning wheel I, wooden arrow, hair plait 2, fragment of long dress, woolen textile 3, woolen woven belt 2, fragment of sleeve	III	Jawbone of s/g buried together
IIM4	94°	vertical rectangular shaft	C	1.66×0.94-1.5	Wooden bed	1	unidentified	unidentified	/	III	1 head of s/g buried together
IIM5	118°	vertical rectangular shaft	C	1.38×0.72-1.14	/	1	F	20-25	Wooden plate II, wooden spinning wheel II, bone shuttle, wooden hook	III	1 head of s/g buried together
IIM6	98°	vertical rectangular shaft	C	0.81×0.42-0.68	Reed mat	unidentified	unidentified	unidentified	Pottery single-handed cup A IV, pottery single-handed pot III, button made of horn, wooden stick	III	/
IIM7	120°	vertical rectangular shaft	C	0.56×0.44-0.18	/	1	unidentified	Under age	Pottery single-handed jar A IV, pottery single-handed cup A IV, wooden item	III	/
IIM8	97°	vertical rectangular shaft	C	0.74×0.4-0.3	/	1	unidentified	4-6	Pottery single-handed cup A IV	III	/
IIM9	111°	vertical rectangular shaft	C	1.52×0.96-1.1	Wooden bed	1	M	30-40	Pottery single-handed jar A IV, wooden arrow shaft 3, bronze button	III	1 head of s/g buried together
IIM10	109°	vertical rectangular shaft	C	1.76×0.76-1.12	Wooden bed, reed mat	1	M	50-60	Pottery single-handed cup A III, B III; wooden spinning wheel II; check piece made of horn II 2; button made of giant clam; wooden supporting plank III; bead ornament; bottom of wooden bucket; wooden stamp	III	1 head of s/g buried together
IIM11	130°	vertical rectangular shaft	C	1.3×0.7-1.12	/	1	F	Adult	Pottery single-handed jar, pottery bowl, wooden stick, wooden spinning wheel II	III	1 head of s/g buried together
IIM12	108°	vertical rectangular shaft	C	1.54×0.8-1.11	Wooden bed, reed mat	1	unidentified	unidentified	Seashell 2, pottery single-handed cup C II, wooden spinning wheel II 2, wooden arrow, wooden item, complex bow I, bone awl, leather box, horn cup, woolen textile woven in Ke technique	III	1 head of s/g buried together
IIM13	95°	vertical rectangular shaft	C	1.42×0.8-1.26	Wooden bed, reed	2	M	40-50	Wooden spinning wheel I, bone gag I, check piece made of horn II 2, pottery single-handed cup A IV 2, wooden arrow II 23, complex bow I, wooden boomerang, wooden plate I, pottery shallow bowl 2, wooden comb A II, awl made of horn, button made of giant clam, wooden stick	III	/
IIM15	125°	vertical rectangular shaft	C	1.3×0.62-0.5	Unidentified	2	M	20-25	Wooden spinning wheel II, pottery ring-foot jar, wooden comb A II, pottery spinning wheel, wooden nail, pottery plate, pottery single-handed cup A IV, bone awl	III	/
IIM16	118°	vertical rectangular shaft	C	1.8×0.78-1.24	/	1	M	35-45	Wooden arrow II 2, wooden nail, pottery bowl, bone awl	III	1 head of s/g buried together
IIM17	134°	vertical rectangular shaft	C	1.46×0.76-1.25	/	1	F	Adult	Wooden four-feet plate, wooden spinning wheel II 2, wooden comb A II, bone awl 2, wooden stick	III	/
IIM18	121°	vertical rectangular shaft	C	1.65×0.96-1.2	reed	1	M	25-35	Wooden arrow II, wooden whip shaft, wooden plate II, wooden comb A II, pottery single-handed jar A IV, complex bow I, wooden spool, leather boot II 2	III	Limb bone of s/g buried together
IIM19	120°	vertical rectangular shaft	C	1.52×0.76-1.02	/	2	M	18-22	Wooden spinning wheel II, pottery single-handed pot III, wooden comb B II, pottery ring-foot jar, bone awl, woolen woven belt	III	/
IIM20	110°	vertical rectangular shaft	C	1.76×0.99-1.42	reed	2	F	35-45	Wooden plate II, pottery single-handed jar A IV, wooden basin, leather box, wooden button, wooden nail	III	1 head of s/g buried together
IIM21	94°	vertical rectangular shaft	C	1.16×0.52-0.76	/	1	F?	10-12	Wooden plate II, golden earring	III	/
IIM22	127°	vertical rectangular shaft	C	1.56×0.92-1	/	1	M	40-50	Wooden plate II, wooden arrow II, pottery single-handed jar A IV, complex bow II, wooden supporting plank III, leather belt	III	1 head of s/g buried together
IIM23	100°	vertical rectangular shaft	C	1.4×0.6-0.58 (1.36×0.58-1.05)	/	2	M	18-22	Pottery single-handed cup C III, wooden nail 3, pottery single-handed jar A IV, pottery spinning wheel, wooden plate II, bone awl, wooden button, leather buckle, pancake, skirt sewed up by woolen woven belts, fragment of woolen string, rug, woolen textile	III	/
IIM24	118°	vertical rectangular shaft	C	1.5×0.88-0.8	/	1	F	20-25	Wooden plate II, pottery single-handed cup A IV, wooden spinning wheel II, wooden comb B II, wooden item 2	III	/
IIM25	106°	vertical rectangular shaft	C	1.82×1.02-1.2	Reed (reed stems)	Unidentified	unidentified	unidentified	Complex bow II, wooden arrow II, wooden comb B I, pottery single-handed pot III	III	/
IIM26	118°	vertical rectangular shaft	C	1.6×0.9-1.12	Woodn bed	Unidentified	unidentified	unidentified	/	III	/
IIM27	115°	vertical rectangular shaft	C	1.74×0.88-1.06	/	1	M	35-45	Pottery single-handed cup A IV, B III; complex bow II; wooden supporting plank III, wooden plate II, wooden arrow II 10	III	/
IIM28	91°	vertical rectangular shaft	C	1.32×0.76-1.08	/	1	unidentified	10-12	Wooden spinning wheel II	III	/
IIM29	100°	vertical rectangular shaft	C	0.92×0.48-0.31	reed mat	1	unidentified	6±	Pottery single-handed pot III	III	/
IIM30	117°	vertical rectangular shaft	C	1.36×0.8 (0.76-1.02)	/	1	F	18-20	Wooden spinning wheel I, pottery single-handed jar B, wooden arrow, wooden plate II, pottery single-handed cup C III, wooden nail 2	III	1 head of s/g buried together
IIM31	112°	vertical rectangular shaft	C	1.5×1-1.2	reed mat	1	M	Adult	Wooden supporting plank III, bronze knife IV, pottery single-handed pot III	III	/
IIM32	116°	vertical rectangular shaft	C	1.26×0.9-1.2	/	1	F	17-20	Wooden arrow, wooden plate II, wooden nail, wooden comb B II	III	/
IIM33	112°	vertical rectangular shaft	C	1.54×1.02-1.4	reed, straw mat (reed mat)	1	F	40-50	Wooden spinning wheel I, wooden plate II, pottery single-handed jar A, bottom of wooden bucket	III	/
IIM34	115°	vertical rectangular shaft	C	1.6×1.1-1.25	wooden bed	1	M	15-18	Pottery single-handed jar A IV, pottery single-handed cup A IV, wooden comb A II, wooden hairpin, wooden nail 2, wooden peg, leather belt	III	/
IIM35	115°	vertical rectangular shaft	C	1.6×1.08-0.9	/	2	M	30-35	Wooden plate II	III	2 heads of s/g buried together
IIM36	104°	vertical rectangular shaft	C	1.86×1.17-1.32	/	1	unidentified	Unidentified	Leather box, wooden spinning wheel I	III	/
IIM37	104°	vertical rectangular shaft	C	1.6×1-1.16	wooden bed	1	M	Adult	Complex bow II, wooden nail, wooden supporting plank III	III	/
IIM38	110°	vertical rectangular shaft	C	1.56×0.93-0.96	/	1	F	35-45	Hair plait, pottery single-handed cup C II, wooden spinning wheel I, bottom of wooden bucket	III	1 head of s/g buried together
IIM39	130°	vertical rectangular shaft	C	1.56×0.7-0.96	/	1	F	35-45	/	III	/
IIM40	131°	vertical rectangular shaft	C	2.2×2-1.96 (1.92)	/	1	M	30-40	Wooden whip, wooden awl 2, wooden button	III	/
IIM41	130°	vertical rectangular shaft	C	2.3×1.51-1.86	/	Unidentified	unidentified	Unidentified	Wooden item, wooden nail 2, horn cup, leather bag, leather hat, leather bridle, leather pouch, woolen woven belt	III	/

IIM42	130°	vertical rectangular shaft	C	1.32×0.76-0.82	/	3	M	20~30	Pottery double-handled pot, wooden four-foot plate, wooden bucket II, wooden headdress	III	1 head of s/g buried together
							unidentified	6±			
							M	35~45			
IIM43	100°	vertical rectangular shaft	C	1.63×1.07-1.4	/	3	M	35~45	Wooden shallow bowl III, pottery single-handled cup A IV, wooden walking stick, wooden item, pottery single-handled jar B, complex bow II, wooden plate III, wooden basin (Yi, water container), pottery basin IV, pottery crucible, iron knife I	III	1 head of s/g buried together
							F	25~35			
							F	30~40			
IIM44	97°	vertical rectangular shaft with side chamber	D	Tomb opening: 1.48×0.8-1.16 Chamber: 1.48×0.3-0.36 (H)	/	5	M	20~30	Leather pouch, pottery bowl, pottery basin III, pottery single-handled cup C III, wooden arrowhead III, bottom of wooden bucket, pottery ring-foot plate, bone tube, leather belt	III	/
							F	18~22			
							unidentified	11~13			
							F	18~22			
IIM45	98°	vertical rectangular shaft	C	1.9×1.2-1.38	/	1	M	45~55	Wooden boomerang, complex bow II, leather bag, wooden polisher	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM46	100°	vertical rectangular shaft	C	3.1×1.9-2.65	/	Unidentified	unidentified	Unidentified	Pottery single-handled jar A IV, hair plait 2, leather boot, leather string, woolen textile, fragment of woolen rug	III	soil+stone mound on top
							unidentified	unidentified			
							unidentified	unidentified			
IIM47	104°	vertical shaft with side chamber; has wall and horse pit	D	Diameter of shaft: 2.15×1.05-1.6 Chamber: 2.1×0.77-0.5 (H)	/	1	M	adult	Wooden four-foot plate	IV	mound on top; wall; horse pit attached; buried with entire horse
							unidentified	unidentified			
							unidentified	unidentified			
IIM48	112°	vertical rectangular shaft with side chamber; has wall and horse pit	D	Shaft: 2.96×1.24-3.02 Chamber: 2.96×1.86-1.33 (H)	Wooden bed	1	M	adult	Wooden Dou (food container), handle of pottery ware, potter jar, heavy stone (hole in center), pottery shallow bowl	IV	Mound on top; horse pit attached; buried with 2 (1) entire horses
							unidentified	unidentified			
							unidentified	unidentified			
IIM49	126°	vertical rectangular shaft with side chamber; has wall and horse pit	D	Shaft: 3.9 × (1.45~1.67) -3.66 Chamber: 3.9×2.67-1.6 (H)	Wooden bed	1	M	adult	Pottery shallow bowl, pottery bowl	IV	Mound on top; wall; horse pit; buried with 1 entire horse
							unidentified	unidentified			
							unidentified	unidentified			
IIM50	100°	Oval vertical shaft	A	0.91×0.4-0.19	/	Unidentified	unidentified	unidentified	Pottery single-handled jar A, wooden shallow bowl II	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM51	110°	Vertical rectangular shaft	C	0.83×0.52-0.5	/	1	unidentified	2~3	Pottery single-handled jar A, pottery single-handled cup A II	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM52	106°	Vertical rectangular shaft	C	1.5×0.9-1.31	/	1	M	40~50	Wooden supporting plank III 2, wooden fire spindle 2, pottery single-handled cup C II, pottery shallow bowl, pottery single-handled jar A III, wooden spinning wheel I, wooden bucket III, bone awl, complex bow II	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM53	140°	Vertical rectangular shaft	C	1.12×0.7-0.8	/	1	unidentified	unidentified	Pottery shallow bowl, pottery single-handled pot III, wooden arrow 2, wooden bow II	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM54	105°	Vertical rectangular shaft	C	1.4×0.72-0.98	reed mat	1	F	25~35	Wooden fire board II, wooden arrow II 3, wooden spinning wheel I, wooden comb B II, bottom of wooden bucket, pottery shallow bowl, wooden shallow bowl II, bone arrowhead	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM55	125°	Vertical rectangular shaft	C	1.34×0.7-1.2	Wooden bed	3	M	35~45	Wooden comb A II, pottery single-handled cup A III	III	/
							M	12~13			
							F	35~45			
IIM56	95°	Vertical rectangular shaft	C	1.02×0.54-0.46 {1.12×(0.38~0.56)-0.46}	/	2	unidentified	3±	Pottery single-handled jar A IV, wooden plate II, wooden shallow bowl III, fragment of woodenware	III	1 head of s/g buried together
							unidentified	2±			
							unidentified	unidentified			
IIM57	98°	Vertical rectangular shaft	C	1.28×0.73- (0.9~1)	/	1	F	15~25	Wooden bucket II	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM58	100°	Vertical rectangular shaft	C	1.61× (0.89~0.98)- (1.3~1.37)	Wooden bed	1	F	20~30	Wooden shallow bowl II, wooden bucket II, wooden button, wooden nail, wooden item	III	1 head of s/g buried together
							unidentified	unidentified			
							unidentified	unidentified			
IIM59	120°	Vertical rectangular shaft	C	1.4×0.7-0.6	/	1	F	35~40	Pottery plate	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM60	103°	Vertical rectangular shaft	C	1.52×0.84-1.33	/	1	M	25~35	Pottery double-handled jar, pottery single-handled jar A IV 2, pottery jar with circular foot, wooden comb B II, wooden spinning wheel III, wooden plate II, leatherware, wooden nail, leather sleeve, woolen textile, woolen woven belt	III	skull and spine of s/g kept in wooden plate; 1 head of s/g buried together.
							unidentified	unidentified			
							unidentified	unidentified			
IIM61	103°	Vertical rectangular shaft	C	1.68×1-1.2	/	1	M	35~45	Fragment of pottery ware, shaft of wooden boomerang, stone pestle, wooden nail, complex bow II, sole of leather boot II, leather pouch, leather boot II 2, leather box	III	1 head of s/g buried together
							unidentified	unidentified			
							unidentified	unidentified			
IIM62	99°	Vertical rectangular shaft	C	1.9×1.22-1	Wooden bed	1	M	40~45 (45~50)	Wooden arrow II 7, bronze button 2, check piece made of horn II, wooden supporting plank III, wooden bow I	III	1 head of s/g buried together
							unidentified	unidentified			
							unidentified	unidentified			
IIM63	120°	Vertical rectangular shaft	C	2.38×1.7-1.33	Wooden bed	1	F	35~45	Harp II, pottery single-handled jar A IV, pottery single-handled cup A IV, wooden bow I, leather sleeve, leather bridle, fragment of pottery ware 2, leather boot II 2, woolen textile 3, woolen string	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM64	98°	Vertical rectangular shaft	C	1.1×0.6-0.38	/	1	unidentified	11~12	Pottery basin III 2	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM65	101°	Vertical rectangular shaft	C	1.48×0.87-0.7	Reed	1	F	40~45	Pottery single-handled jar A IV 2, iron knife I, leather pouch, wooden comb A II 2, wooden plate II, wooden spinning wheel III, leather waist belt, leather sleeve	III	spine of s/g kept in wooden plate
							unidentified	unidentified			
							unidentified	unidentified			
IIM66	87°	Vertical rectangular shaft	C	1.8×1.04-1.05	Reed mat	1	F	25~30	Pottery single-handled jar A IV, pottery single-handled cup C III, complex bow II	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM67	123°	Vertical rectangular shaft	C	1.12×0.58-0.6	/	1	unidentified	4~6	Pottery single-handled jar A IV	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM68	119°	Vertical rectangular shaft	C	0.86×0.52-0.43	/	1	unidentified	3~4	Pottery ring-foot plate III, pottery single-handled jar A IV	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM69	119°	Vertical rectangular shaft	C	1.64×1-1.1	/	1	M	45~55	Pottery double-stringed jar 2, wooden supporting plank III, comb made of horn, wooden nail	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM70	90°	Vertical rectangular shaft	C	1.92×1.31-1.04	/	1	F	50~55	Wooden comb A II, foot of wooden plate, wooden stick, fragment of bottom of pottery basin	III	1 head of s/g buried together
							unidentified	unidentified			
							unidentified	unidentified			
IIM71	114°	Vertical rectangular shaft	C	1.7×1-0.48	/	1	F	20~22	Wooden spool, wooden plate III	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM72	101°	Vertical rectangular shaft	C	1.8×1.01-1.1	/	1	M	30±	Pottery single-handled jar A IV, wooden plate II, wooden boomerang, wooden arrow, complex bow I, woolen textile	III	1 head of s/g buried together
							unidentified	unidentified			
							unidentified	unidentified			
IIM73	102°	Vertical rectangular shaft	C	1.6×0.97-1.66	/	1	F	20~30	Pottery Fu (cooking vessel) III, pottery double-stringed jar 2, wooden bucket III, pottery single-handled jar A IV	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM74	107°	Vertical rectangular shaft	C	1.6×0.8-1.13	/ (reed)	1	M	35~45	Pottery single-handled jar A IV, wooden supporting plank III, complex bow II	III	1 head of s/g buried together
							unidentified	unidentified			
							unidentified	unidentified			
IIM75	295°	Vertical rectangular shaft	C	1.5×0.8-1.32	/	1	M	20~25	Pottery single-handled jar A IV	III	/
							unidentified	unidentified			
							unidentified	unidentified			
IIM76	92°	Vertical rectangular shaft	C	1.6×0.91-1.4	/	1	M	40±	Pottery single-handled jar A IV, pottery basin III, complex bow II	III	1 head of s/g buried together
							unidentified	unidentified			
							unidentified	unidentified			

IIM77	90°	Vertical rectangular shaft	C	1.5×0.92-1.3	Reed	1	F	40-45	s/g horn cup, pottey double-stringed jar 2, comb made of horn, long skirt, long trousers	III	/
IIM78	92°	Vertical rectangular shaft	C	1.36×0.72-0.91	/	1	unidentified	10-12	Pottery single-handled cup A IV, pottery double-stringed jar, wooden cup, pottery single-handled jar A IV, wooden nail 2	III	/
IIM79	316°	Oval vertical shaft	A	1.33×0.92-1	Wild grass, Swertia	1	M	Adult	Wooden plate II, leather box, leather bag, wooden arrow II, pottery single-handled jar A IV	III	/
IIM80	108°	Vertical rectangular shaft	C	1.25×0.82-(0.9-0.94)	Reed	1	F	25-30	/	III	/
IIM81	110°	Vertical rectangular shaft	C	1.5×0.81-1.4	Wooden bed	2	M M	45-55 Mature	Wooden plate II, wooden shallow bowl III, wooden supporting plank III, wooden bow I, wooden nail 5	III	/
IIM82	130°	Vertical rectangular shaft	C	0.78 × (0.4-0.51)-0.6	Reed	1	unidentified	11-12	Wooden plate III, complex bow I, wooden arrow II 2, ornament made of tooth	III	1 head of s/g buried together
IIM83	150°	Oval vertical shaft	A	0.67× (0.22-0.37) - (0.24-0.32)	Reed	1	unidentified	3-4	Pottery single-handled jar B, wooden nail 2	III	/
IIM84	96°	Vertical rectangular shaft	C	1.42×0.83-1.2	Wooden bed	2	M F	25-30 25-35	Pottery single-handled jar A III, B; wooden plate II; pottery single-handled cup C II; wooden spinning wheel II; woolen textile 2; leather boot II 2	III	1 head of s/g buried together
IIM85	100°	Vertical rectangular shaft	C	1.52×0.81-0.9	Wooden bed	1	F	20-25	Wooden spinning wheel II, wooden supporting plank II, bottom of wooden bucket	III	/
IIM86	105°	Vertical rectangular shaft	C	1.76×0.88-1.21	Wooden bed	1	M	35-40	Wooden plate I, comb made of horn, pottery Fu (cooking vessel) II, whetstone, bone awl	III	/
IIM87	112°	Vertical rectangular shaft	C	1.34×0.71 - (0.78-0.87)	Reed stalks	1	F	25-35	Wooden spinning wheel II, wooden spool, wooden plate III, wooden comb A II, pottery basin III	III	/
IIM88	120°	Oval vertical shaft	A	1.31×0.78-0.6	/	1	unidentified	9-10	Pottery single-handled cup A IV, pottery shallow bowl	III	/
IIM89	98°	Vertical rectangular shaft	C	1.6×0.93-1.12	Wooden bed	1	M	Adult	Pottery ladle, pottery shallow bowl, bone check piece III, pottery single-handled jar A I, wooden nail	III	/
IIM90	104°	Vertical rectangular shaft	C	1.32×0.83-0.82	/	1	M	25-35	Wooden peg, pottery single-handled cup A IV	III	/
IIM91	124°	Vertical rectangular shaft	C	1.02×0.67-0.81	/	1	M	30-40	Wooden shallow bowl III, pottery single-handled jar A IV	III	/
IIM92	100°	Vertical rectangular shaft	C	1.3×0.74-0.9	/	2	M M	20-30 40-45	Wooden button, whetstone, wooden comb B II, iron knife I, iron awl, wooden spinning wheel II, wooden arrow II 4, wooden supporting plank III, wooden plate I, pottery single-handled jar A IV, wooden hairpin, wooden fire making kit	III	1 head of s/g buried together
IIM93	110°	Vertical rectangular shaft	C	1.41×0.8-1.1	reed	2	M M	12-13 13-15	Wooden spinning wheel II, pottery jar, pottery single-handled cup C III, bone awl, wheat stalks	III	/
IIM94	100°	Vertical rectangular shaft	C	1.4×0.72-0.82	/	1	M	18-20	Wooden comb B II	III	/
IIM95	95°	Vertical rectangular shaft	C	1.62×0.96-1.4	/	1	F	35-45	Wooden plate II, wooden bucket III, wooden spinning wheel II	III	1 head of s/g buried together
IIM96	130°	Vertical rectangular shaft	C	1.17×0.64-1.12	Wooden bed	1	unidentified	6-8	Pottery ring-foot plate II	III	1 head of s/g buried together
IIM97	105°	Vertical rectangular shaft	C	1.32×0.63-0.83	/(reed)	2	F M	30-40 Mature	Wooden comb A III	III	1 head of s/g buried together
IIM98	117°	Vertical rectangular shaft	C	1.03×0.5-0.55	/	2	F unidentified	18-20 12-15	Wooden plate I; pottery single-handled cup A IV, C III; pottery single-handled jar A IV 2; complex bow II; fragment of pottery ware; pottery shallow bowl; wooden comb B II	III	/
IIM99	110°	Vertical rectangular shaft	C	1.42×0.73-1.08	/	1	M	30-40	Wooden plate II	III	/
IIM100	97°	Vertical rectangular shaft	C	1.46×0.87 - (0.88-0.94)	/	1	F	30-40	Wooden four-foot plate, pottery single-handled cup A IV	III	/
IIM101	115°	Vertical rectangular shaft	C	1.61×0.81 - (1.3-1.41)	Wooden bed	1	M	>55	/	III	/
IIM102	130°	Vertical rectangular shaft; secondary platform on two sides	B	1.2×0.8-1.3	reed	1	M	25-35	Complex bow I, wooden bowl	II	/(secondary platform: South: W:0.11m;North: W: 0.10m; D: 0.15m)
IIM103	140°	Vertical rectangular shaft	C	1.52×0.85-1.3	/	1	M	35-45	/	III	1 head of s/g buried together
IIM104	130°	Vertical rectangular shaft	C	1.57×0.76-1.1	reed	1	M	25-35	Wooden plate II, wooden supporting plank III, leather button 6, wooden fire plank II, wooden item, leatherware, horse tail	III	/
IIM105	115°	Vertical rectangular shaft	C	1.5×0.76-0.87	Straw mat	2	M F	45-55 55-65	Pottery single-handled jar A IV 2, wooden arrow II	III	/
IIM106	102°	Vertical rectangular shaft	C	1.5×1.39-1.1	Reed mat	2	M F	40-50 20-30	Pottery Fu (cooking vessel) IV	III	1 head of s/g buried together
IIM107	107°	Vertical rectangular shaft	C	1.36×0.61-0.72	/	1	F	18-22	Pottery single-handled cup B III, pottery double-handled cup	III	/
IIM108	110°	Vertical rectangular shaft	C	1.4×0.64 - (0.88-0.96)	Reed	2	M F	30± 20-30	Wooden comb A II, wooden shallow bowl III, wooden nail 4, complex bow I, pottery shallow bowl, leatherware, fragment of pottery ware	III	1 head of s/g buried together
IIM109	118°	Vertical rectangular shaft	C	1.6×0.81-1.03	/	2	M F	20-30 25-30	Wooden spinning wheel II 2, wooden plate II, leather box, wooden nail, bone awl, leather boot II 2, fur coat	III	1 head of s/g buried together
IIM110	115°	Vertical rectangular shaft	C	1.71×1.07-1.21	/	1	M	20-30	Wooden bucket III; pottery single-handled cup C II, C IV; wooden spinning wheel II	III	1 head of s/g buried together
IIM111	110°	Vertical rectangular shaft	C	1.52×0.73-1.35	Wooden bed	1	M	25-30	Complex bow I, wooden nail, reed tube, woolen textile	III	1 head of s/g buried together
IIM112	115°	Vertical rectangular shaft	C	1.51×0.92-0.9	Reed	2	M unidentified	25-30 unidentified	Pottery single-handled jar A IV, wooden plate II, wooden comb A II	III	1 head of s/g buried together
IIM113	102°	Vertical rectangular shaft	C	1.2×0.71-0.92	/	1	M	18-22	Pottery single-handled cup C III, pottery single-handled jar A IV	III	/
IIM114	123°	Vertical rectangular shaft	C	1.4×0.67-0.9	Wooden bed	1	M	35-45	Pottery ring-foot jar, complex bow I, wooden arrow II 4, wooden plate II, wooden supporting plank III	III	/
IIM115	126°	Vertical rectangular shaft	C	1.32×0.64-1	/	1	unidentified	7-8	Fragment of pottery ware, woolen textile	III	/
IIM116	116°	Vertical rectangular shaft	C	1.47×0.8-(0.92-1)	/	1	M	25-30	Pottery basin III, wooden fire plank II	III	/
IIM117	115°	Vertical rectangular shaft	C	1.36×0.68-1.18	Wooden bed	1	M	30±	Pottery single-handled cup A IV, C II	III	/
IIM118	125°	Vertical rectangular shaft	C	1.61×0.98-1.1	/	1	M	45-55	Wooden plate II, pottery cup with spout	III	1 head of s/g and 1 limb bone of horse buried together
IIM119	115°	Vertical rectangular shaft	C	1.08×0.58-0.7	/	1	M	11-13	Pottery shallow bowl, pottery single-handled cup A IV, pottery single-handled jar B	III	/

IIM120	130°	Vertical rectangular shaft	C	1.28×0.56-0.74	Reed mat	/	/	/	/	III	/
IIM121	120°	Vertical rectangular shaft	C	1.36×0.66-0.91	Wooden bed, reed mat	2	M	20-25	Wooden plate II; wooden spinning wheel III; pottery single-handled cup A IV, C III; wooden supporting plank III; woolen tassel; leather bridle; complex bow I; pottery shallow bowl	III	1 head of horse buried together
IIM122	95°	Vertical rectangular shaft	C	1.72×0.95-1.29	reed	1	M	35-45	Pottery single-handled cup B III, pottery single-handled jar A IV, pottery double-handled cup, wooden plate II, wooden nail, bone button, bone spinning wheel, bottom of wooden bucket	III	1 head of s/g (sheep) buried together
IIM123	115°	Vertical rectangular shaft	C	1.25×0.74-0.9	Wooden bed	1	F	>55 (50)	Pottery single-handled jar B; pottery single-handled cup C II, A IV	III	/
IIM124	112°	Vertical rectangular shaft	C	1.16×0.67-0.67	Reed mat	2	F unidentified	35-45 6-7	Pottery bucket-shaped cup; pottery single-handled cup C II, C III; wooden spinning wheel II	III	2 heads of s/g buried together
IIM125	75°	Vertical rectangular shaft	C	1.4×0.84-1	Straw mat	1	M	10-13	Complex bow II, comb made of horn, wooden supporting plank III, leather belt, stringed beads, wooden stick 2, woolen string	III	/
IIM126	75°	Vertical rectangular shaft	C	1.2×0.75-0.92	reed	1	unidentified	12-16	Complex bow II, pottery single-handled jar A IV	III	1 head of s/g buried together
IIM127	150°	Vertical rectangular shaft	C	1.65×0.84-1.32	Wooden bed	1	M	30±	Wooden check piece II, pottery shallow bowl, check piece made of horn II 2, pottery single-handled cup C III, wooden comb B III, pottery single-handled pot III, pottery single-handled jar A III, wooden nail 5, wooden fire spindle, bone button, leather armor	III	1 head of s/g buried together
IIM128	123°	Vertical rectangular shaft	C	1.4×0.72-1.2	Wooden bed	1	M	30-40	Wooden comb B III; wooden cup; pottery single-handled cup A IV, C II; bone awl; wooden spool; wooden stick	III	/
IIM129	152°	Vertical rectangular shaft	C	1.53×0.92-1.2	/	1	unidentified	unidentified	Pottery single-handled jar A IV, pottery single-handled cup C III	III	1 head of s/g buried together
IIM130	150°	Vertical rectangular shaft	C	1.42×0.8-1.02	Wooden bed	1	unidentified	unidentified	Wooden plate II	III	/
IIM131	102°	Vertical rectangular shaft	C	1.23×0.77-1.03	Straw mat	2	M F	25-30 18-22	Wooden spinning wheel II 2, pottery plate with circular foot, pottery jar, wooden stirrer, wooden comb A II	III	1 head of s/g buried together
IIM132	108°	Vertical rectangular shaft	C	1.53×0.8-1.19	Straw mat	1	F	35-40	Wooden plate I; wooden spinning wheel II; wooden arrow III; wooden supporting plank III; pottery single-handled cup C II, C III; wooden comb B II; wooden stick	III	1 head of s/g buried together
IIM133	105°	Vertical rectangular shaft	C	1.61×0.8-1.1	Straw mat	1	M	>50	/	III	/
IIM134	110°	Vertical rectangular shaft	C	1.32×0.71-0.81	/	2	F M	40-50 45-55	Awl made of horn, pottery bowl, pottery single-handled cup C II 2, bottom of wooden bucket	III	S/g head pieces buried together
IIM135	110°	Vertical rectangular shaft	C	1.31×0.66-1.09	Reed mat	2	M F	25-30 25-35	Pottery single-handled cup B III, C II; wooden spinning wheel I; pottery shallow bowl; pottery bowl; leather box; wooden plate II; wooden nail 3; wooden supporting plank III	III	/
IIM136	105°	Vertical rectangular shaft	C	1.35×0.81-0.93	/	1	F	55-65	Wooden bucket III, wooden spinning wheel II, wooden whip shaft, wooden comb B III, wooden supporting plank III, wooden arrow shaft, wooden nail	III	1 head of s/g buried together
IIM137	120°	Vertical rectangular shaft	C	1.31×0.6- (0.9-1.01)	Straw mat	1	M	12-13	Wooden arrow II, complex bow I, wooden spinning wheel IV, wooden shallow bowl	III	1 head of s/g buried together
IIM138	295°	Vertical rectangular shaft	C	1.85×1.04-1.27	Wooden bed	1	M	35-45	Wooden plate II, wooden supporting plank III, wooden fire spindle 2, wooden whip, leather bridle (with check piece made of horn II), wooden item, wooden arrow (arrowhead II) 5, gag made of horn I, stone mortar, pottery single-handled cup A III, wooden button 5, wooden polisher, stone pestle 2, stone grinder, wooden check piece III 2, wooden file, leather saddle	III	/
IIM139	130°	Vertical rectangular shaft	C	1.38×0.81-0.79	Wooden bed	1	M	35-40	Wooden arrow II 2, complex bow I, check piece made of horn II 2, wooden whip shaft	III	/
IIM140	120°	Vertical rectangular shaft	C	1.32× (0.8~0.85) -1.12	Reed mat	2	M F	35-45 35-45	Complex bow II, pottery single-handled cup A III, wooden comb A II, wooden plate I 2, wooden spinning wheel III, wooden arrow II 13, wooden supporting plank III, wooden spool, wooden bucket III	III	/
IIM141	122°	Vertical rectangular shaft	C	1.15× (0.52~0.57) -0.6	reed	2	F M	20-30 Adult	Wooden comb A II, fragment of dustpan	III	/
IIM142	285°	Vertical rectangular shaft	C	1.42×0.67-1.11	/	3	M F M	30-35 18-25 Adult	Wooden plate III, pottery single-handled cup A IV, wooden spinning wheel II, wooden supporting plank III, bronze knife IV	III	/
IIM143	96°	Vertical rectangular shaft	C	1.46×(0.7-0.82) -1.12	/	2	M F	45-55 20-25	Pottery bowl, wooden fire spindle 2, wooden arrow II, wooden supporting plank III, wooden bow II	III	/
IIM144	90°	Vertical rectangular shaft	C	1.31×0.91-0.8	Straw mat	2	M F	30-40 Adult	Seashell, pottery shallow bowl, pottery single-handled pot II, wooden nail 2, bead ornament, pottery ring-foot plate	III	/
IIM145	100°	Vertical rectangular shaft	C	1.02×0.6-0.7	/	3	M unidentified F	35-45 7-8 45±	Pottery cup with spout, pottery shallow bowl, wooden bow II	III	/
IIM146	110°	Vertical rectangular shaft	C	1.56×0.81-1.4	/	1	F	18-25	Pottery shallow bowl, pottery single-handled cup C III, wooden nail 8, wooden whipstick	III	1 head of s/g buried together
IIM147	112°	Vertical rectangular shaft	C	1.27×0.61-0.95	Reed mat & felt pieces	3	M F F	18-22 50-60 40-50	Wooden bucket III; pottery single-handled jar A III; pottery bowl; pottery single-handled cup A IV, C III 2; wooden spinning wheel I; pottery shallow bowl; wooden shallow bowl II; whetstone	III	/
IIM148	90°	Vertical rectangular shaft	C	1.28×0.73-1.31	Straw mat	2	unidentified F	Unidentified Adult	Pottery single-handled cup C III, wooden comb B III, wooden spinning wheel II, bronze knife IV	III	/
IIM149	120°	Vertical rectangular shaft	C	1.11× (0.52~0.64) -1.14	Reed mat	1	M	18-24	Wooden shallow bowl II, wooden spinning wheel I, pottery shallow bowl, pottery single-handled cup C III, pottery jar, bone awl	III	1 head of s/g buried together
IIM150	140°	Vertical rectangular shaft	C	1.55×0.91-1.31	/	2	F M	35-45 35±	Pottery single-handled cup A IV, pottery single-handled jar A III, wooden comb B II, pottery shallow bowl, wooden supporting plank III, wooden plate II	III	1 head of s/g buried together
IIM151	120°	Vertical rectangular shaft	C	(1.41~1.6)× 0.91-0.87	Reed mat	1	F	20-25	Wooden plate II, wooden arrow II, wooden spinning wheel II, wooden nail, wooden supporting plank III	III	1 head of s/g buried together
IIM152	125°	Vertical rectangular shaft	C	2.3× (1.68~1.84) -1.9	Reed stalks	2	M M	11~14 (?) 45-55	Pottery bowl, pottery single-handled cup A IV 2, pottery double-handled cup, wooden supporting plank III, wooden arrow II, wooden gag I, stone mortar, wooden button 3, wooden nail 3, wooden knife sheath, wooden shuttle, ankle bone of s/g 3, wooden check piece IV 2, long trousers, woolen textile 2, woolen woven belt 4	III	1 head of s/g buried together
IIM153	116°	Vertical rectangular shaft	C	1.7×0.91-0.95	Reed stalks	1	F	>55	Pottery single-handled jar A IV, pottery plate with circular foot III	III	1 head of s/g buried together
IIM154	105°	Vertical rectangular shaft	C	1.61×1.2-1.33	/	4	F (upper layer) F (lower layer) F (lower layer) M (lower layer)	35-40 Adult 14-16 Adult	Stringed beads, pottery bowl, pottery plate with circular foot III, pottery single-handled pot III 2, wooden spinning wheel II, wooden plate II 2, pottery single-handled jar A IV, pottery single-handled cup A IV, pottery cup with spout	III	/
IIM155	125°	Vertical rectangular shaft	C	1.5×0.87-0.82	/	1	F	13±	Pottery single-handled jar A IV, pottery bowl	III	/
IIM156	318°	Vertical rectangular shaft	C	1.89× (0.88~1.03) -1.17	Wooden bed	1	F	45-55	Pottery single-handled jar A IV 2; pottery single-handled cup C II, C III 2; wooden bucket III	III	1 head of s/g buried together

IIM157	92°	Vertical rectangular shaft	C	1.71×1.08-1.38	/	2	M F	30-40 Adult	whetstone, pottery jar, stone ware, wooden nail 3, wooden comb B III, wooden plate II, complex bow II, leather boot II 2, button made of tooth, leather sleeve, woolen skirt, woolen textile	III	/
IIM158	115°	Vertical rectangular shaft	C	1.72×0.89-1.04	/	1	M	25-35	Wooden arrow II 14, pottery single-handled jar A IV, wooden plate II, iron knife I, complex bow II, wooden supporting plank III, leather boot II, leather sleeve	III	1 head of s/g buried together
IIM159	105°	Oval vertical shaft	A	1.72×1.03-1.09	Reed mat	2	F unidentified	35-45 6±	Pottery single-handled cup A III 3, C III; wooden shallow bowl III, wooden plate II 2, wooden spinning wheel II, wooden arrow 2, bay-leaf-shaped wooden item, bone niddle, leather bag	III	1 head of s/g buried together
IIM160	110°	Vertical rectangular shaft	C	1.31×0.7-0.81	/	1	F	16±	Pottery ring-foot plate III, pottery single-handled cup A IV	III	/
IIM161	110°	Vertical rectangular shaft	C	1.21×0.83-0.86	/	2	unidentified unidentified	7-8 7-9	Wooden bucket III; pottery jar, wooden spinning wheel II; leather boot II 2, III	III	1 head of s/g buried together
IIM162	92°	Vertical rectangular shaft	C	1.52× (0.88~1.08) -1.09	/ (reed stalks)	2	F M	45-55 45-55	Pottery single-handled cup C III, wooden shallow bowl III, wooden stirrer, pottery shallow bowl, wooden nail, bone button	III	1 head of s/g buried together
IIM163	130°	Vertical rectangular shaft	C	1.43×1.01-1.04	reed	2	M F	25± 40-45	Clay figurine, wooden plate II, pottery single-handled jar A IV, leather bridle, leather bow and arrow bag III, pottery shallow bowl, wooden comb B III, leather strap, leather bag, leather sleeve, woolen skirt sewed up by woven belts, woolen textile, stone pestle, long trousers	III	/
IIM164	110°	Vertical rectangular shaft	C	1.5×0.84-1.01	/ (reed stalks)	1	M	30-40	Complex bow II, leather bow and arrow bag III, wooden arrow shaft II 2, wooden plate II, pottery single-handled jar A IV, wooden nail 5, leather bag, middle part of wooden bow	III	Spine and head of s/g buried together
IIM165	90°	Vertical rectangular shaft	C	1.5×1.13-0.92	/	2	M F	>50 40-50	Complex bow I, wooden arrow II 3, wooden nail, bone awl, leather bow and arrow bag II	III	1 head of s/g buried together
IIM166	110°	Vertical rectangular shaft	C	1.29×0.71-0.92	/	2	unidentified M	11-12 25-30	Wooden plate II 2; pottery single-handled cup A IV, C II; pottery single-handled pot II; pottery plate; wooden boomerang	III	/
IIM167	97°	Vertical rectangular shaft	C	1.45×0.9-1.02	/	1	F	45-45 (45-55)	Pottery single-handled cup C III, pottery shallow bowl, pottery bowl, wooden bucket III	III	/
IIM168	120°	Vertical rectangular shaft	C	1.82×0.97-1.62	/	1	M	20-30	Wooden bucket III, pottery single-handled jar A IV 2, wooden nail 2, wooden supporting plank III, wooden plate II, stone ball, stone grinder	III	1 head of s/g buried together
IIM169	120°	Vertical rectangular shaft	C	1.31× (0.73~0.81) -1.13	Clay adobe, reed, wooden bed	3	F (upper layer) M (lower layer) unidentified (lower layer)	20-30 25-30 Under age	Wooden shallow bowl III, whetstone, wooden supporting plank III, fire making kit I, grape vine, wooden bucket II, pottery single-handled cup C II, wooden hook, wooden spinning wheel II, wooden comb A II, leather boot III 2, leather arm protector III	III	2 heads of s/g buried together
IIM170	125°	Vertical rectangular shaft	C	1.42×0.72-1.02	Wooden bed	1	M	Youth	Wooden comb B III, leather box, wooden nail 2, bone awl	III	/
IIM171	120°	Vertical rectangular shaft	C	0.92×0.51-0.69	Straw mat	1	unidentified	Under age	Wooden plate II	III	1 head of s/g buried together
IIM172	102°	Vertical rectangular shaft	C	1.34×0.82-0.82	/	3	M (upper layer) F (lower layer) unidentified (lower layer)	30-40 30-35 11±	Pottery basin III; pottery single-handled jar A III, A IV, B; pottery single-handled cup A IV 2, C III; wooden cup, bone awl	III	/
IIM173	115°	Vertical rectangular shaft	C	1.6×0.85-1.31	Reed mat	2	M F	20-30 30-40	Wooden plate II; bottom of wooden bucket; pottery single-handled cup C III; pottery single-handled jar A IV, B 2; wooden arrow shaft; wooden comb B II; dustpan	III	/
IIM174	97°	Vertical rectangular shaft	C	1.4×0.8-1.01	/	Unidentified	unidentified	Unidentified	/	III	/
IIM175	120°	Vertical rectangular shaft	C	1.36×0.83-0.9	/	1	M	45-50	/	III	/
IIM176	80°	Vertical rectangular shaft	C	2.02×1.22-1.2	/	1	unidentified	5-6	Wooden plate II, pottery single-handled pot III	III	/
IIM177	90°	Vertical rectangular shaft	C	1.3×0.76-1.4	Reed mat	1	M	16-20	Wooden shallow bowl II	III	/
IIM178	116°	Vertical rectangular shaft	C	1.58×0.84-1.17	Wooden bed	1	F	Adult	Wooden plate II 2, unidentified type; pottery single-handled cup A IV, B III; wooden bucket III	III	Head, limb bone and scapula of s/g buried together
IIM179	100°	Vertical rectangular shaft	C	1.41×0.8-0.78	/	1	M	35±	Pottery single-handled jar A IV, wooden nail, leather boot II 2, fragment of dustpan, leather belt	III	/
IIM180	110°	Vertical rectangular shaft	C	1.5×0.78-1.06	/	1	M	25-35	whetstone, wooden boomerang	III	/
IIM181	112°	Vertical rectangular shaft	C	1.66×1.05-1.06	/	1	M	35-40	Wooden arrow II, leather bow and arrow bag III	III	jawbone of s/g buried together
IIM182	120°	Vertical rectangular shaft	C	1.65×0.84-0.83	/	2	F M	25-35 30-40	Pottery bowl, pottery single-handled jar A III, pottery single-handled cup C III, wooden plate II, wooden arrow II	III	/
IIM183	105°	Vertical rectangular shaft	C	1.7×1-1.1	Wooden bed	1	M	>50	Wooden plate II, complex bow II, wooden supporting plank III, pottery single-handled cup A III	III	/
IIM184	130°	Vertical rectangular shaft	C	0.56×0.2-0.13	/	1	unidentified	Under age	Pottery single-handled cup A III	III	/
IIM185	127°	Vertical rectangular shaft	C	1.85×0.96-1.1	/	1	M	30-35	Wooden bucket III, bone awl	III	/
IIM186	95°	Vertical rectangular shaft	C	1.43×0.94-1.27	/	1	F	35-40	Complex bow II, wooden arrow III 2, leather bag, whetstone, wooden awl 4, wooden supporting plank III, stone hammer, stone grinder 2, stone pestle 2	III	/
IIM187	85°	Vertical rectangular shaft	C	1.62×1-0.72	/	1	F	25±	Bone awl, wooden comb B I, bone niddle	III	/
IIM188	100°	Vertical rectangular shaft	C	1.5×0.91-1.17	/	1	F	40±	Pottery single-handled cup C III, leather box, wooden spinning wheel II, check piece made of horn II, wooden comb B II, bottom of wooden bucket, wooden spool	III	/
IIM189	78°	Vertical rectangular shaft	C	1.71×0.99-1.37	/	1	M	25-30	Pottery bowl, pottery shallow bowl, complex bow II, wooden arrow II, wooden supporting plank III	III	/
IIM190	70°	Vertical rectangular shaft	C	1.71×0.8-1.1	Straw mat	1	M	20-25	Pottery single-handled jar A IV, pottery single-handled pot III, complex bow II, wooden square ruler, wooden arrow II 10, wooden boomerang	III	/
IIM191	100°	Vertical rectangular shaft	C	1.51×0.8-1.15	/	1	F	Adult	Pottery single-handled jar A IV, pottery single-handled cup B III, wooden spinning wheel III	III	1 head of s/g buried together
IIM192	85°	Vertical rectangular shaft	C	1.51×0.93-1.1	/	1	F	28±	Pottery single-handled jar A IV 2, wooden plate II, wooden plate with four feet	III	/
IIM193	105°	Vertical rectangular shaft	C	1.6×0.87-1	/	1	F	30±	Pottery single-handled jar A IV	III	/
IIM194	80°	Vertical rectangular shaft	C	0.87×0.49-0.41	/	1	unidentified	12±	Pottery single-handled jar A IV, wooden ladle, pottery Fu (cooking vessel) III	III	/
IIM195	260°	Vertical rectangular shaft	C	1.51×1-1.07	/	1	F	15-18	Pottery double-stringed jar 2, pottery shallow bowl, pottery single-handled pot III, pottery Fu (cooking vessel) III, golden earring, bronze bell, bronze slice 2, stone hammer, stone grinder	III	/
IIM196	128°	Vertical rectangular shaft	C	1.7×1.13-1.31	/	1	F	Adult	Pottery single-handled jar A III, pottery double-stringed jar, pottery plate with circular foot, pottery Fu (cooking vessel) III	III	/
IIM197	118°	Vertical rectangular shaft	C	1.17×0.7-0.7	/	1	F	Youth	Pottery bowl, pottery single-handled jar A IV	III	/

IIM198	110°	Vertical rectangular shaft	C	2.02×1.51-1.26	/	/	/	/	Pottery Fu (cooking vessel) III, pottery shallow bowl, wooden spinning wheel II	III	/
IIM199	95°	Vertical rectangular shaft	C	1.6×0.96-1.37	/	1	F	20-25	Pottery single-handed jar A IV, pottery double-stringed jar, wooden spinning wheel II, wooden plate II, Pottery Fu (cooking vessel) III, bottom of wooden bucket	III	1 head of s/g buried together
IIM200	85°	Vertical rectangular shaft	C	1.46×0.81-1.21	/	1	F	35-40	Wooden four-feet plate, pottery single-handed jar A IV, pottery single-handed cup A IV, wooden spinning wheel II	III	1 head of s/g buried together
IIM201	92°	Vertical rectangular shaft	C	1.5×(0.8~0.91)-1	/	2	F	30-40	Pottery single-handed jar (damaged), pottery single-handed cup A 2, pottery shallow bowl	III	Jawbone and limb bone of s/g buried together
							F	25-30			
IIM202	102°	Vertical rectangular shaft	C	1.61×(0.9~1.03)-1.21	/	1	M	50±	Pottery Fu (cooking vessel) IV, pottery single-handed jar A IV 2, pottery double-stringed jar, wooden plate, stone pestle	III	/(spine bone of s/g kept in the wooden plate)
IIM203	109°	Vertical rectangular shaft	C	1.52×0.8-1.4	/	4	M	40-45	Pottery Fu (cooking vessel) IV; wooden plate II; pottery single-handed cup A III, A IV; pottery single-handed pot III	III	/
							M	30-35			
							F	20-30			
							F	30-40			
IIM204	91°	Vertical rectangular shaft	C	2.01×1.21-1.5	Wooden bed	1	F	40±	Wooden bucket III, wooden plate II, pottery single-handed cup A IV, leather waist belt	III	jawbone of s/g buried together
IIM205	114°	Vertical rectangular shaft	C	1.68×1.12-0.7	/(straw)	4	F (upper layer)	adult	Pottery single-handed cup A IV 2, wooden spinning wheel II, pottery Fu (cooking vessel) IV, pottery shallow bowl, pottery tube-shaped cup, pottery basin III, fragment of pottery ware, handle of wooden ware, iron awl, stone pestle, wooden walking stick, woolen woven belt 5, wooden drilling bit, pottery bowl, leather pillow 2, leather bridle, woolen string, leather saddle, woolen textile, felt	III	/
							M (lower layer)	20-30			
							F (lower layer)	35-40			
							unidentified (lower layer)	Under age			
IIM206	108°	Vertical rectangular shaft	C	1.72×1.17-1.18	/	1	F	35-40	Pottery Fu (cooking vessel), pottery basin III	III	/
IIM207	94°	Vertical rectangular shaft	C	1.9×1.2-1.3	/	1	F	20-25	Pottery jar, pottery single-handed cup C III, pottery single-handed jar B, clay adobe	III	1 head of s/g buried together
IIM208	105°	Vertical rectangular shaft	C	1.52×1-1.1	/	1	F	Adult	Pottery single-handed jar A IV, pottery shallow bowl	III	/
IIM209	99°	Vertical rectangular shaft	C	1.82×(0.85~1)-1.09	/	1	M?	40-50	Pottery single-handed jar A IV, pottery single-handed cup C III, wooden spinning wheel II, bead ornament	III	/
IIM210	117°	Vertical rectangular shaft	C	1.77×1.02-1	/	1	M	25-35	Pottery single-handed jar A III, wooden boomerang, ceramic-tipped blowpipe, whetstone, crucible	III	/
IIM211	110°	Vertical rectangular shaft	C	1.6×0.89-(1.28~1.32)	hay	2	F	17-25	Wooden plate III 2, pottery bowl 2, comb made of horn, pottery bucket-shaped cup, pottery ladle, pottery single-handed jar B, pottery single-handed cup A IV, wooden spool, wooden structure piece, wooden stamp, wooden spinning wheel II, leather pouch, wooden shallow bowl II, pottery spinning wheel, fragment of pottery ware, wooden stick, leather painting, woolen textile, woolen skirt sewed up by woven belts	III	1 head of s/g buried together
							F	45-55			
IIM212	120°	Vertical rectangular shaft	C	1.65×1-0.82	Wooden bed, reed mat	/	/	/	Wooden arrow II, III 13; bronze button 2; pottery single-handed cup A IV; wooden polisher; gag made of horn; wooden check piece IV 2	III	Horse pit attached; buried with entire horse
IIM213	295°	Vertical rectangular shaft	C	0.79×0.52-0.5	/	unidentified	unidentified	Under age	/	III	/
IIM214	117°	Vertical rectangular shaft	C	1.91×1.28-1.08	/	1	F	Adult	Pottery single-handed cup C III, pottery shallow bowl	III	/
IIM215	110°	Vertical rectangular shaft	C	1.25×0.75-0.76	/	1	M	30-40	Wooden arrow III, button made of carbon, wooden comb A II	III	Head, spine bone and jawbone of s/g buried together
IIM216	120°	Vertical rectangular shaft with side chamber; wall surrounded; horse pit attached	D	Shaft: 1.67×1.09-1.34 Chamber: 1.56×0.38-0.42	/	1	F	18-22	Niddle and thread	IV	Horse pit attached in the north; buried with entire horse
IIM217	113°	Vertical rectangular shaft	C	1.34×0.82-0.81	/	1	F	Adult	Bronze niddle, wooden spool, fragment of pottery ware 2	III	/
IIM218	100°	Vertical rectangular shaft	C	1.34×0.75-0.77	/	2	F (upper layer)	Adult	Pottery double-handed jar, pottery spinning wheel, pottery single-handed jar A IV, leather box, food (pancake), pottery plate with circular foot III, wooden nail	III	/
							F (upper layer)	Adult			
IIM219	92°	Vertical rectangular shaft	C	1.33×0.91-0.69	/	2	M	35-45	Pottery single-handed cup A IV 2, C III; pottery single-handed jar A IV; wooden spinning wheel III; comb made of horn; wooden plate I; wooden arrow II; bottom of wooden bucket	III	/
							M	12-14			
IIM220	103°	Vertical rectangular shaft	C	1.76×1.15-1.24	/	1	F	Middle age	Pottery shallow bowl, pottery single-handed jar A IV	III	head and limb bone of s/g buried together
IIM221	125°	Vertical rectangular shaft	C	1.8×0.9-1.09	/	1	M	40-50	Pottery single-handed cup A IV, pottery single-handed jar A IV, wooden item, wooden arrow 6, complex bow II, bottom of wooden bucket	III	/
IIM222	124°	Vertical rectangular shaft	C	(1.47~1.64)×0.9-1.22	/	1	F	35-45	Pottery single-handed jar A IV, pottery single-handed cup C III, wooden comb B III, pottery shallow bowl, ox horn cup	III	1 head of s/g buried together
IIM223	120°	Vertical rectangular shaft	C	1.64×0.9-1.1	/	1	M	40-50	Wooden plate II, pottery single-handed jar A IV, button made of horn, wooden arrow 5, wooden supporting plank III 2, wooden stirrer, wooden fire spindle, complex bow II	III	/

Tomb No.	Tomb Orientation	Tomb Structure	Tomb Type	Dimension of Tomb Passage L×W-D (m)	Dimension of Tomb Chamber L×W-D (H) (m)	Tomb Furnishings	No. of buried people	Gender	Year of Age	Burial Objects	Cultural Period	Remarks
IIIM1	93°	vertical shaft with side chamber	D	2.2×1-1.61	2.22×(0.45~1.07)-0.62	/	2	M	18~22	Iron gag, bone check piece III 2, stone bead ornament 40, wooden arrow (arrowhead III), wooden single-handled jar, wooden plate II, leather button 2, complex bow II, wooden supporting plank III, bronze button 2, bone button II, leather belt, woolen hair cover, woolen woven belt	IV	Entire horse buried together
								F	14~18			
IIIM2	75°	vertical shaft with side chamber	D	2.2×1-1.9	2.2×0.69-0.52	/	3	M	25~30	Wooden supporting plank III, wooden ruler, pottery single-handled cup A V 3, pottery basin IV 2, pottery bowl 3, pottery shallow bowl, iron gag, wooden box, iron button, wooden headdress	IV	/
								F	mature			
								M	adult			
IIIM3	95°	vertical rectangular shaft	C	/	2.4×1.34-2.02	Wooden bed	5	M	adult	Pottery Fu (cooking vessel) V, wooden plate III, complex bow II, wooden button 2, pottery single-handled jar A V, wooden walking stick, pottery shallow bowl, wooden supporting plank III, wooden arrow III, wooden stick, leather belt, woolen cloth (textile), stone grinder 2	IV	/
								M	adult			
								M	adult			
								F	adult			
								F	adult			
IIIM4	113°	vertical rectangular shaft	C	/	1.51×0.69-0.89	Reed mat, felt	2	F	adult	Stone pestle 2, leather boot II 2, leather sleeve, wooden plaque ornament, stone grinder, wooden item	IV	/
								M	adult			
IIIM5	85°	vertical shaft with side chamber	D	2.21×0.81-1.92	2.41×0.94-0.6	Wooden bed	3	M	45~55	Pottery bowl, pottery double-stringed jar, stone pestle, complex bow II, wooden headdress	IV	/
								unidentified	2~3			
								F	adult			
IIIM6	90°	vertical shaft with side chamber	D	1.78×1-1.9	1.8×0.61-0.48	/	1	M	adult	Pottery bowl, complex bow II	IV	Horse bone buried together
IIIM7	110°	vertical shaft with side chamber	D	1.81×0.79-1.8	1.87×1.12-0.52	/	2	F	adult	Wooden stick 2, woolen hair cover, leather pouch made of s/g tripe, wooden wheel-shaped ware, bronze slice, wooden plaque ornament, skirt sewed up by woolen woven belts	IV	/
								unidentified	unidentified			
IIIM8	270°	vertical rectangular shaft	C	/	1.7×0.5-0.7	/	1	M	40±	Pottery three-feet basin, pottery bucket-shaped cup, pottery single-handled cup A V	IV	/
IIIM9	88°	vertical shaft with side chamber	D	1.7×0.6-1.4	1.81×0.77-0.5	/	2	M	45~55	Pottery single-handled cup A V, unidentified type; pottery single-handled jar A V; pottery bowl 2; wooden comb B IV; wooden headdress 2; pottery plate	IV	/
								unidentified	10~12			
IIIM10	47°	vertical shaft with side chamber	D	2.33×1.08-1.41	2.33×0.46-0.5	/	2	M	20~25	Pottery shallow bowl 2, complex bow II, leather sleeve 2, wooden plate II, wooden fire plank III	IV	s/g head, horse head, scapula and limb bone buried together
								M	25~30			
IIIM11	47°	vertical shaft with side chamber	D	2.06×1-1.61	1.8×0.68-0.59	/	2	M	20~25	Iron hook, wooden button 2, pottery single-handled jar B, stone grinder, wooden stick, wooden structure item, stone pestle 2, woolen string	IV	/
								M	25~30			
IIIM12	50°	vertical rectangular shaft	C	/	2×0.85-1.14	/	1	M	adult	Golden earring; pottery single-handled cup A V, A; wooden fire spindle; stone grinder	IV	1 head of s/g buried together
IIIM13	45°	vertical shaft with side chamber	D	2.35×0.89-1.21	2.35×0.79-0.4	/	1	M	20~30	Wooden plate I, II; pottery shallow bowl; pottery bucket-shaped cup; wooden arrow 3; leather bag; wooden supporting plank III	IV	/
IIIM14	312°	vertical shaft with side chamber	D	2.32×0.69-0.87	2.53×0.93-0.43	/	2	M	30~40	Pottery basin IV, pottery single-handled cup A V 2, wooden fire board III, bone tube, complex bow II, wooden knife sheath, wooden button	IV	/
								unidentified	6~7			
IIIM15	48°	vertical shaft with side chamber	D	2×0.48-0.7	2.04×(0.2-0.53)-0.46	/	1	M	18~22	Wooden plate II, pottery single-handled cup A V 3, pottery single-handled jar IV, complex bow II, hair plait, wooden arrow 2, wooden headdress	IV	/
IIIM16	48°	vertical shaft with side chamber	D	1.8×0.59-1.37	1.83×1.03-0.5	/	3	M	40±	Wooden plate I, pottery single-handled cup A V 3, pottery bowl 2, complex bow II, wooden supporting plank III	IV	/
								F	30±			
								unidentified	unidentified			
IIIM17	33°	vertical shaft with side chamber	D	2.1×0.81-1.02	2.12×0.94-0.38	/	2	M	adult	Pottery Fu (cooking vessel) V, wooden arrow, whetstone, iron knife II, leather bow and arrow bag III, wooden check piece IV, wooden stirrer, wooden fire plank III	IV	/
								F	adult			
IIIM18	26°	vertical shaft with side chamber	D	1.76×0.56-0.99	1.83×1.38-0.52	/	3	M	45±	Wooden plate II, pottery shallow bowl, pottery single-handled cup A V 2, leather bow and arrow bag III 2, wooden arrow III, complex bow II, wooden fire plank III, stone pestle 2, leather pillow, wooden box, leather knife sheath, woolen cloth bag, turquoise ornament, wooden headdress, leather boot III, stone grinder, golden ornament, woolen woven belt, jacket 2, long skirt	IV	/
								F	35±			
								F	12~15			
IIIM19	27°	vertical rectangular shaft	C	/	1.65×0.84-0.79	/	2	unidentified	under-age	Pottery shallow bowl, pottery bowl	IV	/
								F	adult			
IIIM20	45°	vertical shaft with side chamber	D	1.8×0.8-0.81	1.83×1.05-0.4	/	1	M	adult	Wooden plate II, pottery single-handled cup A V, fragment of wooden bucket IV, wooden supporting plank III, complex bow II	IV	/
IIIM21	45°	vertical shaft with side chamber	D	1.9×0.62-1.21	1.96×(0.62~0.85)-0.4	/	7	M	adult	Pottery single-handled cup A V 2, iron arrowhead, bone button, button made of horn, complex bow II 2, pottery bowl, pottery jar, pottery bucket-shaped cup, wooden shallow bowl III, pottery shallow bowl, pottery single-handled jar B, leather pillow, woolen woven belt, wooden supporting plank III, wooden headdress, woolen textile	IV	/
								M	adult			
								unidentified	2~3			
								M	adult			
								F	adult			
								F	adult			
IIIM22	45°	vertical shaft with side chamber	D	1.8×0.54-1.47	1.85×0.94-0.6	/	1	M	>35	Wooden plate II, pottery single-handled cup A V, pottery shallow bowl, wooden supporting plank III, complex bow II, wooden hook, part of wooden headdress	IV	/
IIIM23	45°	vertical shaft with side chamber	D	2.14×1.01-1.81	2.2×0.9-0.63	/	2	M	adult	Wooden plate II, pottery shallow bowl, pottery bowl, stone grinder, wooden stick, leather arm protector III, leather bag, leather pouch, leather knife sheath	IV	head of s/g buried together
								unidentified	unidentified			
IIIM24	44°		D	1.9×0.6-0.92	2.07×0.82-0.47	/	3	M	>55		IV	

		vertical shaft with side chamber						M	>35	Pottery single-handed cup A IV, A V 2; pottery bowl 2; pottery shallow bowl V; pottery jar; pottery crucible 2; wooden plate II; stone pestle 2		/
								M	>55			
IIIM25	42°	vertical shaft with side chamber	D	2.3×1.3-1.61	2.41×1.5-0.55	/	3	F	30~35	Pottery basin IV, pottery single-handed cup A V, pottery bowl 2, ox horn cup, leather bow and arrow bag III, wooden button, wooden headdress B III, wooden Dou (food container), stone grinder, wooden supporting plank III, wooden walking stick, pottery jar, complex bow II, woolen cloth	IV	/
								M	25~35			
								M	40~50			
IIIM26	45°	vertical shaft with side chamber	D	2.5×0.91-1.8	2.53×1.26-0.3	/	4	F	35~45	Pottery single-handed cup A V 3, pottery jar, pottery shallow bowl, wooden box, wooden bucket IV, wooden headdress	IV	/
								M	35~45			
								M	50~60			
								M	30~40			
IIIM27	48°	vertical shaft with side chamber	D	2.5×1-1.63	2.5×1.1-0.45	/	2	M	45~50	Pottery single-handed cup A V 3, leather bag, stone spinning wheel, wooden comb B IV, ox horn cup, stone grinder, wooden headdress	IV	/
								F	35~45			
IIIM28	90°	vertical shaft with side chamber	D	1.85×0.7-0.81	1.85×0.65-0.36	/	2	M	14~16	Pottery single-handed cup A V	IV	/
								unidentified	unidentified			
IIIM29	46°	vertical shaft with side chamber	D	1.8×0.58-0.86	1.8×0.6-0.25	/	1	F	35±	Pottery jar, wooden eared cup, pottery bowl, wooden comb A III, gilt bronze earring, ox horn cup, woolen cloth, wooden headdress	IV	/
IIIM30	85°	vertical shaft with side chamber	D	2.2×0.7-1.41	2.2×1-0.45	/	2	M	35~45	Pottery single-handed cup A V 3, pottery jar with spout, pottery single-handed jar A, pottery shallow bowl, wooden plate II, pottery bowl, complex bow II, wooden stick, wooden awl, wooden supporting plank III, wooden ware 3, wooden spinning wheel II, leather bow string, leather bag, leather sleeve, wooden arrow	IV	/
								F	35~45			
IIIM31	97°	vertical shaft with side chamber	D	1.7×0.7-1.19	1.81×0.85-0.52	/	2	M	adult	Pottery shallow bowl, pottery single-handed cup A V, wooden stick, fragment of pottery ware	IV	/
								F	adult			
IIIM32	87°	vertical shaft with side chamber	D	2×0.7-0.6	2×0.7-0.28	/	1	M	30~40	Pottery single-handed cup A V, pottery three-feet basin, wooden plate II, comb made of horn, wooden cup	IV	/
IIIM33	60°	vertical shaft with side chamber	D	1.89×0.81-1.8	1.89×0.76-0.55	Wooden bed	5	M	30~40	Pottery bucket-shaped cup, leather belt 3, complex bow II, leather pouch, stone pestle 2, stone grinder 2	IV	/
								F	20~25			
								F	18~22			
								M	30~35			
								M	45~50			
IIIM34	97°	vertical rectangular shaft	C	/	2.01×0.7-0.7	/	2	F	adult	Wooden plate II; wooden headdress; headdress 2; pottery shallow bowl; wooden walking stick; leather boot II, III	IV	/
								M	22~30			
IIIM35	115°	vertical shaft with side chamber	D	1.71×0.6-1.24	1.71×0.9-0.35	/	2	M	adult	Wooden plate III, fragment of pottery ware, complex bow II, wooden arrow, pottery shallow bowl 2, iron hook, wooden button 2, wooden fire board III	IV	1 head of s/g buried together
								F	adult			
IIIM36	103°	vertical shaft with side chamber	D	1.38×0.7-1.28	1.38×0.61-0.4	/	4	M	30~40	Pottery Fu (cooking vessel) V, pottery bowl, leather belt with bone buckle, pottery shallow bowl, pottery single-handed cup A V 4, bucket-shaped cup, woolen cloth bag, woolen woven belt, stone pestle, bone comb, leather boot II 2, woolen textile 2	IV	/
								M	35~45			
								M	45~55			
								F	adult			
IIIM37	103°	vertical shaft with side chamber	D	2.1×1-1.5	2.1×1.5-0.5	/	3	M	30±	Wooden plate with circular foot, wooden ware, bone spinning wheel, wooden comb B II, wooden nail 4, leather boot III 2, stone grinder, stone hammer, headdress, pottery bucket-shaped cup, woolen textile, fragment of long dress	IV	/
								M	35~45			
								M	45~55			
IIIM38	95°	vertical rectangular shaft	C	/	1.82×0.67-1	/	2	unidentified	5±	Pottery single-handed cup A III, bucket-shaped cup 2, pottery single-handed jar B, leather boot II 2	IV	/
								F	25~35			
IIIM39	80°	vertical shaft with side chamber	D	2.1×0.69-1.2	2.1×0.73-0.46	/	1	M	15~17	Wooden spoon; pottery single-handed cup A V, unidentified type; pottery single-handed pot IV; pottery shallow bowl; wooden plate II; complex bow II; leather pouch; iron knife II; wooden supporting plank III	IV	/
IIIM40	115°	vertical shaft with side chamber	D	3.3×2.3-1.9	3.3×1.25-0.6	/	1	M	adult	Ox horn cup, leather belt, leather saddle, wooden arrow shaft, complex bow II, fragment of pottery ware 2, stone hammer, horn of sheep 2	IV	/
IIIM41	90°	vertical shaft with side chamber	D	2×0.95-1.6	2×0.67-0.52	/	2	M	40~50	Pottery bucket-shaped cup, pottery single-handed cup A V, fragment of pottery jar, stone ball, internal part of wooden headdress, wooden button, external part of wooden headdress, fragment of pottery ware	IV	/
								F	35~45			
IIIM42	75°	vertical shaft with side chamber	D	2×0.8-1.5	2×1.11-0.3	/	2	M	>55	Pottery bowl, stone spinning wheel, wooden dart, wooden walking stick	IV	/
								F	50~65			
IIIM43	94°	vertical rectangular shaft	C	/	1.89×0.6-0.6	/	3	M	35~45	Pottery jar 2, pottery double-handed cup, stone grinder, bone button 2, wooden arrow shaft 2, bead ornament 2	IV	/
								M	adult			
								F	adult			
IIIM44	80°	vertical rectangular shaft	C	/	2.11×1-0.39	/	3	M	adult	Pottery bucket-shaped cup D, wooden plate II, wooden shallow bowl III, middle part of wooden bow, slice of ox horn, wooden button, bone buckle, bone top cover of two ends of bow	IV	/
								F	adult			
								F	adult			
IIIM45	97°	vertical rectangular shaft	C	/	2.3×1.18-1.2	/	unidentified	unidentified	unidentified	Pottery shallow bowl V	IV	/
IIIM46	92°	vertical shaft with side chamber	D	2.1×0.6-0.99	2.1×0.9-0.4	/	2	M	adult	Pottery shallow bowl, pottery basin IV, pottery single-handed cup A V, pottery bucket-shaped cup	IV	/
								F	adult			
IIIM47	100°	vertical shaft with side chamber	D	2.2×1.21-1.2	2.26×1-0.5	/	2	M	adult	Wooden plate III, pottery jar with spout, pottery shallow bowl 2, pottery jar, pottery Dou (food container) IV, pottery single-handed cup A V, wooden walking stick, pottery basin IV	IV	/

		Vertical shaft with side chamber						F	adult	(wood container) IV, pottery single-handled cup A V, wooden walking stick, pottery basin IV, whetstone, wooden comb A II, leather bag, leather pillow 2		
IIIM48	85°	Vertical shaft with side chamber	D	2.4×0.91-1.59	2.4×1.46-0.5	/	1	M	adult	Wooden ware 2, harp (damaged) III, complex bow II, pottery shallow bowl	IV	Horse bones buried together
IIIM49	94°	Vertical shaft with side chamber	D	1.59×0.7-1.19	1.72×0.6-0.47	/	3	M	adult	Pottery bowl, wooden plate III	IV	/
								M	adult			
								F	adult			
IIIM50	90°	Vertical rectangular shaft	C	/	1.92×0.97-0.83	/	6	unidentified	unidentified	Pottery bucket-shaped cup, wooden walking stick, bottom of pottery jar, iron button, wooden fire board I, bottom of wooden bucket, seashell	IV	/
								unidentified	unidentified			
								unidentified	unidentified			
								unidentified	unidentified			
								unidentified	unidentified			
IIIM51	275°	Vertical shaft with side chamber	D	2.26×0.81-2	2.45×1.41-0.45	/	unidentified	unidentified	unidentified	Wooden ware, wooden headdress, wooden button, complex bow II	IV	/
IIIM52	274°	Vertical rectangular shaft	C	/	2.15×0.93-0.9	/	unidentified	unidentified	unidentified	/	IV	/
IIIM53	270°	Vertical rectangular shaft	C	/	1.76×0.92-1.2	/	2	M	adult	Pottery single-handled cup A V, pottery single-handled jar A IV, iron knife II, golden ornament	IV	/
								F	adult			
IIIM54	280°	Vertical shaft with side chamber	D	1.8×0.8-0.56	2×0.7-0.43	/	1	M	adult	/	IV	/
IIIM55	260°	Vertical shaft with side chamber	D	2.12×0.86-0.3	2.28×0.91-0.43	/	1	M	adult	Bottom of pottery jar	IV	/
IIIM56	283°	Vertical rectangular shaft	C	/	1.78×0.64-1.5	/	1	M	25~35	/	IV	/
IIIM57	270°	Vertical rectangular shaft	C	/	1.91×(0.4-0.8) -0.36	/	1	M	adult	Pottery single-handled cup A V 2, iron loop	IV	/
IIIM58	283°	Vertical rectangular shaft	C	/	2.16×0.81-0.86	/	3	M	35~45	Pottery jar with spout, pottery single-handled cup A V, pottery shallow bowl 2, pottery bowl, iron knife II, pottery ring-foot plate III	IV	/
								F	30~45			
								unidentified	10~14			
IIIM59	296°	Vertical rectangular shaft	C	/	1.92×1.2-0.46	/	1	M	adult	Pottery single-handled cup A V 3, pottery shallow bowl, iron crucible, wooden supporting plank III, wooden plate II, wooden walking stick	IV	/
IIIM60	310°	Vertical rectangular shaft	C	/	1.91×0.96-0.81	/	2	unidentified	under-age	Pottery single-handled cup A V, bottom of pottery ware 2, wooden headdress, pottery Fu (cooking vessel) V	IV	/
								F	30~35			
IIIM61	95°	Vertical rectangular shaft	C	/	2.02×1.09-0.59	/	1	M	adult	Pottery single-handled cup A V, pottery bowl, wooden fire board III, pottery Fu (cooking vessel) IV, pottery jar	IV	head of horse and limb bone of s/g buried together
IIIM63	287°	Vertical rectangular shaft	C	/	2.3×0.94-0.68	/	1	F	adult	Pottery single-handled cup A V, pottery jar, pottery shallow bowl 3	IV	/
IIIM64	278°	Vertical rectangular shaft	C	/	(1.63- 1.83) ×1.08-0.55	/	3	F	adult	Pottery bowl, pottery single-handled jar A V, pottery single-handled cup, whetstone, wooden supporting plank III, wooden arrow shaft 6, wooden plate II, wooden button, bronze eardrop, wooden fire board III 2, fire making kit 1, wooden nail, golden ornament, wooden plaque	IV	3 heads of s/g, 1 head of horse and 1 head of ox buried together
								F	adult			
								M	adult			
IIIM65	280°	Vertical rectangular shaft	C	/	1.61×0.8-1.34	/	unidentified	unidentified	unidentified	Wooden spinning wheel IV	IV	/
IIIM66	294°	Vertical rectangular shaft with secondary platform	B	/	1.66×0.8-1.7	/	unidentified	unidentified	unidentified	/	II	Secondary platform around four sides, W: 0.2m, D: 0.8m.
IIIM67	80°	Vertical shaft with side chamber	D	1.9×0.71-0.8	1.9×0.67-0.35	/	2	F	14~16	Pottery shallow bowl 3, pottery cup, pottery jar with spout, wooden headdress	IV	/
								unidentified	2±			
IIIM68	48°	Vertical shaft with side chamber	D	2.51×0.9-1	2.5×1-0.5	/	2	M	50~60	Complex bow II, pottery single-handled cup A V 2, wooden nail, golden ornament	IV	1 head of s/g and 1 jaw bone of horse buried together
								F	adult			
IIIM69	46°	Horse pit	/	/	1.35-0.42	/	/	/	/	/	IV	2 entire horses buried
IIIM70	52°	Horse pit	/	/	1.18-0.26	/	/	/	/	/	IV	1 entire horse buried
IIIM71	52°	Vertical shaft with side chamber	D	1.61×0.45-0.67	1.61×0.5-0.28	/	2	M	12~13	Wooden plate III, pottery bucket-shaped cup 2, wooden walking stick, bone buckle, iron button 2, wooden comb B IV, wooden stick	IV	/
								M	45~55			
IIIM72	45°	Vertical shaft with side chamber	D	1.94×0.9-0.61	1.94×0.73-0.42	/	4	F	adult	Pottery jar with spout, pottery bucket-shaped cup, pottery single-handled cup A V 2, wooden plate III, wooden shallow bowl III 2	IV	/
								F	adult			
								F	adult			
								M	adult			
IIIM73	47°	Vertical shaft with side chamber	D	2.5×1.3-1	2.5×0.9-0.5	/	2	M	20~30	Wooden plate II, III; pottery shallow bowl; complex bow II; wooden arrow; ox horn cup; wooden headdress; wooden awl; bone awl; pottery bucket-shaped cup	IV	/
								M	45~50			
IIIM74	45°	Vertical shaft with side chamber	D	2.55×1.27-0.91	2.56×0.85-0.42	/	2	M	>50	Wooden plate II, pottery plate, pottery shallow bowl 3, pottery crucible, wooden arrow shaft, wooden figure, , check piece made of horn III 2, leather belt, buckle of leather belt	IV	/
								M	40~45			
IIIM75	43°	Vertical rectangular shaft	C	/	1.51×0.66-0.2	/	1	M?	adult	Pottery bowl 3, stone spinning wheel, wooden arrow II 10	IV	/
IIIM76	40°	Vertical shaft with double side chambers	D	1.92×1.26-1.95	1.93×0.92-0.8 1.95×0.7-0.76	/	2	M	45±	Pottery jar 3, pottery bowl 2, wooden plate III, straw basket, stone spinning wheel, iron knife II, iron awl 2, wooden comb A III, leather belt, wooden plaque, long skirt, cotton hat, skirt sewed up by pieces	IV	/
								F	40±			
IIIM77	46°	Vertical shaft with side chamber	D	2.4×0.9-1.06	2.4×0.8-0.45	/	2	M	40~45	Ox horn cup, pottery jar, pottery shallow bowl, felt hat	IV	/
								F	15~20			
IIIM78	50°	Vertical rectangular shaft	C	/	2.2×0.8-0.7	/	1	M	50~60	Stone grinder 3, complex bow II, pottery bowl, bead ornament 3	IV	/
IIIM79	100°	Vertical shaft with side chamber	D	2.7×0.9-2.31	2.7×0.9-0.48	/	2	M	25~35	Pottery bucket-shaped cup 2, wooden headdress 2, wooden hairpin, wooden box, wooden plate II 2, wooden arrow shaft 2, middle part of wooden bow, pottery shallow bowl, wooden spool	IV	/
								F	35~45			

III M80	92°	Vertical shaft with side chamber	D	2.9×1.19-1.75	2.9×0.9-0.45	/	1	M	17-22	Wooden headdress, leather pouch, wooden nail 5, wooden box, complex bow II, wooden ware 3	IV	1 entire horse buried together
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L=length; W=width; D=depth; s/g=sheep/goat

Table 9 Yanghai 2006 Season

Tomb No.	Tomb No.	Tomb Orientation	Tomb Structure	Tomb type	Dimension of Tomb Chamber L×W×D (m)	Tomb Furnishings	No. of buried people	Gender	Year of Age	Burial Objects	Cultural Period	Remarks
061 M1	061 M1	110°	vertical rectangular shaft	/	1.22 × (0.72-0.92) - 0.48	reed mat	1	/	/	wooden comb	/	/
061 M2	061 M2	280°	vertical rectangular shaft	/	1.34 × 0.78 - 0.5	reed mat	1	M	/	pottery shallow bowl	/	/
061 M3	061 M3	261°	vertical rectangular shaft	/	1.74 × 0.68 - 0.54		1	M	/	woolen textile, shoe sole, wooden shallow bowl	/	burial on left side with bent limbs
061 M4	061 M4	80°	vertical rectangular shaft with two side chambers, with grave mound	/	2.8 × (1.14-1.42)(upper)/2.6×(0.8-1.08)(lower) - 1.94	reed mat	2	F(south) & M(north)	/	written document 2, paper shoes with silk surface 2, wooden comb, wooden plank with words, paper hat, woolen skirt	/	supine with extended limbs
061 M5	061 M5	139°	vertical rectangular shaft	/	(1.42-1.32) × (0.86-0.78) - 0.88		1	M	/	pottery single-handled Jar, pottery single-handled Cup,	/	/
061 M6	061 M6	91°	vertical rectangular shaft	/	(1.5-1.54) × (1-0.9) - 1.18	reed mat	1	M	/	pottery shallow bowl, wooden spoon, leather bag, pottery single-handled Cup, wooden awl	/	/
061 M7	061 M7	105°	vertical rectangular shaft	/	(1.51-1.28) × (0.94-0.88) - 0.62	reed mat	1	M	/	pottery single-handled Jar, pottery shallow bowl	/	/
061 M8	061 M8	115°	vertical rectangular shaft	/	(1.26-1.2) × (0.68-0.7) - 0.98		1		/	pottery single-handled Cup, wooden comb	/	/

Table 11. Yanghai Tomb & Grave Goods Typology and Time Period

Type	Tomb Type	Pottery Single-handled Jar			Pottery Single-handled Cup			Pottery Single-handled Jug	Pottery Basin	Pottery Fu	Pottery Ring-foot Plate (Dish)	Wooden Bucket	Wooden Plate	Wooden Shallow Bowl	Wooden Spinning Wheel	Wooden Fire-making Plank	Wooden Comb	Harp	Knife		Gag Bit	Check Piece		Complex Bow	Wooden Supporting Plank	Leather Arrow Bag	Leather Sleeve	Leather Boot	Time Period	
		A	A (upright handle)	B (side handle)	C (vertical handle)	Bronze	Iron												Wooden	Horn										
1	A (IM21)	I (IM18: 2)	I (IM18: 4)						I (IM15: 1)	I (IM66: 1)										I (IM21: 4)										Middle Bronze Age 13-11th century BC
2	B (IM90)	C (IM32)	II (IM5: 10)	II (IM148: 16)	I (IM56: 1)	I (IM136: 4)	I (IM20: 5)	II (IM62: 7)	II (IM54: 2)	I (IM169: 2)	II (IM23: 4)	I (IM188: 1)	II (IM60: 4)	I (IM80: 3)	I (IM11: 19)	II (IM133: 6)	I (IM90: 12)		II (IM5: 6)		I (IM29: 2)	I (IM208: 5)								Late Bronze Age 10th-8th century BC
3		C (IM14)	III (IM84: 1)	III (IM106: 12)	II (IM186: 5)	II (IM201: 1)	II (IM195: 1)	III (IM187: 5)	III (IM194: 3)	II (IM13: 1)	II (IM57: 1)	II (IM18: 3)	II (IM149: 1)	II (IM198: 3)	II (IM192: 1)	II (IM55: 1)	III (IM63: 1)		III (IM195: 6)		II Bronze Gag Bit (IM14: 2)	III (IM2: 4)								first half of Early Iron Age 7th-5th century BC
4		C (IM10)	IV (IM197: 2)	IV (IM100: 2)	III (IM178: 3)	III (IM23: 1)	III (IM25: 4)	III (IM172: 1)	IV (IM202: 1)	III (IM154: 3)	III (IM73: 4)	III (IM43: 7)	III (IM162: 2)	III (IM121: 2)	II (IM2: 5)	III (IM97: 1)			IV (IM31: 2)	I (IM63: 3)	III Bronze Gag Bit (IM18: 10)	IV (IM121: 6)	III (IM14: 3)	II (IM186: 1)	III (IM69: 3)	III (IM144: 2)	III (IM109: 11 right)	II (IM179: 3 left)	second half of Early Iron Age 5th-3rd century BC	
5		D (IM39)	C (IM8)	V (IM69: 2)	V (IM2: 13)		IV (IM39: 3)	IV (IM2: 4)	V (IM45: 1)	IV (IM47: 5)	IV (IM26: 3)	III (IM49: 2)	III (IM2: 10)	IV (IM65: 1)	III (IM17: 8)	III (IM76: 9)				Iron Gag Bit (IM1: 1)		III (IM74: 9-1)	III (IM18: 6)	II (IM16: 8)	III (IM17: 5)	III (IM23: 6)	III (IM18: 17)	Han Dynasty 2nd century BC-2nd century AD		

Table 10 Yanghai tomb type

With Two Layers	With Beam	Shaft	With One Layer	With Two Layers		With Three Layers	With Four Layers	With Beam													
M21	M33	M18	M3	M6	M91	M133	M5	M176	M1	M40	M71	M109	M141	M185	M206						
M153	M67	M19	M51	M8	M94	M138	M12	M213	M2	M41	M72	M110	M144	M186	M207						
M171	M143	M22	M52	M10	M95		M100		M4	M42	M73	M111	M148	M187	M208						
M175	M146	M43	M53	M11	M96		M113		M7	M44	M74	M112	M151	M188	M211						
M178	M149	M66	M80	M16	M97		M118		M9	M45	M75	M114	M155	M189							
	M150	M78	M98	M20	M103		M142		M13	M46	M77	M115	M158	M191							
	M152	M122	M99	M23	M129		M160		M14	M49	M81	M116	M159	M192							
	M154	M145	M107	M24	M130		M163		M15	M54	M82	M117	M162	M193							
	M156	M174	M108	M25	M131				M17	M55	M83	M119	M164	M194							
	M177	M212	M124	M26	M137				M27	M56	M85	M120	M165	M195							
	M179	M214	M135	M30	M139				M28	M57	M87	M121	M166	M196							
	M209		M147	M47	M157				M29	M58	M88	M123	M167	M197							
	M215			M48	M161				M31	M59	M89	M125	M168	M198							
				M50	M180				M32	M60	M92	M126	M169	M199							
				M61	M181				M34	M63	M93	M127	M170	M200							
				M62	M216				M35	M64	M101	M128	M172	M201							
				M76	M217				M36	M65	M102	M132	M173	M202							
				M84	M218				M37	M68	M104	M134	M182	M203							
				M86					M38	M69	M105	M136	M183	M204							
				M90					M39	M70	M106	M140	M184	M205							
5	13	12	12	39		2	8	2	125												
30				63																	
218																					
Section Nr. II tomb type																					
Type A (Oval vertical shaft tomb)	Type B (Rectangular shaft tomb with two layers)	Type C (Rectangular Shaft tomb)																			
		Shaft tomb with horse pit	Shaft tomb																		
M50	M102	M212	M1	M16	M31	M51	M65	M80	M95	M111	M126	M141	M156	M171	M186	M201	M218				
M79			M2	M17	M32	M52	M66	M81	M96	M112	M127	M142	M157	M172	M187	M202	M219				
M83			M3	M18	M33	M53	M67	M82	M97	M113	M128	M143	M158	M173	M188	M203	M220				
M88			M4	M19	M34	M54	M68	M84	M98	M114	M129	M144	M160	M174	M189	M204	M221				
M159			M5	M20	M35	M55	M69	M85	M99	M115	M130	M145	M161	M175	M190	M205	M222				
			M6	M21	M36	M56	M70	M86	M100	M116	M131	M146	M162	M176	M191	M206	M223				
			M7	M22	M37	M57	M71	M87	M101	M117	M132	M147	M163	M177	M192	M207					
			M8	M23	M38	M58	M72	M89	M103	M118	M133	M148	M164	M178	M193	M208					
			M9	M24	M39	M59	M73	M90	M104	M119	M134	M149	M165	M179	M194	M209					
			M10	M25	M40	M60	M74	M91	M105	M120	M135	M150	M166	M180	M195	M210					
			M11	M26	M41	M61	M75	M92	M106	M121	M136	M151	M167	M181	M196	M211					
			M12	M27	M42	M62	M76	M93	M107	M122	M137	M152	M168	M182	M197	M213					
			M13	M28	M43	M63	M77	M94	M108	M123	M138	M153	M169	M183	M198	M214					
			M14	M29	M45	M64	M78		M109	M124	M139	M154	M170	M184	M199	M215					
			M15	M30	M46				M110	M125	M140	M155		M185	M200	M217					
5	1	1	211																		
223																					
Section Nr. III tomb type																					
Type B (Rectangular Shaft tomb with two layers)	Type C (Rectangular Shaft tomb)			Type D (Vertical Tomb with a side chamber)						Horse Pit											
With four layers																					
M66	M3	M45	M61	M1	M14	M24	M33	M47	M72	M69											
	M4	M50	M62	M2	M15	M25	M35	M48	M73	M70											
	M8	M52	M63	M5	M16	M26	M36	M49	M74												
	M12	M53	M64	M6	M17	M27	M37	M51	M76												

	M19	M56	M65	M7	M18	M28	M39	M54	M77										
	M34	M57	M75	M9	M20	M29	M40	M55	M79										
	M38	M58	M78	M10	M21	M30	M41	M67	M80										
	M43	M59		M11	M22	M31	M42	M68											
	M44	M60		M13	M23	M32	M46	M71											
1		25				52				2									
80																			

L=length; W=width; D=depth; s/g =sheep/goat

Table 12 Subeixi 1980 Season

Tomb No.	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (m)	No.of buried people	Gender	Burial Objects	Disturbance
80SASM1	282	vertical rectangular shaft with side chamber	Tomb Chamber: 3.5×1.5-1 Tomb Passage: 3.4×1.5-2.53	1 (chamber)	F (chamber)	Pottery Jar II, Pottery Shallow Bowl III, Bronze headdress in animal head shape (4x), Silver Ring, Bronze Ornament in flower shape (2x), Bone Ring (3x), Bronze Ornament in tooth shape, Bone Plaque (6x), Iron Piece, Bone Plank	No
80SASM2	285	vertical rectangular shaft with side chamber	Tomb Chamber: 2.6×1.15-0.85 Tomb Passage: 2.38×1.10-2.54	3 (passage) 3 (chamber)	2 unknow adult, 1 infant (passage) 1 F, 1 M, 1 Child (chamber)	Pottery Jar II, Pottery Jar III (2x), Pottery Shallow Bowl II, Pottery Jar IV, Iron Hair Pin	No
80SASM3	205	vertical rectangular shaft with side chamber	Tomb Chamber: 2.4×1.01-0.8 Tomb Passage: 1.95×1.3-2.34	2 (passage) 3 (chamber)	1 infant in jar, 1 unknow (passage) 1 F, 1 M, 1 child (chamber)	Pottery Cup II, Pottery Shallow Bowl III (2x), Wooden Belt Button, Wooden Box, Wooden Plank, Wooden Object piece (2x), Wooden Couch, Iron Knife, Clam Ornament, Agate	No
80SASM4	280	vertical rectangular shaft with side chamber	Tomb Chamber: 2.2×1.2-0.92 Tomb Passage: 1.8×0.9-2.7	1 (passage) 2 (chamber)	1 infant (passage) 1 F, 1 M (chamber)	Pottery Jar I (2x), Pottery Jar II, Pottery Cup I, Pottery Bowl III, Pottery Bowl II (2x), Pottery Basin, Wooden Couch	No
80SASM5	285	vertical rectangular shaft with side chamber	Tomb Chamber: 2.2×1.6-0.56 Tomb Passage: 2.2×0.88-2.16	1 (passage) 2 (chamber)	1 child (passage) 1 F, 1 M (chamber)	Pottery Jar I, Pottery Jar II, Pottery Bowl II (2x), Pottery Jar IV	Yes
80SASM6	290	vertical rectangular shaft with side chamber	Tomb Chamber: 2×0.84-0.71 Tomb Passage: 1.8×0.86-2	2 (chamber) 3 (chamber)	1 F, 1 M (chamber)	Pottery Jar I, Pottery Shallow Bowl III, Pottery Jar IV, Wooden Bowl (2x), Small Wooden Box, Wooden Object Piece (2x)	Yes
80SASM7	285	vertical rectangular shaft	1.86×1.1-2.2	3	1 F, 1 M, 1 Child	Pottery Jar I, Pottery Shallow Bowl I, Pottery Jar IV, Wooden Basin (3x), Wooden Object Piece (2x), Bone Point Tool, Woolen Felt, Woolen Textile (6x), Leather pouch (4x), Goat/sheep skin blanket of wooden couch, Woolen Woven Belt (2x)	Yes
80SASM8	295	vertical rectangular shaft	2.4×1.04-2.5	2	1 F, 1 M	Pottery Jar II, Pottery Bowl II, Pottery Bowl I (2x), Pottery Jug, Pottery Painted Jug, Pottery Painted Bowl, Wooden Basin, Wooden Comb, Wooden Couch, Hair net	No
Collection						Pottery Painted Jar (1x), Pottery Jug (1x), Pottery Jar (2x)	

Table 13 Subeixi 1985 Season

Goods No.	Type	Description	Data
85SASM: 1	Pottery Painted Shallow Bowl	flat lip, curved belly, one ring handle on the rim, flat base; red coating on the outer surface, with irregular triangle pattern;	the rim diameter is 15.8cm, belly diameter is 16.2cm, height is 16.2cm, and the thickness is 0.4cm.
85SASM: 2	Pottery Jar (Weng)	flat closed lip, curved belly, two ring handles on the belly, flat base; the surface was blackened by smoke	the rim diameter is 28cm, belly diameter is 42cm, height is 43cm, the base diameter is 14.5cm, and the thickness is 0.8cm
85SASM: 3	Pottery Jar (Gang)	flat lip, slightly curved belly, flat base, two ring handles on the belly; the surface was blackened by smoke	the rim diameter is 24cm, belly diameter is 30cm, height is 42cm, base diameter is 15cm, and the thickness is 0.8cm
85SASM: 4	Pottery Jar IV	flat slightly open lip, high neck, curved belly, one arc handle starts from the lip until the central belly, round base	the rim diameter is 7.4cm, belly diameter is 9cm, and the height is 9.2cm
85SASM: 5	Pottery Jar I	flat point lip with spout, high neck, curved belly, one ring handled on the belly, flat base	the rim diameter is 13cm, spout rim diameter is 18cm, the spout width is 5.5cm, belly diameter is 17.5cm, height is 21cm, and the thickness is 0.5cm.
85SASM: 6	Pottery Jar II	flat open lip, high neck, curved belly, one ring handled on the belly, round base	the rim diameter is 10.8cm, belly diameter is 12.5cm, and the height is 16.2cm
85SASM: 7	Pottery Jar III	flat point lip, high neck, curved belly, one broken handled on the belly, round base	the rim diameter is 7.4cm, neck diameter is 5.7cm, belly diameter is 8.1cm, and the height is 12cm
85SASM: 8	Pottery Cup I	flat slightly open lip, short neck, curved belly, one ring handled on the belly, round base	the rim diameter is 8.4cm, belly diameter is 10.5cm, and the height is 8.4cm
85SASM: 9	Pottery Cup II	flat point lip, high neck, curved belly, one ring handled on the belly, round base	the rim diameter is 6.2cm, belly diameter is 8.8cm, and the height is 7.1cm
85SASM: 10	Pottery Cup III	flat slightly open lip, slightly curved belly, one ring handled on the belly, round base	the rim diameter is 6.5cm, belly diameter is 7.6cm, and the height is 7.5cm
85SASM: 12	Pottery Cup IV	flat closed lip, one ring handled on the lip, flat base	the rim diameter is 5cm, height is 5.2cm, and the base diameter is 5.5cm
85SASM: 13	Pottery Shallow Bowl VI	flat open lip, flat base, two small handles on the rim	the rim diameter is 12.5cm, height is 6.2cm, base diameter is 10cm, and the thickness is 0.4cm
85SASM: 14	Pottery Bowl I	flat open lip, flat base, two small handles on the rim	the rim diameter is 11.5cm, height is 7.8cm, base diameter is 7cm, and the thickness is 0.4cm
85SASM: 15	Pottery Spoon	flat open lip, flat base, one broken handle	the rim diameter is 10cm, height is 4.4cm, and the base diameter is 6.4cm
85SASM: 16	Pottery Plate	flat point lip, round base	the rim diameter is 18cm, and the height is 4.5cm
85SASM: 17	Pottery Shallow Bowl II	flat open point lip, round base	the rim diameter is 14cm, and the height is 5.5cm
85SASM: 18	Pottery Shallow Bowl I	flat open lip, round base	the rim diameter is 14.4cm, and the height is 5.5cm
85SASM: 21	Pottery Shallow Bowl V	flat lip, curved belly, flat base	the rim diameter is 10cm, belly diameter is 10.5cm, base diameter is 5.4cm, and the height is 5.8cm
85SASM: 22	Pottery Bowl III	flat open lip, round base	the rim diameter is 10cm, height is 7.3cm, and the thickness is 0.4cm
85SASM: 23	Pottery Shallow Bowl III	flat slightly open lip, curved belly, round base	the rim diameter is 5.6cm, belly diameter is 9.4cm, and the height is 5.6cm
85SASM: 24	Pottery Bowl II	flat open lip, flat base	the rim diameter is 9.6cm, height is 8.2cm, base diameter is 8cm, and the thickness is 0.4cm
85SASM: 25	Pottery Shallow Bowl IV	flat closed lip, curved belly, round base	the rim diameter is 11.2cm, belly diameter is 11.8cm, and the height is 4.8cm
85SASM: 27	Wooden Basin	flat lip, round base; there is one small hole on the belly, with one leather belt through	the length is 25.5cm, width is 15cm, height is 6.5cm, the thickness is 0.3-3cm; the hole diameter is 0.8cm, and the length of the belt is 7cm
85SASM: 30	Wooden Cup	flat point lip, curved belly, one ring handle on the belly, flat base; polished; the rim has been wear down, could be used as spoon	the rim diameter is 10cm, belly diameter is 12.2cm, height is 8.6cm, and the thickness is 0.2-1.2cm
85SASM: 31	Leather Tool	spoon shape	the length is 11cm, width is 3.4cm, and the height is 13.5cm
85SASM: 32	Wooden Bow	broken	the remained length is 65cm
85SASM: 33	Wooden Arrow	the arrow head is broken	the remained length is 69.6cm
85SASM: 34	Wooden Arrow	round shaft, groove on the end; three-flanged arrow head with conoid socket and lanceolate blades	the shaft diameter is 0.8cm, and the length is 74.5cm; the arrow head length is 7cm
85SASM: 36	Bone Plaque	two holes on each end respectively	the length is 8cm, width is 2.7cm, and the hole diameter is 1.4cm
85SASM: 37	Bovin-bone Comb	one small hole on the central; 7 remained tooth	the height is 5.8cm, length is 2.2cm, and the hole diameter is 0.3cm
85SASM: 38	Bone Ring	made by one rectangular bone piece, with one small hole on the central	the length is 2.3cm, width is 1.7cm, and the thickness is 0.6cm; the hole diameter is 0.9cm
85SASM: 40	Bronze Plaque	rectangular, with one circle of point pattern on the edge, the middle was made a tiger; there is one bridge button on the back; one layer of gold foil on the front side	the length is 4.7cm, width is 3.5cm, and the thickness is 0.2cm
85SASM: 41	Gold Foil	round, one tiger on the central	the diameter is 4.1cm
85SASM: 42	Bronze Dagger	point end with knife on two edge; the handled is in tail shape	the body length is 6cm, handle length is 7.5cm, and the width is 1.4cm
85SASM: 43	Bronze Dagger	broken	the width is 1.7cm
85SASM: 44	Bronze Knife	one knife edge on the end	the body length is 5.55cm, handled length is 6cm, width is 1.05cm; and the thickness is 0.2cm
85SASM: 45	Bronze Knife	one knife edge on the end, slightly broken point edge	the length is 11cm
85SASM: 46	Woolen Blanket	sewed by three woolen textile, the middle part is yellow, the other two are red; the middle part's each sq cm conclude 7 warp and 26 weft, the angle is 17°; two side parts' each sq cm conclude 12 warp and 14 weft, two weft become one real weft, and angle between warp and weft is 35°	the length is 3.05m, width is 1.38m; the width of the middle part is 57cm, the width of two side parts are 46cm and 35cm respectively
85SASM: 47	Woolen Hat	sewed by red felt, and the edge was sewed by thin woolen rope; there is one hollow palce on top; with earflaps on two sides, and one small leather rope under the earflaps	the height is 30cm
85SASM: 48	Woolen Hat	broken	
85SASM: 49	Woolen Belt	each sq cm conclude 30 warp and 8 weft; the warp has yellow, blue, red, pink, and white color; the central is a square net, with two blue stripe above and under respectively, in between is one red & white stripe pattern, and the outter stripe is red.	the length is 21cm, and the width is 5.6cm
85SASM: 50	Woolen Textile	each sq cm conclude 10 warp and 26 weft; one red woolen edge, the other part is green	the length is 26cm, and the width is 24cm
85SASM: 51	Woolen Belt	made by 72 strand of thin woolen rope	the length is 160cm, and the diameter of the rope is 1.5cm
85SASM: 52	Felt Piece	white, the edge was sewed by thin woolen rope	the length is 160cm, width is 88cm, and the thickness is 0.5cm
85SASM: 53	Leather Jacket	broken, the lower part is remained; the wool on the lower edge is dyed into blue	the length is 2.15m
85SASM: 54	Leather Belt	the edge is dyed into blue, could be the belt of the jacket	the length is 180cm, and the width is 4.5-9cm

85SASM: 46	Woolen Blanket	sewed by three woolen textile, the middle part is yellow, the other two are red; the middle part's each sq cm conclude 7 warp and 26 weft, the angle is 17°; two side parts' each sq cm conclude 12 warp and 14 weft, two weft become one real weft, and angle between warp and weft is 35°	the length is 3.05m, width is 1.38m; the width of the middle part is 57cm, the width of two side parts are 46cm and 35cm respectively
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L=length; W=width; D=depth; s/g =sheep/goat

Table 14 Subeixi Nr. 1 Cemetery

Tomb No.	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (m)	No.of buried people	Gender & Age	Burial Objects	Remarks
92SASM9	300	vertical rectangular shaft	1.75×0.9-1.9	2	1 Child 1 F	Pottery Pot (Fu), Pottery Bowl, Pottery Cup, Wooden Ware (2×), Wooden Bowl, Leather Pillow, Millstone, Leather Jacket, Woolen Te×tile, Leather & Felt Boot, Woolen Trousers, Woolen Blanket, Pebble Couch	
92SASM10	300	vertical rectangular shaft with side chamber	Tomb Chamber: 2.1×0.66-1.0 Tomb Passage: 2.16×0.82-1.82	1	1 F	Pottery Pot (Fu) (2×), Pottery Bowl (2×), Pottery Basin, Pottery Jug, Pottery Cup, Wooden Arrowhead, Iron Knife, Leather Arrow Bag, Plaque (2×), Wooden Harness, Wooden Whip Stick (2×), Wooden Pate, Leather Pillow, Leather Jacket, Woolen Te×tile (2×), Woolen Felt Trousers, Leather & Felt Boot (2×), Iron Button, Leather Belt, Blanket (2×)	there are arrow, string in the arrow bag; the harness include gag holder, check piece, leather belt, button, saddle, pouch, etc.
92SASM11	316	vertical rectangular shaft	1.96×1.2-2.18	3	1 Boy (14-16) 1 F 1 M	Pottery Bowl (2×), Pottery Basin (3×), Pottery Two-handed Cup, Pottery Single-handed Jar (2×), Pottery Painted Jug, Pottery Shallow Bowl, Pottery Jug, Wooden Plate (2×), Wooden Spoon, Felt Pouch, Leather Pouch, Leather Sheath (2×), Wooden Comb, Wooden Whip Stick (2×), Wooden Bowl, Iron Awl with wooden handle, Leather Bag, Leather Pillow, Bone Button, Leather Glove, Leather Jacket (2×), Woolen Te×tile (2×), Woolen Trousers, Woolen Dress, Leather Felt Hat (2×), Leather & Felt Boot (2×), Hair Net (2×), Hair Mask, Felt Hat, Leather Face Mask, Woolen Face Mask, Blanket (3×)	s/g Bone & Meat, and Bread were buried together; there are comb, eyebrown stone, square wooden piece and string found in the leather bag
92SASM12	290	vertical rectangular shaft	2.1×0.96-1.96	2	1 M 1 child	Pottery Single-handed Jar (2×), Pottery Cup (2×), Wooden Ware, Wooden Plate, Bronze Earring (2×), Leather Jacket, Woolen Te×tile, Leather & Felt Boot (2×), Woolen Dress, Hair Net (2×), Hair Mask, Felt Hat, Blanket	s/g Bone & Meat were buried together
92SASM13	285	vertical rectangular shaft	2.22×1.06-2.24	2	1 Boy (14-15) 1 M (32-36)	Pottery Single-handed Jar, Pottery Painted Jar, Pottery Shallow Bowl (2×), Wooden Plate, Wooden Cup (Dou), Iron Knife, wooden couch	s/g Bone & Meat were buried together

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 15 Shengjiindian remains

Tomb No.	Tomb Orientation (°)	Tomb Structure	Tomb Type	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Objects	Remarks
M1	302	Rectangular shaft pit	B	225×140-180	Wooden Couch: 180×102-24	5	M (3×) & F (2×)	M: 35, 30, 40; F: 23-25, 24-26	pottery cup (4×), pottery shallow bowl (4×), small pottery cup, small pottery bowl, pottery basin, pottery pot, wooden plate (3×), wooden shallow bowl, wooden sheath, wooden button, wooden item, wooden bow, wooden arrow, leather boots (3×), leather button, iron knife, gravel stone, glass bead (42×)	one infant body found on the upper disturbance soil
M2	302	Rectangular shaft pit with side chamber	C	Tomb Passage: 170×74-110, Chamber: 74×42-38	None	2	M & F	M: 40; F: A	pottery double-handed jar, pottery single-handed cup (2×), wooden bow(2×), wooden plate, wooden prosthesis leg, wooden stick	
M3	323	Oval shaft pit	B	135×76- (113-125)	None	1	M	30	pottery single-handed jar, iron knife, bronze earring, agate bead (10×), stone bead (20×), bone tube, tooth ornament	
M4	308	Oval shaft pit	B	175×108-180	Wooden Couch: 158×70-42	3	M (2×) & F	M: 55, F: 20-22	pottery bowl, pottery cup (3×), wooden bowl (2×), wooden button, wooden spinning stick, wooden pin, leather pouch, stone bead necklace, bronze piece	
M5	335	Rectangular shaft pit	B	300×100-130	None	1	M	25-28	wooden hair ornament, wooden cup, wooden arrow (3×), o× horn	some infant skull pieces found in the filling soil

Tomb No.	Tomb Orientation (°)	Tomb Structure	Tomb Type	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Objects	Remarks
M6	304	Round bottom shaft pit	B	80×44-35	None				pottery double-handled pot	
M7	317	Oval shaft pit with side chamber	C	Tomn Passage: 185×80-138, Chamber: 196×60-40	None	1	M	55	pottery shanllow bowl, pottery jar, pottery pot, leather button, leather belt, leather pouch, leather arrow bag, wooden bow	the side chamber was covered by willow branches
M8	305	Rectangular shaft pit	B	212×86-124	None	3	F (2×); Unknow (1×)	30, 35	pottery cup, pottery bowl, wooden plate, wooden button (2×), wooden comb, leather boots, bronze mirror, iron earring, bone comb, glass bead	grape seed found in the filling soil
M9	328	Rectangular shaft pit with secondary platform	A	190×(100-110)-(188-200)	Wooden Couch	3	M (3×)	14	pottery single-handled cup (2×), wooden plate, leather product, wooden bow, pottery basin	one coffin cover; the secondary platform is 20-25cm wide and 100cm high; some paintings on the body face
M10	305	Rectangular shaft pit	B	227×90-(140-150)	Woolen Felt	3	M (1×), F (1×), Unknown (1×)	Unkown	pottery single-handled cup, pottery double-handled basin, wooden hair ornament (2×), fire-making stick, wooden button, wooden box, golden ornament	one molar found inside the box
M11	302	Rectangular shaft pit	C	Tomb Passage: 215×84-138, Chamber: 220×60	Woolen Felt	3 or 4 (?)	M & F	A	wooden sickle, wooden object (11×), wooden stick (7×), pottery cup, bone comb (2×), wooden button (3×), woode spinning wheel (3×), wooden knife (3×), wooden nail (4×), woode spinning stick, wooden pin, wooden awl (2×), wooden bat (2×), wooden plate, leather sheath, golden earring, string ornament, leather boot	there are 3 human head, and 4 human jaws
M12	33	Oval shaft pit	B	66×36-18	Sheep skin and fur	1	unknow	infant	none	
M13	302	Rectangular shaft pit with secondary platform	A	250×120-214	Wooden Couch	2	M & F	A	pottery shallow bowl (3×), pottery single-handled cup (3×), pottery jar, mud lampe, wooden hair ornament (2×), wooden bow, wodden arrow (3×), wooden cup, wooden plate, woode spinning wheel, wooden nail (4×), wooden object (3×), wooden button (2×), wooden stick (10×), leather arrow bag, leather pouch (4×), leather bag, leather boot, leather belt, leather durum, leather painting, silk pouch (2×), silk belt, iron knife, iron button, bronze mirror, bronze button with golden coat, golden earring, bone box, glass bead	one coffin cover
M14	220	Shaft pit with side chamber	C	Tomb Passage: 215×100-146, Side chamber: 170×54-80	None	7	M (1×), F (3×), Infant (1×), Unkown (2×)	M: 55, F: 14, 45, 55	pottery cup (3×), pottery bowl (2×), pottery single-handled cup (2×), pottery spinning wheel, wooden plate (5×), wooden cup (4×), wooden stick (5×), wooden button, wooden cup, wooden round box, wooden object (8×), wooden spinning wheel, wooden bow, leather pouch, leather button (5×), leather boot (2×), leather cover, leather belt (2×), bow ornament, felt belt, leather box, bronze mirror with wooden handle, silk belt, horn comb (4×)	g/s head and bones found in the chamber
M15	320	Vertical shaft with side chamber	C	Tomb Passage: 243×92, Chamber: 228×94-163	Wooden Couch & Woolen Flet	4	unknow	Unkown		g/s bones
M16	132	Vertical shaft	B	198×82-(100-108)	None	6	M (2×), F (1×), infant (1×), Kid (1×), Unknown (1×)	M: 55, Kid: 7-8; rest unkown	wooden basin, pottery cup, wooden awl	one g/s head in the wooden basin
M17	320	Rectangular shaft pit	B	Tomb Opening: 235×142-75, Tomb bottom: 231×140-150	Woolen Felt	2	M (2×)	Unkown	pottery single-handled cup, pottery shallow bowl, wooden spinning sheel, wooden knife, wooden object, reed branch, arrow carrier lid, wooden stick	g/s tail and bones in the chamber
M18	330	Vertical shaft with side chamber	B	Tomb Opening: 220×114-65, Tomb Passage: 190×90-170	None	3	M (2×), F (1×)	M: 55, F: 35	wooden shallow bowl, wooden cup, wooden knife, wooden button, bow ornament, horn button	
M19	295	Vertical shaft	B	250×92-140	None	2	M (1×), Unkown	A	wooden arrow, wooden plate, bone ornament, hair braid	
M20	190	Vertical shaft with side chamber	C	150×67-(100-116)	None	2	M (1×), F (1×)	10	pottery single-handled cup, wooden bucket, wooden bowl, wooden arrow, wooden bowl (3×), leather boot (2×), leather box, wooden button, golden earring, string bead	g/s bones in the chamber
M22	305	Rectangular shaft pit	B	63×38-20	None	1	infant	< 1	none	
M23	326	Vertical shaft	B	194×82-(120-144)	straw mat	2	F (1×), Kid (1×)	F: 25-27, Kid: 7-8	pottery cup (3×), wooden plate (2×)	
M24	130	Vertical shaft	B	226×155-170	straw mat	2	M (1×), F (1×)	A	pottery cup, pottery spinning wheel, wooden plate, leather pouch (3×), leather sheath, leather button, leather pillow, ox-horn comb	g/s head and bones found in the chamber
M25	130	Rectangular shaft pit	B	274×175-210	reed	3	M (1×), F (1×), Unknown (1×)	A	pottery cup (2×), wooden cup (4×), wooden stick (4×), wooden plate (3×), reed tube, wooden piece, wooden object, button (3×), leather belt, leather sheath, leather pouch, horse tail, bridle, silk belt, leather rope, leather boot	g/s head found in chamber
M26	320	Vertical shaft	B	198×(70-97)-(183-190)	None	5	M (1×), F (2×), Unkown (2×)	A	pottery cup, wooden plate (2×), wooden cup (2×), wooden arrow, leather boot (3×), leather trousers, wooden bow, leather belt, felt coat (2×), silk piece (2×), button, linen trousers, bone comb	g/s head (2×)
M27	112	Vertical shaft with side chamber	C	Tomb Passage: 260×105-160, Chamber: 256×(25-35)	Wooden Couch	2	M (1×), Unkown	Unkown	leather boot and shoelace, fire-making stick, wooden bucket lid, wooden plaque, iron awl	
M28	274	Vertical shaft	B	Tomb Opening: 196×72-148, Bottom width: 88	None	2	F	Unkown	pottery single-handled cup, pottery single-handled cup with peak, pottery bowl, hat ornament (2×), wooden knife, wooden stick, leather cup, leather pillow, bronze pin, stone axe, stone bead (2×)	
M29	338	Vertical shaft	B	245×133-180	Wooden Couch	2	M (1×), F (1×)	Unkown	pottery single-handled cup (4×), pottery single-handled jar (2×), pottery bowl (2×), pottery cup, wooden bucket, wooden bowl, wooden button, wooden stick, arrow bage, wooden box, iron knife (2×), wooden plate (2×), bronze mirror with wooden frame, stone spinning wheel, stone bead, leather pouch (2×), leather pillow (2×), leather belt (2×), leather sheath, woolen belt, bone box, bone comb, stone bead, wooden object	g/s head (2×); some plant seeds remained in the pottery bowl
M30	326	Vertical shaft	B	182×(42-76)-66		1	M	45	pottery single-handled cup (2×), pottery bowl, wooden bowl (3×), iron knife, millstone (2×)	
M31	270	Vertical shaft	B	(240-260)×140-130	Wooden Coffin	1	M	Unkown	pottery single-handled cup (2×), pottery cup, wooden plate, wooden bow, arrowshaft, leather boot	

Table 16 Aiding grave goods

Tomb Nr.	Colored Pottery	Uncolored Pottery	Bronze	Iron	Golden	Stone
80TADM1	Jar (2×)	Bowl				
80TADM2	Jar, Shallow Bowl (2×)					
80TADM3	Jug					
80TADM4					Golden foil in flower shape (2×)	
80TADM5		Bowl				
80TADM6	Jar					
80TADM7		Basin				
80TADM8		Shallow Bowl				
80TADM9		Shallow Bowl				
80TADM10	Jar	Shallow Bowl, Jar (2×), Spoon				
80TADM11	Jug, Jar (2×)					
80TADM12		Shallow Bowl, Jar				
80TADM13						Spinning Wheel
80TADM14		Jar				
80TADM15		Cup				
80TADM16		Jar				
80TADM17		Cup				
80TADM18			Arrowhead	Button		
80TADM19		Shallow Bowl				
80TADM20	Jar					
80TADM21	Jar					
80TADM22	Jar	Jar (2×), Basin				
80TADM23	Jar					
80TADM24		Shallow Bowl				
80TADM25	Jar					
80TADM26		Spinning Wheel				
80TADM27	Jar					
80TADM28	Jar	Jar				
80TADM29	Jar (2×)					
80TADM30		Shallow Bowl				
80TADM31	Cup	Jar				
80TADM32	Jar	Jar (2×)				
80TADM33	Jar (3×)					
80TADM34		Jar				
80TADM35		Bowl				
80TADM36	Jar (2×)					
80TADM37		Jar (Yu)				
80TADM38	Jar (2×)	Jar				
80TADM39		Jar				
80TADM40	Jar (2×)					
80TADM41		Shallow Bowl				
80TADM42		Jar (Gang)				
80TADM43	Jar, Bowl	Jar				
80TADM44	Jar	Jar				
80TADM45	Jar (2×)	Jar				
80TADM46	Jar with stand (Ding)					
80TADM47	Jug	Bowl				
80TADM48	Shallow Bowl					
80TADM49		Shallow Bowl				
80TADM50		Jar				

Tomb Nr.	Colored Pottery	Uncolored Pottery	Bronze	Iron	Golden	Stone
80TADM0	Jug (2×), Jar (16×), Shallow Bowl (3×), Cup (Dou)	Jug (2×), Jar (17×), Shallow Bowl (7×), Bowl (5×), Basin (2×), Jar (Gang)(2×), Cup (3×)	Button, Hook, Mirror with no patterns, Mirror Pieces, Arrowhead, Ornament (2×)	Knife (3×), Arrowhead (2×)		Knife stone (2×)

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 17 Saensayi remains

Tomb No.	Surface mound	Dimension of surface mound Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Form	Burial Objects	Remarks
M1	round mound	600 × 30	310	vertical rectangular shaft	228 × 72 - 65	/	1	M	Adult	straight supine	bronze arrowhead (6×), one arrowhead (3×), knife head	
M2	round mound	2200 × 80	300	vertical rectangular shaft	300 × 140 - 195	/	1	F	Adult	/	/	
M3	round mound	800 × 50	297	vertical rectangular shaft	232 × 106 - 130	/	1	F	Adult	straight supine	bone arrowhead (8×), bronze arrowhead, s/g head (4×), pottery sherds, wooden pieces	
M4	round mound	450 × 20	307	vertical rectangular shaft	100 × 50 - 70	/	1	Infant	5~6	straight supine	stone bead	
M5	round mound	900 × 40	310	vertical rectangular shaft with side chamber and secondary platform	240 × 100 - 195	/	1	M	Adult	/	s/g bones, iron arrowhead, iron hook, bone object	
M6	round mound	610 × 30	305	vertical rectangular shaft	220 × 91 - 80	/	1	M	Adult	straight supine	faience Jar, s/g bones, hores head, bronze gag bit	
M7	round mound	1050 × 50	272	vertical rectangular shaft with side chambe	260 × 78 - 296	/	1	/	/	/	pottery shallow Bowl, pottery Jug, iron object, cow bone, s/g bones	there are some burning traces on the tomb opening
M8	round mound	780 × 40	307	vertical rectangular shaft	230 × 110 - 80	/	2	M	Adult	secondary burial	stone buckle, bone arrowhead, bone Check Piece, bronze awl, bronze object, pottery Jug,	
M9	round mound	980 × 60	307	oval rectangular shaft	220 × 110 - 70	/	2	F & M	Adult	secondary burial	bronze arrowhead, bronze awl (2×)	
M10	Oval mound	850 × 40	272	oval rectangular shaft	186 × 100 - 55	/	2	/	/	/	pottery Jar	there are some burning traces on the tomb opening
M11	round mound	650 × 60	325	oval rectangular shaft	Dm: 150, D: 140	/	3	F & Infant (2×)	Adut/Infant	Side flex	pottery sherd	
M12	round Cricle	Dm: 350	260	vertical rectangular shaft	170 × 90 - 60	Wooden Bed	1	Infant	/	/	/	
M13	round Cricle	425 × 26	310	vertical rectangular shaft	165 × 72 - 50	/	1	F	Adult	/	s/g head (2×), bronze arrowhead, pottery Jar, bronze arrowhead	
M14	round mound	800 × 30	275	stone chamber	250 × 150 - 140	/	3	F (2×) & M	Adult	secondary burial	horse head, s/g head, bronze dagger, bronze ware, bronze neddle, bone hairpin, bone bead, pottery Jar, bone Check Piece, strap fitting, lithic tool	
M15	round mound	470 × 30	50	vertical rectangular shaft	204 × 96 - 88	/	1	F	Adult	straight flex	s/g head	
M16	round mound	800 × 50	306	vertical rectangular shaft	220 × 100 - 100	/	1	/	Adult	secondary burial	s/g bone, horse bone, lithic tool, pottery sherd	
M17	stone mound circle	1200 × 80	317	vertical rectangular stone shaft	240 × 140 - 180	/	2	M & Infant	Adut/Infant	secondary burial	horse bone, bronze arrowhead, golden ornament, bone ornament (2×), horn object (2×)	there are some burning traces on the tomb opening
M18	round mound	700 × 30	55	vertical rectangular shaft	210 × 98 - 120	/	1	M	Adult	secondary burial	s/g bone, bone ornament, bow ornament	
M19	stone mound circle	1450 × 40	300	vertical rectangular shaft	230 × 190 - 90	/	3	/	/	straight supine	s/g head (2×), horse tooth, bronze arrowhead (2×), bronze awl, bone arrowhead (3×), coal ornament, bead ornament (3×), pottery ware	
M20	stone mound circle	1450 × 60	295	vertical rectangular shaft	240 × 124 - 70	/	2	/	/	secondary burial	s/g head, horse head, bone ornament, shell ornament, faience pottery Cup	
M21	stone mound circle	500 × 30	50	vertical rectangular shaft	145 × 110 - 110	/	1	M	Adult	straight supine	s/g bone, bone arwohead, bronze knife, pottery Jug, bronze object, bronze awl	
M22	stone mound circle	1300 × 70	290	vertical rectangular shaft	326 × 220 - 150	/	8	/	/	straight flex	horse head (4×), s/g head, horse bone, bead (27×), bronze gag bit, bone gag bit, bronze arrowhead (2×), bronze knife, pottery Jar (3×)	
M23	round mound	350 × 40	270	vertical rectangular shaft with side chamber	120 × 100 - 150	/	1	F	Adult	straight supine	s/g bones, bronze earring, iron knife	the entrance of the side chamber was blocked by stones
M24	round mound	600 × 50	230	vertical rectangular shaft with side chamber	215 × 65 - 218	/	1	M	Adult	straight flex	horse bones, pottery Jug (2×), iron knife, golden foil	the entrance of the side chamber was blocked by stones
M25	round mound	700 × 30	260	vertical rectangular shaft	160 × 105 - 120	/	1	/	/	secondary burial	bead ornament	
M26	round mound	600 × 40	/	/	/	/	/	/	/	secondary burial	/	
M27	scattered stone mound	/	35	vertical rectangular shaft	232 × 75 - 200	Wooden Bed	1	F	Adult	straight flex	bow ornament (2×), iron knife, bronze earring (2×), bronze buckle (2×), iron arrowhead, coffin nail (5×), iron cup, bead ornament (4×)	
M28	scattered stone mound	/	335	vertical rectangular shaft	200 × 65 - 60	/	1	M	Adult	straight flex	/	
M29	scattered stone mound	/	295	vertical rectangular shaft	200 × 75 m - 54	/	1	F	Adult	/	pottery Jar	
M30	Broken stone mound	/	305	vertical rectangular shaft	200 × 70 - 70	/	1	/	/	secondary burial	Lithic tool, bone ornament	
M31	stone mound circle	1300 × 50	300	vertical rectangular shaft	226 × 85 - 90	/	1	M	Adult	straight flex	s/g head (3×), horse head, bone arrowhead (6×), bronze knife (2×), bronze awl, bronze gag bit, pottery ware	
M32	stone mound	/	/	vertical rectangular shaft	200 × 160 - 100	/	/	/	/	/	s/g bone	
M33	stone mound circle	1050 × 50	280	vertical rectangular shaft	225 × 140 - 110	/	1	M	Adult	straight flex	s/g head (4×), horse head, bone arrowhead (15×), bronze knife (2×), faience Jar, turquoise bead	
M34	stone mound circle	1200 × 60	275	vertical rectangular shaft	230 × 100 - 110	/	1	M	Adult	straight flex	s/g head, pottery Jar, bronze arrowhead	
M35	round mound	Dm: 700	/	vertical rectangular shaft	180 × 130 - 140	/	1	/	/	secondary burial	horse bone, pottery Jar	
M36	round mound	Dm: 800	/	vertical rectangular shaft	260 × 205 - 140	/	1	/	/	secondary burial	/	
M37	round mound	Dm: 800	/	vertical rectangular shaft	240 × 196 - 200	/	1	M	Adult	/	pottery ware, bronze board	there are four pits on the tomb chamber corner, the pits' depth are 40-50cm
M38	round mound	Dm: 800	125	vertical rectangular shaft	Dm: 200, D: 220	/	1	/	/	secondary burial	lithic tool, bone ornament	there are two pits on northern and southern side, the pits' depth are 40-50cm
M39	round mound	Dm: 800	305	vertical rectangular shaft	240 × 230 - 170	/	/	/	/	/	s/g bone	there are two pits on northern and southern side, the pits' depth are 40-50cm
M40	round mound	360 × 40	/	vertical rectangular shaft	Dm: 38, D: 24	/	1	/	Adult	Cremation	/	
M41	round mound	Dm: 900	305	vertical rectangular shaft	300 × 245 - 190	/	1	F	Adult	/	pottery sherd	there are two pits on northern and southern side, the pits' depth are 40-50cm

Tomb No.	Surface mound	Dimension of surface mound Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Form	Burial Objects	Remarks
M42	round mound	Dm: 800	305	vertical rectangular shaft	210 × 210 - 182	/	1	F	Adult	/	/	there are four pits on the tomb chamber corner, the pits' depth are 40-50cm
M43	round mound	Dm: 900	265	vertical rectangular shaft	240 × 235 - 182	/	1	M	Adult	secondary burial	pottery sherd	there are two pits on northern and southern side, the pits' depth are 40-50cm
M44	round mound	Dm: 700	340	vertical rectangular shaft	140 × 70 - 70	/	/	/	/	/	/	there are four pits on the tomb chamber corner, the pits' depth are 40-50cm
M45	round mound	Dm: 700	100	vertical rectangular shaft	275 × 260 - 232	/	1	F	Adult	straight supine	bronze ornament, pittery Jar	
M46	round mound	850 × 40	280	vertical rectangular shaft	154 × 114 - 110	/	1	M	Adult	secondary burial	/	
M47	round mound	Dm: 800	100	vertical rectangular shaft	290 × 160 - 190	/	1	M	Adult	secondary burial	pottery ware (2×)	there are four pits on the tomb chamber corner, the pits' depth are 40-50cm
M48	stone mound	/	/	/	/	/	/	/	/	/	/	
M49	stone mound circle	1550 × 40	315	vertical rectangular shaft	200 × 156 - 70	/	2	F & M	Adult	secondary burial	jade bead, stone bead (5×), bronze ornament	
M50	round mound	800 × 500	270	vertical rectangular shaft	185 × 160 - 106	/	2	M (2×)	Adult	secondary burial	bronze knide	
M51	round mound	500 × 20	260	vertical rectangular shaft with side chamber	246 × 80 - 110	Wooden Bed	1	M	Adult	straight supine	golden ornament (2×), bow ornament	
M52	stone mound circle	1500 × 100	340	vertical rectangular shaft	230 × 130 - 85	/	1	M	Adult	secondary burial	jade bead (2×), pottery ware	
M53	round mound	1000 × 30	275	vertical rectangular shaft	240 × 160 - 120	/	2	1 M	Adult	straight flex	/	
M54	round mound	Dm: 600	300	vertical rectangular shaft	260 × 160 - 190	/	2	1F	Adult	secondary burial	pottery sherd	there are two pits on northern and southern side, the pits' depth are 40-50cm; there is one secondary platform on the western wall
M55	round mound	Dm: 240	275	vertical rectangular stone shaft	Dm: 160, D: 60	/	1	F	Adult	secondary burial	pottery sherd	
M56	round mound	Dm: 600	275	vertical rectangular stone shaft	190 × 190 - 40	/	2	F & M	Adult	Side flex	bronze bracelet, bead ornament, bronze buckle	
M57	round mound	Dm: 500	290	vertical rectangular shaft	290 × 230 - 150	/	1	F	Adult	secondary burial	pottery sherd, bronze ormanet (2×), bronze awl	there are four pits on the tomb chamber corner, the pits' depth are 40-50cm
M58	round Cricle	Dm: 500	275	vertical rectangular shaft	300 × 300 - 160	/	1	F	Adult	secondary burial	pottery Jar, bronze bowl, bronze spoon	there are four pits on the tomb chamber corner, the pits' depth are 40-50cm
M59	round Cricle	800	/	vertical rectangular shaft	265 × 250 - 200	/	1	F	Old	secondary burial	bronze ware, stone mortar	there are four pits on the tomb chamber corner, the pits' depth are 40-50cm; there are burning traces on the tomb opening
M60	round Cricle	800	/	vertical rectangular shaft	Dm: 200, D: 100	/	1	/	Infant	secondary burial	bone tube	
M61	round mound	700 × 40	/	/	/	/	/	/	/	/	pottery Jar	
M62	round Cricle	800	/	vertical rectangular shaft	Dm: 138, D: 40	/	1	/	/	/	pottery Jar, bronze ornament	there are burning traces on the tomb opening
M63	scattered stone mound	/	/	vertical rectangular shaft	Dm: 145, D: 40	/	4	/	Adult	secondary burial	/	
M64	round Cricle	600 × 30	5	vertical rectangular shaft with two chambers	Chamber A: 180 × 60 - 38 Chamber B: 150 × 98 - 65	/	3	M (2×)	Adult	secondary burial and straight supine	whetstone, bronze knife, pottery Jar	Chamber B is a stone chamber
M65	round mound	700 × 30	15	vertical rectangular shaft	96 × 80 - 30	/	1	F	Adult	secondary burial	/	
M66	round mound	300 × 20	265	vertical rectangular shaft	124 × 55 - 32	/	1	/	Infant	straight supine	golden piece	
M67	round Cricle	600	300	vertical rectangular shaft	295 × 250 - 165	/	2	/	Adut/Infant	secondary burial	bone ware	
M68	Irregular stone mound	Dm: 6-10, H: 20	7	vertical rectangular shaft with four chambers	Chamber A: 220 × 56 - 38 Chamber B: 180 × 50 - 26 Chamber C: 170 × 45 - 40 Chamber D: 165 × 46 - 40	/	3	/	/	secondary burial	wheatstone, pottery ware (2×)	there is one round sacrifice pit
M69	round mound	700 × 40	320	vertical rectangular shaft	190 × 110 - 142	/	1	F	Adult	straight supine	/	
M70	stone mound circle	800 × 40	290	vertical rectangular shaft	180 × 170 - 70	/	1	F	Adult	straight supine	pottery sherd, bone spinning wheel	
M71	stone mound circle	900 × 50	280	vertical rectangular shaft	180 × 110 - 110	/	1	M	Adult	straight supine	s/g head (2×), bronze arrowhead, pottery Jar	there is one secondary platform; there are some burning traces on the tomb opening
M72	round mound	800 × 50	280	vertical rectangular shaft	230 × 135 - 90	/	1	F	Adult	/	horse head	
M73	round mound	800 × 50	320	vertical rectangular shaft	230 × 100 - 90	/	1	M	Adult	secondary burial	leather belt, bone ornament, arrow ornament, bow ornament, iron object	
M74	stone mound circle	1200 × 50	290	vertical rectangular stone shaft	235 × 130 - 100	/	2	F & M	Adult	secondary burial	s/g head (2×), horse head, bronze arrowhead (2×), bone arrowhead, bronze awl	
M75	round mound	600 × 20	295	vertical rectangular stone shaft	175 × 90 - 70	/	1	/	/	secondary burial	/	
M76	round mound	1350 × 40	295	vertical rectangular shaft	280 × 150 - 166	/	1	F	Adult	secondary burial	s/g head (2×), horse head (3×), bonr arrowhead (20×), bone ornament, bronze dagger	
M77	stone mound circle	1100 × 40	270	vertical rectangular shaft	250 × 106 - 100	/	1	F	Adult	secondary burial	/	there are some burning traces on the tomb opening
M78	round mound	700 × 30	300	vertical rectangular shaft with side chamber	236 × 160 - 120	/	1	/	/	straight supine	s/g bones, pottery ware (3×), bronze ornament (2×), iron knife	
M79	round mound	700 × 30	285	Cata pit	opening diameter is 160, bottom diameter is 230, D: 260	/	2	F & M	Adult	straight supine & straight flex	bronze ornament	
M80	irregular stone mound	/	30	vertical rectangular shaft	170 × 130 - 135	/	1	M	Adult	straight flex	stone bead bracelet (2×)	
M81	round mound	450 × 20	275	vertical rectangular shaft	120 × 50 - 50	/	1	/	Infant	straight supine	/	
M82	round mound	800 × 40	130	vertical rectangular shaft with side chamber	200 × 120 - 270	/	1	M	Adult	straight flex	s/g bones, bronze mirror, bronze object (4×), cowry ornament	
M83	round mound	500 × 30	175	vertical rectangular shaft with side chamber	Dm: 130, D: 140	/	1	M	Adult	Side flex	s/g bones, pottery ware, pottery sherd	
M84	round mound	400 × 20	185	Cata pit	Dm: 120, D: 190	stone Coffin	1	F	Adult	straight flex	s/g bones, pottery Jar, bronze bracelet, bronze ornament	

Tomb No.	Surface mound	Dimension of surface mound Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Form	Burial Objects	Remarks
M85	irregular stone mound	L: 1600, W: 700, H: 50	320	vertical rectangular shaft with five chambers	Chamber A: 235 × 75 - 50 Chamber B: 220 × 110 - 80 Chamber C: 225 × 70 - 90 Chamber D: 200 × 48 - 60 Chamber D: 200 × 48 - 60 Chamber E: 200 × 58 - 60	/	6	1 Teenager, F (2×), M (3×)	5 Adult, 1 Teenager	secondary burial	pottery ware (4×)	there are some burning traces on the tomb opening
M86	irregular stone mound	L: 900, W: 600, H: 30	340	vertical rectangular shaft with two chambers	Chamber A: 230 × 85 - 80 Chamber B: 210 × 70 - 80	/	2	M	Adult	secondary burial	pottery ware	there are some burning traces on the tomb opening
M87	round mound	500 × 20	195	vertical rectangular shaft with side chamber	Dm: 110, D: 122	/	1	/	Teenager	straight supine	pottery ware (2×), stone bead	
M88	round mound	500 × 20	240	vertical rectangular shaft	Dm: 100-150, D: 135	stone Coffin	1	/	Adult	straight flex	pottery Cup, bone stick, lithic tool	
M89	round mound	600 × 30	355/275	vertical rectangular shaft with two chambers	Chamber A; 225 × 90 - 120 Chamber B: 200 × 80 - 50	/	2	F	Adult / Teenager	straight supine	bronze knife, bronze mirror, bronze hairpin, stone bead (36×), bone spinning wheel, whetstone	there are some burning traces on the Chamber B entrance
M90	scattered stones	/	300	vertical rectangular shaft	100 × 70 - 50	stone Coffin	1	/	Infant	secondary burial	/	
M91	scattered stones	/	/	vertical rectangular shaft	Dm: 100, D: 20	/	1	/	Infant	secondary burial	/	
M92	round mound	1000 × 50	280	vertical rectangular shaft	240 × 85 - 85	/	1	F	Adult	secondary burial	stone bead (14×), bronze needle	
M93	scattered stones	/	/	/	/	/	/	/	/	/	/	
M94	round mound	1000 × 60	355	vertical rectangular shaft	280 × 180 - 160	/	1	M	Adult	straight supine	bone arrowhead (4×)	
M95	scattered stones	/	/	/	/	/	/	/	/	/	/	
M96	scattered stones	/	/	/	/	/	/	/	/	/	/	
M97	round mound	1500 × 40	30	vertical rectangular shaft	230 × 128 - 86	/	/	/	/	/	/	
M98	round mound	1600 × 110	305	vertical rectangular shaft	450 × 280 - 300	/	1	/	Adult	/	lithic tool, bronze circle (2×), bronze awl, golden ornament (2×)	
M99	round mound	800	/	vertical rectangular shaft	200 × 140 - 200	/	/	/	/	/	/	robbed
M100	round mound	1200	285	vertical rectangular shaft	300 × 200 - 175	/	3	/	/	/	pottery ware (2×), bone arrowhead, bone circle (4×)	robbed
M101	round mound	900	287	vertical rectangular shaft	300 × 280 - 300	/	1	/	/	/	bronze knife, bronze gag bit, faience ware	robbed
M102	round mound	1450 × 80	296	vertical rectangular shaft	370 × 210 - 300	/	2	F & M	Adult	/	horse head, s/g head (2×), bone bead (14×), lithic tool (3×), golden ornament, pottery sherd, bone circle	
M103	round mound	1400 × 70	295	vertical rectangular shaft	280 × 175 - 240	/	1	/	Adult	/	horse bone, s/g bone, pottery sherd, bone bead, boar tusk	there is one secondary platform on the western wall
M104	round mound	1450 × 50	307	vertical rectangular shaft	360 × 320 - 250	wooden bed	1	/	Adult	/	s/g head, horse head (2×), cow head, pottery Jar, bronze awl, stone bead (33×)	
M105	round mound	800 × 70	278	Cata pit	245 × 180 - 135	wooden/stone bed	1	/	/	/	s/g bone, horse bone, bone spinning wheel, pottery ware (2×)	there are some burning traces on the tomb opening
M106	round mound	1400 × 50	307	vertical rectangular shaft	270 × 250 - 186	/	1	F	Adult	straight supine	s/g head, horse head, lithic tool, bronze mirror, bronze knife, bronze gag bit, bronze strap fitting (2×), faience ware	
M107	round mound	300 × 20	337	vertical rectangular shaft	70 × 40 - 34	/	1	/	Infant	secondary burial	/	
M108	scattered stones	/	5	vertical rectangular shaft with side chamber	210 × 45 - 80	/	1	M	Adult	straight supine	/	there is one secondary platform on the eastern wall
M109	scattered stones	/	0	cata pit	175 × 35 - 100	/	1	F	Adult	straight supine	/	there is one secondary platform on the eastern wall
M110	scattered stones	/	357	vertical rectangular shaft with side chamber	175 × 45 - 60	/	1	F	Adult	/	/	there is one secondary platform on the eastern wall
M111	scattered stones	/	358	vertical rectangular shaft with side chamber	205 × 65 - 100	/	1	F	Adult	/	/	there is one secondary platform on the eastern wall
M112	scattered stones	/	346	vertical rectangular shaft with side chamber	180 × 40 - 70	/	1	M	Adult	straight supine	/	there is one secondary platform on the eastern wall
M113	round mound	600 × 60	290	vertical rectangular shaft	320 × 260 - 300	/	1	F	Adult	straight supine	s/g head (3×), horse head (2×), animal bones, faience ware, bronze mirror, bronze awl, bronze knife, bronze gag bit, lithic tool	
M114	stone mound circle	1300 × 50	302	vertical rectangular shaft	170 × 120 - 90	/	1	M	Adult	/	s/g head (2×), horse head, animal bones, pottery sherd, bone arrowhead, bronze knife	
M115	stone mound circle	1300 × 40	290	vertical rectangular shaft	200 × 100 - 120	/	2	F & M	Adult	secondary burial and straight supine	horse head, s/g head (2×), pottery ware (2×), bronze knife (2×), bronze arrowhead, bronze awl, bronze gag bit, bone arrowhead (2×)	
M116	round mound	500 × 30	/	round rectangular shaft	Dm: 180, D: 95	/	1	/	Teenager	secondary burial	s/g bone	
M117	scattered stones	/	0	vertical rectangular shaft with side chamber	200 × 60 - 85	/	1	F	Adult	straight supine	/	there is one secondary platform on the eastern wall
M118	scattered stones	/	0	vertical rectangular shaft with side chamber	135 × 40 - 45	/	1	/	Teenager	straight supine	/	there is one secondary platform on the eastern wall
M119	scattered stones	/	0	vertical rectangular shaft with side chamber	145 × 40 - 50	/	1	/	Teenager	straight supine	/	there is one secondary platform on the eastern wall
M120	scattered stones	/	338	vertical rectangular shaft	182 × 60 - 80	/	1	M	Adult	straight supine	/	
M121	round mound	1100 × 40	275	vertical rectangular stone shaft	255 × 115 - 100	/	2	M	Adut/Infant	secondary burial	bow ornament, bone object, golden foil piece	
M122	round mound	700 × 40	280	vertical rectangular shaft	200 × 110 - 120	/	1	M	Adult	straight supine	faience ware, whetstone, lithic tool, millstone	
M123	stone mound circle	800 × 40	258	vertical rectangular shaft	210 × 80 - 100	/	2	M	Adut/Infant	straight supine	pottery Jar, bronze knife, tooth ornament (2×)	
M124	round mound	900 × 50	5	vertical rectangular shaft	275 × 160 - 190	/	1	M	Adult	straight supine	s/g head, horse bones, pottery sherd, iron gag bit, iron arrowhead, bronze ornament, golden ring	there is one secondary platform on the western wall
M125	round mound	600 × 70	350	vertical rectangular shaft	200 × 110 - 110	/	1	M	Adult	straight supine	silver bowl	there is one secondary platform
M126	round mound	500 × 20	23	stone coffin tomb	235 × 80 - 50	stone bed	1	M	Adult	straight supine	pottery shallow bowl	
M127	scattered stones	/	290	cata pit	120 × 100 - 70	/	1	/	Infant	secondary burial	pottery sherd	there is one secondary platform on the eastern wall; the entrance of the side chamber is blocked by stone
M128	scattered stones	780 × 40	123	vertical rectangular shaft	130 × 90 - 50	/	1	M	Adult	secondary burial and side flex	/	
M129	round mound	1000 × 50	310	vertical rectangular shaft	250 × 200 - 190	/	1	M	Adult	/	horse bones	there is one secondary platform on the western wall
M130	scattered stones	/	292	vertical rectangular shaft	120 × 95 - 60	/	1	/	Teenager	secondary burial and side flex	/	
M131	round mound	800 × 40	288	vertical rectangular shaft	210 × 115 - 105	/	2	F	Adult	secondary burial and straight supine	s/g head, horse head, pottery sherd, bronze arrowhead	there are some burning traces on the tomb opening

Tomb No.	Surface mound	Dimension of surface mound Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Year of Age	Burial Form	Burial Objects	Remarks
M132	stone mound circle	1000 × 60	287	vertical rectangular shaft	220 × 115 - 95	/	2	/	Adult	secondary burial and straight supine	s/g head, horse head, bone arrowhead (2×), bronze knife, bronze arrowhead, bronze awl	
M133	round mound	1000 × 50	5	vertical rectangular shaft	260 × 170 - 210	/	1	F	Adult	/	horse bones	
M134	stone mound circle	1400 × 70	293	vertical rectangular shaft	240 × 110 - 100	/	2	/	Adult	secondary burial	s/g head, horse head, faience Jar, bronze knife, bronze haipin, stone bead	
M135	round mound	900 × 50	280	vertical rectangular shaft with side chamber	230 × 80 - 135	/	1	F	Adult	/	s/g bones	there is one secondary platform on the southern wall; the entrance of the side chamber is blocked by stone
M136	round mound	900 × 30	235	vertical rectangular shaft	220 × 120 - 160	/	1	F	Adult	secondary burial	/	
M137	/	/	280	vertical rectangular shaft	156 × 95 - 60	/	1	M	Adult	straight supine	millstone	
M138	round mound	500 × 30	/	vertical rectangular shaft	Dm: 100, D: 30	/	1	/	Adult	secondary burial	/	
M139	round mound	800 × 50	303	vertical rectangular stone shaft	250 × 150 - 200	/	1	M	Adult	secondary burial	/	
M140	round mound	700 × 30	335	vertical rectangular stone shaft	280 × 180 - 180	/	1	M	Adult	/	/	
M141	round mound	800 × 50	295	vertical rectangular stone shaft	190 × 110 - 180	/	1	/	Adult	/	/	
M142	round mound	1400 × 80	/	/	/	/	/	/	/	/	/	
M143	round mound	Dm: 1100	25	vertical rectangular shaft	270 × 220 - 210	/	1	M	Adult	/	/	
M144	round mound	700 × 60	20	cata pit	240 × 60 - 130	/	1	F	Adult	straight supine	bronze mirror, ear ornament	there is one secondary platform on the eastern wall
M145	scattered stones	/	/	/	/	/	/	/	/	/	/	
M146	scattered stones	/	268	vertical rectangular shaft	240 × 100 - 176	stone bed	1	/	Adult	secondary burial	bow ornament (3×)	there is one secondary platform
M147	scattered stones	/	260	vertical rectangular stone shaft	210 × 110 - 178	/	1	/	Adult	/	/	
M148	round mound	700 × 30	0	vertical rectangular shaft with side chamber	220 × 100 - 160	/	1	M	Adult	/	millstone	
M149	round mound	500 × 40	288	vertical rectangular stone shaft	220 × 120 - 130	/	1	M	Adult	secondary burial	/	
M150	scattered stones	/	/	/	/	/	/	/	/	/	/	
M151	scattered stones	/	/	/	/	/	/	/	/	/	/	
M152	scattered stones	/	/	/	/	/	/	/	/	/	/	
M153	scattered stones	/	/	/	/	/	/	/	/	/	/	
M154	scattered stones	/	/	/	/	/	/	/	/	/	/	
M155	scattered stones	/	/	/	/	/	/	/	/	/	/	
M156	scattered stones	/	/	/	/	/	/	/	/	/	/	
M157	scattered stones	/	/	/	/	/	/	/	/	/	/	
M158	scattered stones	/	/	/	/	/	/	/	/	/	/	
M159	scattered stones	/	/	/	/	/	/	/	/	/	/	
M160	scattered stones	/	/	/	/	/	/	/	/	/	/	
M161	scattered stones	/	/	/	/	/	/	/	/	/	/	
M162	scattered stones	/	/	/	/	/	/	/	/	/	/	
M163	scattered stones	/	/	/	/	/	/	/	/	/	/	
M164	round mound	700 × 30	276	vertical rectangular shaft	280 × 95 - 55	/	1	/	Adult	secondary burial	/	
M165	round mound	900 × 80	5	vertical rectangular shaft	240 × 180 - 160	/	1	M	Adult	straight flex	s/g bones, complete horse bones	there is one secondary platform on the western wall
M166	stone mound circle	1200 × 40	277	surface stone coffin	400 × 300 - 30	stone coffin	1	/	/	secondary burial	/	
M167	stone mound circle	1500 × 70	295	vertical rectangular shaft	230 × 110 - 80	/	1	F	Adult	secondary burial	s/g head, horse head (2×), grinding stone, bronze button, bone bead, golden ornament	
M168	round mound	2000 × 80	/	/	/	/	/	/	/	/	/	robbed
M169	stone mound circle	420 × 40	276	round rectangular shaft	Dm: 170, D: 95	/	1	M	Adult	straight supine	bronze bead (2×), s/g bone	
M170	round mound	500 × 50	275	vertical rectangular shaft	250 × 100 - 110	/	1	M	Adult	straight supine	lithic tool	
M171	scattered stones	/	0	vertical side chamber	172 × 60 - 80	/	1	/	Adult	secondary burial	/	there is one secondary platform on the eastern wall
M172	scattered stones	/	0	vertical side chamber	80 × 40 - 60	/	1	/	Teenager	secondary burial	/	there is one secondary platform on the eastern wall
M173	scattered stones	/	0	vertical side chamber	168 × 40 - 80	/	1	/	Teenager	side supine	/	there is one secondary platform on the eastern wall
M174	scattered stones	/	345	vertical side chamber	180 × 80 - 58	/	1	/	Teenager	secondary burial	/	
M175	scattered stones	/	355	vertical side chamber	140 × 45 - 70	/	1	/	Teenager	straight supine	/	there is one secondary platform on the eastern wall
M176	scattered stones	/	355	vertical side chamber	110 × 50 - 70	/	1	/	Teenager	straight supine	/	there is one secondary platform on the eastern wall
M177	scattered stones	/	353	vertical side chamber	195 × 40 - 70	/	1	F	Adult	straight supine	/	there is one secondary platform on the eastern wall
M178	round mound	450 × 40	290	vertical rectangular shaft	210 × 80 - 90	/	1	M	Adult	straight supine	/	
M179	round mound	800 × 50	296	vertical rectangular shaft	300 × 200 - 150	/	1	M	Adult	straight supine	bone ornament, bronze arrowhead	
M180	round mound	450 × 30	290	vertical rectangular shaft	220 × 80 - 85	/	1	M	Adult	straight supine	/	
M181	round mound	700 × 50	286	vertical rectangular shaft	230 × 110 - 90	/	1	/	Adult	secondary burial	/	
M182	round mound	800 × 60	278	vertical rectangular shaft with side chamber	290 × 180 - 300	/	1	M	Adult	straight flex	pottery ware (3×), whetstone	there is one secondary platform on the northern wall

Table 18 Saensayi tomb type

Tomb Surface Feature	Tomb Structure	(Round)-rectangular	Round	Oval	Irregular	Amount	Total
No Surface Mound	Vertical rectangular shaft	M35, M37, M39, 41, M42, M43, M44, M45, M47, M52, M54, M56, M57, M59, M67, M137	M38, M58, M60, M62	M128	M36, M80	23	25 (15.5%)
	Stone Coffin tomb		M55, M126			2	
Surface Mound	Vertical rectangular shaft	M1, M2, M3, M6, M8, M9, M10, M12, M15, M16, M18, M19, M20, M22, M27, M28, M29, M30, M31, M33, M34, M46, M49, M50, M53, M65, M66, M69, M70, M72, M73, M77, M81, M92, M101, M107, M115, M120, M122, M123, M125, M130, M131, M132, M136, M143, M146, M164, M170, M174, M178, M180	M11, M79, M91, M116, M169	M4, M13, M14, M25, M32, M94, M100, M114, M129, M133, M165, M179	M21, M63, M97, M99, M106, M124, M138, M168, M181	78	136 (84.5%)
	Vertical rectangular shaft with side chamber	M5, M7, M24, M51, M108, M109, M110, M111, M112, M117, M118, M119, M127, M135, M144, M148, M171, M172, M173, M175, M176, M177		M182		23	
	Cata pit	M78, M82, M105	M79, M83, M84, M87, M88	M23		9	
	Vertical rectangular stone shaft	M74, M75, M98, M102, M103, M113, M121, M134, M147, M149, M167		M17, M71, M76, M139, M140, M141		17	
	Stone Coffin tomb	M166					
	Cremation			M40			
	Vertical rectangular shaft with multiple side chambers	M64 (two chambers), M68 (four chambers), M85 (five chambers), M86 (two chambers), M89 (two chambers)				5	
Total			161				

Table 19 Saensayi sub-groups

Sub-group	Tomb Nr.	Amount	Description
1	M35, M36, M37, M38, M39, M40, M41, M42, M43, M45, M46, M47, M49, M52, M53, M54, M55, M56, M57, M58, M59, M60, M62, M64, M67, M126, M127, M128, M130	29	Scattered stone circles on the surface ground; mostly vertical rectangular shaft, with one vertical stone shaft and few stone coffin tomb; mostly with no coffin bed; the pottery are all flat base ware; with little bronze ornament and lithic tools
2	M28, M29, M30, M68, M85, M86	6	Scattered stones; vertical rectangular shaft; mostly with small round pit on the tomb opening; no coffin bead; the pottery are all round base ware, no other grave goods
3	M3, M4, M6, M8, M9, M10, M11, M12, M13, M14, M15, M16, M17, M19, M20, M22, M31, M33, M34, M70, M71, M72, M74, M75, M76, M81, M89, M90, M91, M92, M97, M98, M100, M101, M102, M103, M104, M106, M113, M114, M115, M121, M122, M123, M131, M132, M134, M166, M167, M168, M169, M170, M178, M179, M180	55	Round mound/round stone circles on the surface, the tomb chamber are relatively large, some are also found with secondary platform; mostly have stones on the vertical rectangular shaft chamber bottom; some are found with multi bodies; there are a lot horse and sheep/goat heads found altogether; the pottery are mostly faience ware, also with a various of bronze and bone weapons and harness
4	M21, M23, M25, M77, M78, M79, M82, M83, M84, M87, M88, M105	12	Round mound; mostly vertical rectangular/round shaft with side chamber; some are with wooden/stone coffin; no horse bones; the pottery are mostly round base ware, with also some flat base ware; with one faience ware and few bronze objects; there are few iron objects
5	M1, M2, M5, M7, M18, M24, M27, M50, M51, M52, M61, M63, M65, M66, M69, M73, M80, M94, M107, M116, M120, M128, M130, M135, M136, M137, M138, M139, M140, M141, M146, M147, M149, M164, M174, M180, M181	37	Round/irregular mound; vertical rectangular shaft, vertical rectangular stone shaft and shaft with side chamber, mostly chamber on the western wall; only one tomb with wooden coffin; few sheep/goat and horse bones together; few pottery and bronze objects; the iron objects are relatively more than last group
6	M18, M73, M124, M125, M129, M133, M143, M144, M148, M165	10	Round/irregular mound; vertical rectangular shaft, few with secondary platform and side chamber; no coffin, no pottery, only bronze ornament like mirror, golden and silver ornament, and some iron objects.
7	M107, M108, M109, M110, M111, M112, M116, M117, M118, M119, M171, M172, M173, M174, M175, M176, M177	17	Scattered stone mound; one vertical rectangular shaft, and rest are with side chamber; no coffin and no grave goods

Table 20 Saensayi sub-groups dates

Sub-group	Tomb Nr.	Amount	Description	Time Period
1	M35, M36, M37, M38, M39, M40, M41, M42, M43, M45, M46, M47, M49, M52, M53, M54, M55, M56, M57, M58, M59, M60, M62, M64, M67, M126, M127, M128, M130	29	Scattered stone circles on the surface ground; mostly vertical rectangular shaft, with one vertical stone shaft and few stone coffin tomb; mostly with no coffin bed; the pottery are all flat base ware; with little bronze ornament and lithic tools	First Period: Bronze Age
2	M28, M29, M30, M68, M85, M86	6	Scattered stones; vertical rectangular shaft; mostly with small round pit on the tomb opening; no coffin bead; the pottery are all round base ware, no other grave goods	
3	M3, M4, M6, M8, M9, M10, M11, M12, M13, M14, M15, M16, M17, M19, M20, M22, M31, M33, M34, M70, M71, M72, M74, M75, M76, M81, M89, M90, M91, M92, M97, M98, M100, M101, M102, M103, M104, M106, M113, M114, M115, M121, M122, M123, M131, M132, M134, M166, M167, M168, M169, M170, M178, M179, M180	55	Round mound/round stone circles on the surface, the tomb chamber are relatively large, some are also found with secondary platform; mostly have stones on the vertical rectangular shaft chamber bottom; some are found with multi bodies; there are a lot horse and sheep/goat heads found altogether; the pottery are mostly faience ware, also with a various of bronze and bone weapons and harness	
4	M21, M23, M25, M77, M78, M79, M82, M83, M84, M87, M88, M105	12	Round mound; mostly vertical rectangular/round shaft with side chamber; some are with wooden/stone coffin; no horse bones; the pottery are mostly round base ware, with also some flat base ware; with one faience ware and few bronze objects; there are few iron objects	Second Period: Han & Jin Dynasty (汉晋时期)
5	M1, M2, M5, M7, M18, M24, M27, M50, M51, M52, M61, M63, M65, M66, M69, M73, M80, M94, M107, M116, M120, M128, M130, M135, M136, M137, M138, M139, M140, M141, M146, M147, M149, M164, M174, M180, M181	37	Round/irregular mound; vertical rectangular shaft, vertical rectangular stone shaft and shaft with side chamber, mostly chamber on the western wall; only one tomb with wooden coffin; few sheep/goat and horse bones together; few pottery and bronze objects; the iron objects are relatively more than last group	
6	M18, M73, M124, M125, M129, M133, M143, M144, M148, M165	10	Round/irregular mound; vertical rectangular shaft, few with secondary platform and side chamber; no coffin, no pottery, only bronze ornament like mirror, golden and silver ornament, and some iron objects.	Third Period: Sui & Tang Dynasty (隋唐时期)

Sub-group	Tomb Nr.	Amount	Description	Time Period
7	M107, M108, M109, M110, M111, M112, M116, M117, M118, M119, M171, M172, M173, M174, M175, M176, M177	17	Scattered stone mound; one vertical rectangular shaft, and rest are with side chamber; no coffin and no grave goods	Fourth Period: Song & Yuan Dynasty (宋元时期)

Table 21 Qiongkeke Nr. I Cemetery

Tomb No.	Dimension of surface mound Dm×H (cm)	Tomb Structure	Dimension of surface circle L×W/Dm (cm)	Dimension of Tomb Chamber L×W×D (cm)	Secondary Platform / Tomb furnishing L×W×H (cm)	No.of buried people & Gender & Age	Burial Form	Burial Objects	Remarks
M1	(1000-1180)×45	Vertical shaft with side chamber	450×50	210×80-150	/	F (1×), 20-25	Supine straight	Wooden Basin, s/g bone	
M2	1100×130	Surface Stone Coffin	/	/	Stone coffin: 230×70-50	M (1×)	/	Bronze Knife, gravel stone	Secondary-burial
M3	1003×50	Vertical shaft with side chamber	250-900	207×65-120	/	M (1×), 20	Supine straight	/	
M4	900×40	Vertical shaft with side chamber	200-800	200×55-132	/	M (1×), 30-35	Supine straight	Pottery Cup	One bladder stone under the body
M5	550×25	Vertical shaft with side chamber	450×400	250×43-160	10×20	F (1×), 30-35	Supine straight	Pottery Jug, wooden Basin, s/g bone	
M6	(600-750)×40	Vertical shaft with side chamber	(400-750)×300	230×90-100	/	M (1×), 20	Supine straight	Pottery Bottle, s/g bone	
M7	750×500	Vertical shaft with side chamber	600	240×55-140	10×15	F (1×), 16-18	Supine straight	Pottery shallow Bowl, pottery jar, s/g bone	
M8	425×15	Vertical shaft with double chamber	475-500	A: 250×70-154 B: 218×60-58	/	A: (1×), 30-35 B: (1×), 35	Supine straight	A: wooden single-handed Basin, pottery single-handed Cup, s/g bone B: /	
M9	830×40	Vertical shaft with side chamber	240-370	210×65-135	20×32	M (1×), 40	Supine straight	Pottery shallow Bowl, iron Knife, s/g bone	
M10	1200×45	Vertical shaft with three chamber	A: 200 B: 250 C: 400	A: 100×40-40 B: 164×56-92 C: 340×70-200	A: / B: 10×20 C: 40×40	A: Infant (1×) B: Kid (1×), 8-9 C: M (1×), 25	Supine straight	A: / B: pottery Jar, s/g bone C: wooden Basin	
M12	880×40	Vertical shaft with side chamber	425×340	250×80-140	60×20	F (1×), 30	Supine straight	Iron Awl, pottery Cup (2×), s/g bone	
M13	830×55	Vertical shaft with double chamber	350×280	A: 160×55-100 B: 120×50-87	A: 25×30 B: 5×20	A: F (1×), 11-14 B: F (1×), 6-7	Supine straight	A: iron Knife, bead necklace B: wooden Basin (2×), iron Knife	
M14	(570×700)-35	Vertical shaft with side chamber	290×220	170×65-81	5×10	M (1×), 30-35	Supine straight	/	One hole on the forehead
M15	740×40	Vertical shaft with double chamber	A: 200-290 B: 250-300	A: 170×65-140 B: 250×55-90	A: 22×22 B: 16×9	A: F (1×), 40 B: M (1×), 25-30	Supine straight	A: pottery shallow Bowl pottery Jug, wooden Basin, iron Knife, s/g bone B: pottery shallow Bowl, wooden Basin, wooden object, iron Knife	One hole on the forehead
M16	800×600	Vertical shaft with double chamber	A: 350-400 B: 220	A: 220×65-170 B: 215×50-132	A: 32×40 B: 26×30	A: M (1×), 20-25 B: F (1×), 40	Supine straight	A: pottery Jar, iron Knife, s/g bone B: wooden Basin (2×), iron Knife, s/g bone	
M18	(880-960)×50	Vertical shaft with side chamber	280×(60-100)	225×75-160	32×22	F (1×), 20	Supine straight	pottery Jar, iron Knife, s/g bone	
M19	650×35	Vertical shaft with side chamber	(300-520)×100 500×275	210×85-132	40×22	M (1×)	Supine straight	/	
M21	2450×1130-100	Vertical shaft pit	2100×1100	200×200-135	/	/	/	Pottery Jug, pottery sherds, animal bones	The human bones are scattered in the tomb pit
M23	(1000-1150)×100	Vertical shaft pit	1000×900	220×110-170	/	/	/	/	Only one piece of human tooth remained
M24	670×60	Vertical shaft pit	350-560	210×100-110	/	M (1×), 55-60	/	/	Secondary-burial
M25	1250×115	Surface Stone Coffin	1200	/	Stone coffin: 245×100-80	/	/	/	Secondary-burial
M26	1650×950-44	Vertical shaft pit	/	270×150-175	/	/	/	S/g bone	The tomb is filled with large stone pieces, several human bones under the stone planks
M27	900×800	Vertical shaft pit	550-750	132×62-80	/	M (1×)	/	/	Secondary-burial
M28									
M29	720×630-40	Surface Stone Coffin	500-580	/	Stone coffin L: 200×100-25	/	/	/	Secondary-burial
M30	760×50	Vertical stone coffin shaft	250-300	240×110-135	Stone coffin: 222×120-54	M (1×), 20-25	Supine straight	Pottery Basin, bone Button, s/g bone	
M31	800	Vertical stone coffin shaft with double chamber	740×600	A: 255×120-100 B: 210×(20-30)-80	Stone coffin A: 186×74-36 Stone coffin B: 190×90-43	A: M (1×), 30-35 B: F (1×), 40	Supine straight	A: iron Knife, s/g bone B: /	
M32	(840-1000)×46	Vertical shaft with side chamber	400×300	220×80-148	34×26	M (1×), 20	Supine straight	Pottery Jug	
M33	360×70	Vertical stone coffin shaft	170-210	200×93-84	Stone coffin: 200×90-21	M (1×)	Supine straight	Pottery Jar, pottery shallow Bowl	
M34	(360-430)×25	Vertical shaft with three chamber	A: 100×60 B: 100×100 C: 220×80	A: 90×60-30 B: 190×60-100 C: 175×72-80	Stone coffin C: 174×74-34	A: Infant (1×) B: M (1×), 20-25 C: M (1×), 20-25	Supine straight	A: pottery Jug B: s/g bone /	
M35	820×50	Vertical shaft with side chamber	300-350	250×85-135	40×12	M (1×), 30-35	Supine straight	Pottery Cup, bone Button	
M36	790×45	Vertical shaft with side chamber	250-300	170×50-80	/	M (1×), 4-5	Supine straight	Pottery Jar	
M37	800×50	Vertical shaft pit	350×300	250×90-110	/	M (1×), 20-25	Supine straight	S/g bone	
M38	(840-970)×50	Vertical stone coffin shaft	(700-800)×75	265×65-120	Stone coffin: 216×78-22	M (1×), 25	Supine straight	S/g bone	
M39	520×25	Vertical stone coffin shaft	200×130	220×90-86	Stone coffin: 223×88-25	M (1×), 25-30	Supine straight	pottery spouted Jar, pottery shallow Bowl, s/g bone	
M40	/	Vertical shaft pit	/	273×90-200	/	M (1×), 40	Supine straight	Pottery Jug, pottery Jar	
M41	/	Vertical shaft with side chamber	/	244×86-143	26×22	F (1×), 25	Supine straight	Pottery Jar, wooden Basin, s/g bone	The s/g bone is found in the wooden basin
M43	/	Stone circle	700	/	/	/	/	/	
M44	(725-830)×70	Vertical shaft with side chamber	350	255×80-220	46×52	F (1×), 30-35	Supine straight	Pottery Jar	
M45	950×70	Vertical shaft with double chamber	A: 250-300 B: 200-350	A: 195×40-110 B: 250×50-112	A: 40×13 B: 50×30	A: M (1×), 2-25 B: F (1×), 25	Supine straight	A: pottery Cup, wooden Basin, iron Knife, s/g bone B: pottery Jug, iron Knife, s/g bone (2×)	
M46	950×70	Vertical shaft with double chamber	A: 320 B: 415×230	A: 200×75-140 200×60-150	A: 36×18 B: 20-20	A: M (1×), 16-18 B: M (1×), 16-18	Supine straight	A: pottery Jar, iron Knife, iron object, bone ornament, gravel stone, bone Arrowhead B: pottery Cup, iron Knife, bone object, s/g bones (2×)	
M47	(350-410)×30	Vertical shaft with side chamber	330-360	210×51-180	50×21	M (1×), 30-35	Supine straight	/	
M48	600×25	Vertical shaft with side chamber	245×175	185×70-114	22×11	Kid (1×), 10	Supine straight	/	
M49	(680-740)×50	Vertical shaft with side chamber	300×275	220×70-113	/	M (1×)	Supine straight	pottery Cup	
M50	(1005-1200)×60	Vertical shaft with side chamber	700×(200-25) 450×225	312×80-200	/	/	/	/	Secondary-burial
M51	1180×865-70	Vertical stone coffin shaft	1005×103	250×112-190	Stone coffin: 238×108-40	M (1×)	Prone	/	The body is in climbing form
M52	(845-970)×30	Vertical stone and wooden coffin shaft	750×650	285×100-240	Stone coffin: 275×110-60 Wooden coffin: 180×50	M (1×), 20	/	Bone Arrowhead (2×), s/g bone (19×), leather piece	The s/g bones and leather piece have verdigris
M53	(580-700)×50	Vertical shaft with double chamber	A: 175-225 B: 250	A: 175×70-120 B: 220×110-160	A: 17×8 B: 40×25	A: Kid (1×), 4-5 F (1×), 20-25	Supine straight	A: pottery shallow Bowl pottery Jar B: s/g rib	
M54	(560-630)×20	Vertical shaft pit	550×80	190×55-110	/	M (1×), 40	Supine straight	Pottery Cup, bone Button	
M55	800×65	Vertical shaft with side chamber	300×225	250×70-95	/	F (1×), 20-25	Supine straight	Pottery shallow Bowl	
M56	960×70	Vertical shaft with double chamber	A: 380×150 B: 230×60	A: 230×60-120 190×60-134	A: 34×20 B: 23×20	A: F (1×), 25-30 B: M (1×), 30-35	Supine straight	A: pottery shallow Bowl B: pottery Jug, pottery shallow Bowl	

Tomb No.	Dimension of surface mound Dm×H (cm)	Tomb Structure	Dimension of surface circle L×W/Dm (cm)	Dimension of Tomb Chamber L×W-D (cm)	Secondary Platform / Tomb furnishing L×W-H (cm)	No.of buried people & Gender & Age	Burial Form	Burial Objects	Remarks
M57	375×35	Vertical shaft with side chamber	320×90	210×61-90	26×22	F (1×)	Supine straight	Pottery shallow Bowl, pottery Cup	

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 22 Suodunbulake tombs

Tomb No.	Dimension of surface mound Dm×H/L×W-H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	No.of buried people	Gender & Age	Burial Form	Burial Objects	Remarks
90M1	/	240	Vertical shaft Pit	224×118-80	1	M (1×)	Supine straight	Pottery Jug, iron Sword, s/g bones	
90M2	/	230	Vertical shaft Pit	235×146-30	1	M (1×)	Supine straight	/	Secondary-burial
90M3	/	/	/	/	/	/	Supine straight	Pottery Spinning wheel, stone Awl	
90M4	500×40	250	Vertical shaft Pit	220×110-170	/	/	Supine straight	/	
90M5	300×40	355	Vertical shaft Pit	195×80-34	1	M (1×)	Supine straight	/	
90M6	380×40	280	Vertical shaft with side chamber	Passage: 230×74-120 Chamber: 230×78-38	1	M (1×)	Supine straight	Pottery pot Fu, pottery single-handled Jae, bronze Pin, s/g bones	
90M7	(200-558)×68	285	Vertical shaft with side chamber	Passage: 220×62-104 Chamber: 220×60-65	1	M (1×), 20	Supine straight	Pottery pot Fu (2×), pottery Jug, iron object	
90M8	(310-575)×40	250	Vertical shaft with side chamber	Passage: 240×76-128 Chamber: 254×66-70	1	F (1×), 30	Supine straight	pottery pot Fu, pottery single-handled Jar, s/g bones	
90M9	440×360-30	250	Vertical shaft Pit	228×85-120	1	M (1×), 20	Supine straight	Pottery pot Fu, pottery Jug, s/g bones	
90M10	460×10	260	Vertical shaft Pit	230×65-150	1	F (1×), 35	Supine straight	Pottery pot Fu, pottery Jug, bronze Earring, iron Knife	
90M11	310×30	260	Vertical shaft Pit	150×70-66	1	Kid	/	Pottery sherds	Secondary-burial
90M12	550×30	280	Vertical shaft with side chamber	Passage: 236×76-148 Chamber: 220×90-70	1	M (1×), 25	Supine straight	Pottery pot Fu, pottery Jug, iron object	
90M13	605×485-25	265	Vertical shaft Pit	220×98-136	1	M (1×), 25	Supine straight	Pottery Jar	
90M14	400×20	260	Vertical shaft Pit	187×82-120	1	M (1×), 40	Supine straight	Pottery pot Fu, pottery Jug	
90M15	/	250	Vertical shaft with side chamber	Passage: 220×83-90 Chamber: 218×80-50	1	M (1×), 45	Supine straight	Pottery Jug, iron Knife	
90M16	/	260	Vertical shaft Pit	170×60-58	1	F (1×)	Supine straight	Pottery Jar	
90M17	455×30	260	Vertical shaft Pit	196×60-60	1	M (1×), 40	Supine straight	Pottery pot Fu, pottery Jug	
90M18	480×350-40	265	Vertical shaft with side chamber	Passage: 190×65-85 Chamber: 188×56-40	1	M (1×), 25	Supine straight	Iron Awl	
90M19	560×400-30	260-275	Vertical shaft with two side chamber	Northern Chamber: 222×62-90 Passage: 188×80-130 Chamber: 200×64-40	2	F (1×), 20, M (1×), 40	Supine straight	Pottery pot Fu	
90M20	700-60 400×300	240	Vertical shaft with side chamber	Passage: 270×72-140 Chamber: 240×80-70	1	M (1×), 30	/	Iron Knife, lithic tool, pottery sherds	Secondary-burial
90M21	870×740-70 480×400	250-255	Vertical shaft with two side chamber	Northern Chamber: 205×64-100 Passage: 240×70-120 Chamber: 250×95-45	2	F (1×), 40, F (1×), 20	/	Pottery pot Fu (2×), pottery single-handled Jar	Secondary-burial
90M22	(220-380)×35	240	Vertical shaft Pit	190×70-80	1	M (1×), 20	Supine straight	Iron Knife	
90M23	/	265	Vertical shaft Pit	200×70-70	1	F (1×), 30	Supine straight	Pottery pot Fu, pottery sherds	
90M24	780×760-60 370×350	260	Vertical shaft with side chamber	Passage: 280×178-136 Chamber: 254×100-64	1	F (1×), 40	/	/	Secondary-burial
90M25	(300-750)×70	260	Vertical shaft with side chamber	Passage: 180×82-150 Chamber: 210×82-90	1	F (1×), 25	Supine straight	Pottery single-handled Jar, pottery sherds, iron object, s/g bone	
90M26	1020×820-75 620×400	260	Vertical shaft with side chamber	Passage: 270×160-209 Chamber: 270×94-45	1	M (1×), 20	/	Cattle bone	
90M27	(560-1000)×75	260	Vertical shaft with side chamber	Passage: 330×126-280 Chamber: 314×104-40	1	F (1×), 25	/	Cattle bone, s/g bone	
90M28	(530-1020)×65	260	Vertical shaft with side chamber	Passage: 280×182-220 Chamber: 278×100-40	1	M (1×), 40	/	Cattle bone	
90M29	(550×960)×70	260	Vertical shaft with side chamber	Passage: 330×110-220 Chamber: 206×75-45	1	F (1×), 25	/	Pottery sherds, cattle bone	
90M30	1000×30	245	Vertical shaft Pit	260×92-120	1	M (1×), 35	/	Pottery sherds	
90M31	800×40	260	Vertical shaft Pit	288×111-152	2	M (1×), 30	/	Pottery sherds	
90M32	290×38	260	Vertical shaft Pit	226×58-110	1	F (1×), 30	Supine straight	Pottery pot Fu, pottery Bowl, s/g skeleton	
90M33	1050×65	260-290	Vertical shaft with two side chambers	Eastern Chamber: 240×140-140 Western Chamber: 228×102-90	3	M (2×), 35, F (1×), 25	Western: supine straight	Pottery shallow Bowl (2×), pottery single-handled Jar	Eastern: secondary-burial

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 23 Chawuhu Nr. I Cemetery

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IM200	III	Stone Circle	400×300	279	Stone	190×80-96	/	7	M (4×), F (3×)	Supine flex	pottery spouted Jar (2×), pottery spouted Cup (2×), pottery Jug, pottery Cup, bronze Button (3×), stone Bead (2×), stone ornament	
IM201	III	Stone Circle	360×280	315	Stone	190×120-76	Wood mat and stone row	2	/	/	Pottery spouted Cup, pottery shallow Bowl, pottery spinning wheel, pottery spouted sherd (2×), pottery spouted Jar, gravel stone, stone cosmetic stick, stone spinning wheel	
IM202	III	Stone Circle	445×360	321	Stone	150×140-65	Wood mat and stone row	6	M (3×), F (2×), Kid	Supine flex	pottery spouted Jar (2×), pottery spouted Cup (2×), pottery Cup, pottery shallow Bowl, pottery spouted Cup and Jar sherds, bronze Awl, bronze Tube, wooden Bo× piece, bone Plaque	
IM203	III	Stone Circle	/	348	Stone	170×113-61	Grass mat	6	M (3×), F (2×)	Supine flex	Pottery spouted Cup, pottery spouted Jar, pottery Cup	Pottery wares above the tomb cover; there is one children pit M298, with three young boys body
IM204	III	Stone Circle	610×430	350	Stone	203×141-120	Wood mat and stone row	16	F (4×)	/	Pottery spouted Cup (12×), pottery Cup (12×), pottery Jug (2×), pottery pot Weng (2×), pottery double-handed Jar, pottery sherds (3×), bronze Knife, bronze Tube, bronze Button, golden Pieces (2×), golden earring, metal piece, gravel stone, stone cosmetic stick, eyebrow stone, stone bead, stone Bowl, bone Spinning wheel	Only skulls remained; there are 2 children pits F1 and F2 with 6 children skulls
IM205	III	Stone Circle	274×215	301	Stone	210×160-70	/	3	M (1×), F (2×)	/	Pottery spouted Cup (3×), pottery spouted Jug, pottery Cup, pottery cup sherd (4×), bronze Knife (2×), bronze Needle, bronze Awl, bronze Tube, iron Knife, bone Plaque, bone ornament	There is one female body above the tomb cover, with one iron knife; there is one children pit, with two kids
IM206	III	Stone Circle	305×300	310	Stone	230×190-60	/	14	F (1×)	Supine straight	Pottery spouted cup sherd (2×), pottery cup sherd, bronze Knife, bronze Ring, bronze Button (2×), bone Spinning Wheel	There are two horse pits, with three horse heads
IM207	III	Stone Circle	660×450	324	/	260×180-150	/	10	M (4×), F (2×)	Supine flex	Pottery spouted Jar (2×), pottery Basin, pottery spouted Cup (5×), pottery Cup (2×), pottery pot Fu, pottery sherds (4×), golden piece, bone Tube (2×), bone Arrowhead, wooden Basin, wooden Plate	
IM208	III	Stone Circle	405×378	301	/	247×164-77	/	8	/	/	Pottery spouted Cup (10×), pottery pot Fu, pottery Cup (2×), pottery shallow Bowl, pottery sherd, bronze Knife (2×), bronze Awl, golden Roll (2×), golden pieces (2×), golden Earring, wooden stick (3×), wooden piece, wooden Bowl, wooden Arrow (5×), wooden Basin, wooden Spinning wheel, wooden Plaque, wooden Bow, wooden Arrowhead, wooden bo× piece, wooden pillow piece, grass piece, bone Spinning wheel, bone Tube, woolen fabrics, stone bead, food remain	
IM209	III	Stone Circle	411×366	298	Stone	193×95-60	/	3	F (1×), Kids (2×)	/	Pottery spouted Cup, pottery pot Fu, pottery double-handed Jar, pottery spouted sherd, stone bead	
IM210	III	Stone Circle	410×310	296	Stone	191×99-45	/	3	M (1×)	Supine flex	pottery spouted Cup, pottery pot Fu, pottery Cup (2×), wooden Basin, bone Plaque	
IM211	III	Stone Circle	410×360	310	Stone	183×135-105	Wood mat and stone row	4	/	/	Pottery Jar, pottery spouted jar and cup sherds, bronze Awl, bone Bead, bone Tube, gravel stone	
IM212	III	Stone Circle	570×346	317	Stone	174×120-100	/	4	M (2×), F (2×)	Supine straight	Pottery spouted Cup (2×), pottery pot Fu, pottery Cup, pottery Jug, pottery Spinning wheel (2×), pottery sherds (2×), bronze Awl, wooden Bow, wooden basin pieces (3×), wooden Arrow shaft, bone Ornament	
IM213	III	Stone Circle	390×300	290	Stone	146×98-70	/	3	/	/	Pottery spouted Cup, bronze pieces, stone bead string, bone bead	
IM214	III	Stone Circle	510×400	330	Stone	211×126-170	/	5	/	/	pottery spouted Cup, pottery double-handed Jar, pottery sherds (2×), gravel stone, bone Arrowhead	One human skull found above the tomb cover
IM215	III	Stone Circle	254×380	336	Stone	220×144-128	/	10	M (1×), F (1×)	Supine flex	pottery spouted Cup (3×), pottery Cup (3×), pottery pot Weng, pottery sherds (3×), pottery Jar, bronze Knife, eyebrow stone, bone Comb, bone Awl, bone Button	
IM216	III	Stone Circle	340×235	311	Stone	158×88-74	/	4	M (1×)	/	Pottery Jar (2×), gravel stone, stone Button	
IM217	III	Stone Circle	/	330	Stone	104×60-60	/	2	/	Supine flex	pottery spouted Cup, bronze Knife	
IM218	III	Stone Triangular Circle	420×134	320	Stone	130×112-94	/	3	M (1×), Kid	Supine flex	Pottery Spinning wheel, pottery spouted cup sherd, bronze Knife, bone Spinning wheel	
IM219	III	Stone Circle	535×370	315	Stone	214×130-65	/	9	M (3×), F (3×)	/	Pottery spouted Cup 95×, pottery Cup (2×), pottery jar and cup sherds (2×), bronze Tube, bronze Awl, golden Ornament (2×)	
IM220	III	Stone Circle	410×360	303	Stone	184×110-75	/	3	M (1×), F (1×)	Supine flex	pottery Jar, pottery Spinning wheel, bronze Knife	
IM221	III	Stone Circle	310	317	/	215×100-65	/	3	/	/	Pottery Cup, pottery sherd, bronze Knife (2×), bone Spinning wheel, stone cosmetic stick	
IM222	III	Stone Circle	295	314	Stone	205×115-71	/	2	/	Supine flex	Pottery sherds, pottery spouted Cup (2×)	One children pit
IM224	III	Stone Circle	400×238	312	Stone	176×80-64	/	3	M (1×)	Supine flex	Pottery Cup, pottery spouted Jug, pottery sherd, bronze Button	
IM225	II	/	/	301	/	90×70-74	/	1	M (1×)	Supine flex	pottery spouted Cup	
IM226	II	Stone Circle	410×380	195	Stone	138×80-80	/	2	M (1×)	/	pottery sherds (2×)	
IM227	II	Stone Circle	/	295	Stone	160×84-37	/	1	/	/	pottery sherd, bronze Knife, bone Spinning wheel	
IM228	II	Stone Circle	100×900	328	Stone	116×166-120	/	2	/	Supine flex	Pottery pot Fu, pottery Jar, pottery Cup, pottery shallow Bow, bronze piece	With tomb entrance door and one horse pit
IM229	I	Stone Circle	380×360	267	Stone	180×140-61	/	2	M (2×)	Supine flex	Bone Spinning wheel, bone Tube, stone Bead	
IM230	II	Stone Circle	470×300	/	/	150×120-71	/	2	M (1×)	Supine flex	Bronze Knife (2×)	
IM231	I	Stone Triangular Circle	340×224	252	Stone	175×75-50	/	2	M (1×)	/	pottery spouted Cup, pottery pot Fu, pottery Cup, bronze Knife, stone ornament	
IM232	I	Stone Circle	456×342	270	Stone	152×77-64	/	2	/	/	pottery Jar	
IM233	II	Stone Triangular Circle	400×352	285	Stone	184×120-50	/	3	M (2×), F (1×)	Supine flex	Pottery spouted jar, cup and basin sherds, bronze Knife	
IM234	I	Stone Circle	340×260	302	Stone	138×80-89	/	3	M (1×)	/	Pottery sherds, bronze Arrowhead	
IM235	I	/	/	290	Stone	174×64-106	/	2	M (1×)	Supine flex	Pottery Cup, pottery shallow Bowl, pottery jar bottom, brown Knife, bone Spinning wheel	
IM236	I	Stone Triangular Circle	420×250	281	Stone	194×72-80	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery pot Fu, pottery Cup, pottery shallow Bow, pottery sherd, bone spinning wheel, gravel stone	
IM237	I	Stone Rectangular Circle	490×300	283	Stone	480×190-70	/	17	M (1×), F (7×)	Supine flex	Pottery spouted Jar (2×), pottery spouted Cup (9×), pottery pot Fu (2×), pottery double-handed Jar, pottery Cup (3×), pottery shallow Bowl, bronze Earring, bronze Awl, bronze Knife, wooden ornament, wooden Earring, wooden Basin (8×), wooden Arrow shaft, wooden fir-making stick, wooden spinning wheel, bone Spinning wheel (2×), bone Arrowhead, stone Button, stone cosmetic stick, grass mat	The bodies are placed in three layers divided by the grass mat; there is another children pit
IM238	II	/	/	270	Stone	138×90-72	/	7	M (2×)	Supine flex	Pottery spouted cup sherds (2×), bone Tube, bone Bead, stone Bead (6×)	Two bodies above the tomb cover
IM239	I	Stone Triangular Circle	294×261	310	Stone	198×86-84	/	1	M (1×)	Supine flex	Pottery sherds, bronze Knife, bronze Awl	
IM240	I	Stone Triangular Circle	222×354	315	Stone	153×55-59	/	2	M (1×), F (1×)	Supine flex	Pottery pot Fu, pottery Jug, bronze awl, bronze Knife, wooden Arrowshaft	
IM251	III	Stone Rectangular Circle	370×296	270	Stone	148×80-70	/	2	M (1×)	/	pottery Spinning wheel, pottery sherds, bronze Awl, bone Tube, wooden Arrowshaft	

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IM242	III	Stone Triangular Circle	440×336	303	Stone	168×90-76	/	2	M (1×), F (1×)	Supine flex	Bronze Knife, bronze Awl, bone Spinning wheel	
IM243	/	Stone Triangular Circle	264×220	274	Stone	74×78-65	/	2	F (1×)	Supine flex	Pottery pot Fu, pottery sherds	
IM244	III	/	/	322	Stone	127×89-54	/	5	M (1×), Kids (3×)	/	Pottery spouted Jar, pottery spouted Cup (2×), pottery pot Fu, pottery Cup (2×), pottery sherds, bronze Knife	
IM245	III	Stone Rectangular Circle	471×252	300	Stone	152×116-70	/	5	/	/	pottery spouted Cup (2×), pottery shallow Bowl, pottery sherds, bronze Knife (3×), bronze Button, bone Awl, golden pieces (3×), golden Earring	
IM246	III	/	/	288	Stone	146×103-74	/	4	F (3×)	/	Pottery spouted Cup (2×), pottery double-handled Jar, pottery Jug, bone Spinning wheel	
IM247	III	/	/	289	/	154×97-148	/	3	F (1×)	/	Pottery Spouted Cup, pottery pot Fu, pottery Jug, bone Bead	
IM248	II	Stone Circle	405×400	297	Stone	112×85-65	/	3	M (1×)	/	pottery spouted Cup, pottery Basin, bronze Button, bone Spinning Wheel	
IM249	III	Stone Triangular Circle	306×400	329	Stone	169×64-70	/	2	/	/	Bronze Knife, bronze Button	
IM250	III	Stone Circle	354×304	292	Stone	153×94-54	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery sherds (2×), bronze Awl, bronze Button, bronze Knife, bone object	
IM251	III	Stone Circle	342×310	300	Stone	174×90-70	/	3	M (1×), F (1×)	Supine flex	Pottery sherd, bronze Arrowhead, bronze Knife (2×)	
IM252	III	Stone Triangular Circle	360×310	277	Wood	223×100-145	/	5	M (3×), F (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup (3×), pottery Cup (2×), pottery sherds, bone Spinning wheel, wooden Bowl	
IM253	III	/	340×210	272	Wood	210×98-135	/	1	M (1×)	Supine flex	Pottery pot Fu, pottery Cup, pottery double-handled Jar, pottery sherd, bronze Knife, bronze Needle	
IM254	III	Stone Triangular Circle	360×270	298	/	195×110-160	/	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup, pottery Jar, pottery spouted Cup, bronze Knife, golden piece, bone Bead	Two horse pits
IM255	II	Stone Triangular Circle	410×360	291	Stone	200×88-78	/	2	M (2×)	Supine flex	Pottery spouted Cup, bronze Knife, wooden Basin	One human body above the tomb cover
IM256	III	Stone Triangular Circle	520×410	315	Stone	180×110-114	/	6	M (2×), F (3×)	/	pottery spouted Cup (3×), pottery pot Fu, pottery sherds, stone cosmetic stick, wooden Basin (2×), bone Spinning wheel, bone Bead, bone Tube	One horse pit
IM257	III	/	/	/	Stone	130×86-39	/	3	/	Supine flex	Pottery spouted Cup, pottery pot Fu, bone Spinning wheel	
IM258	III	Stone Triangular Circle	217×322	310	Stone	161×101-88	/	7	M (3×), F (1×)	Supine straight	Pottery sherds, bronze Knife, bone Check piece	
IM259	III	Stone Circle	410×385	292	Stone	201×114-75	/	6	M (3×), F (2×)	Supine flex	pottery spouted Cup, pottery Jug, pottery double-handled Jar, pottery jar, pottery sherd, bronze Circle, bronze Knife, bronze Button, golden pieces (2×), golden Earring, bone Button, bone Check piece, bone Arrowhead, gravel stone, wooden Arrowhead, wooden Arrowshaft	
IM260	II	Stone Circle	310×295	315	/	160×97-71	/	7	M (1×), F (1×)	Supine straight	Pottery spouted Cup (2×), pottery pot Fu, pottery Cup (3×), bronze Knife, bronze Needle, wooden piece, wooden object, stone bead	
IM261	II	Stone Circle	320×240	308	Stone	159×54-64	/	2	M (1×), F (1×)	Supine flex	Pottery jar, bronze Knife, bone Spinning wheel (2×), wooden Plate (3×)	
IM262	I	Stone Circle	300×273	350	Stone	200×126-80	/	1	F (1×)	Supine flex	pottery spouted Cup, pottery pot Fu	
IM263	I	Stone Circle	360×210	290	Stone	183×86-70	/	1	M (1×)	Supine flex	Pottery pot Fu, pottery Cup (2×), g/s rib	
IM264	III	Stone Circle	340×250	280	Stone	190×104-70	/	2	/	/	Pottery Jug, pottery sherds, bronze Knife, bronze Tube, bone object, bone Spinning wheel, wooden Spinning wheel (2×), wooden object	
IM265	III	Stone Rectangular Circle	300×261	327	Stone	122×76-63	/	2	F (1×)	/	Pottery spouted Cup, pottery Cup	
IM266	III	Stone Triangular Circle	317×162	323	Stone	174×132-61	/	7	M (4×), F (1×)	/	Pottery spouted Cup (2×), pottery Cup, pottery pot Fu, pottery Spinning wheel, pottery sherds, wooden Basin, wooden Arrowhead (2×), bone Button	
IM267	III	Stone Triangular Circle	420×390	315	Stone	210×156-108	/	10	M (2×), F (1×)	Supine flex	Pottery shallow Bowl, pottery sherds, bronze Knife, bone object	
IM268	I	Stone Triangular Circle	500×365	293	Stone	244×96-85×60	/	3	M (2×), F (1×)	/	Bronze Button, silver Earring	
IM269	III	Stone Rectangular Circle	410×365	290	Stone	170×85-80	/	2	M (1×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery sherd, bronze Button, bronze Knife (2×), wooden Basin	One horse pit
IM270	I	Stone Rectangular Circle	450×254	300	Stone	198×88-64	/	3	M (1×), F (1×)	Supine flex	pottery spouted Cup, pottery pot Fu, pottery Cup, bronze button, bone Spinning wheel, stone bead (95×), wooden stick, g/s rib	
IM271	I	Stone Circle	375×350	/	Stone	142×80-76	/	4	M (1×), F (2×)	Supine flex	Pottery Bowl, pottery Spinning wheel, pottery sherd	
IM272	I	/	530×400	292	Stone	180×78-88	/	9	M (3×), F (5×)	Supine flex	pottery spouted Cup, pottery Cup, pottery Jug, pottery sherds, bone Check piece, wooden object, wooden Arrow	
IM273	/	Stone Circle	164	156	Stone	80×46-42	/	1	Kid (1×)	Supine flex	pottery spouted Cup	
IM274	I	Stone Triangular Circle	414×282	318	Stone	134×80-72	/	3	M (1×), F (2×)	/	pottery spouted Jar (2×), pottery spouted Cup, pottery Cup, pottery Jar (2×)	
IM275	I	/	/	312	Stone	164×71-40	/	1	M (1×)	Supine flex	Pottery Cup, pottery pot Fu, gravel stone	
IM276	III	/	405×210	315	Stone	153×105-108	/	2	M (2×)	Supine flex	Pottery sherd, bronze Awl	
IM277	I	Stone Rectangular Circle	500×310	365	Stone	200×70-60	/	4	F (3×)	/	Pottery Cup (3×), pottery Jug, pottery sherds, bronze Knife, grass rope, bone Spinning wheel, stone Bead, wooden Arrow	One human body above the tomb cover
IM278	II	Stone Circle	490×350	309	Stone	193×96-76	/	5	/	/	Pottery spouted Jar, pottery pot Fu, stone bead	
IM279	II	Stone Triangular Circle	386×280	325	Stone	174×108-99	/	3	/	/	Pottery sherd, bronze Knife (3×), cowry ornament, bone ornament (2×), wooden object	One human body in the filling soil
IM280	III	Stone Triangular Circle	249×280	300	Stone	122×80-130	/	1	M (1×)	Supine flex	/	
IM281	III	Stone Circle	467×385	314	Stone	146×76-120	/	3	M (2×), F (1×)	Supine flex	Pottery Cup, bronze Knife (2×), bronze Awl (12×), bronze Dagger, bronze Earring, bone Spinning wheel, wooden Spinning wheel	Two horse pits with three horse heads
IM282	II	Stone Triangular Circle	420×340	340	/	194×122-104	/	3	M (2×), F (1×)	/	Pottery sherd, bronze Knife (2×), bone Spinning wheel	
IM283	II	Stone Triangular Circle	474×322	300	/	195×122-104	/	5	M (4×), F (1×)	/	Pottery spouted Jar, pottery spouted Cup, pottery Cup (2×), pottery Jug, pottery sherds, bronze Knife, iron Knife, gravel stone	
IM284	II	Stone Rectangular Circle	305×234	328	/	152×61-120	/	2	M (1×), F (1×)	Supine flex	Pottery sherd, pottery Cup, bronze Knife	
IM285	II	Stone Circle	307×274	300	/	147×83-110	/	3	M (2×)	Supine flex	Pottery spouted Jar, gravel stone	
IM286	II	Stone Triangular Circle	500×340	335	Stone	160×100-70	Wooden mat	4	M (3×), F (1×)	Supine flex	pottery pot Fu, pottery sherds, bronze Knife, bone Comb, bone object	One horse pit
IM287	III	Stone Circle	450×290	315	Stone	159×110-76	/	3	M (1×), F (2×)	Supine straight	Bronze Awl	One horse pit

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IM288	III	Stone Triangular Circle	500×270	325	Stone	145×120-68	/	2	M (1×), F (1×)	Supine flex	Bronze Knife	
IM289	III	Stone Circle	510×310	310	Stone	176×95-76	/	3	M (3×)	Supine flex	Pottery sherd, bronze Knife, stone Bead	
IM290	III	Stone Triangular Circle	458×276	320	Stone	200×120-94	/	5	M (2×)	Supine flex	Pottery spouted Cup (3×), pottery wheel, pottery Cup, pottery shallow Bowl, pottery double-handled Jar, golden Ring, bone object, bronze Knife, bronze Awl (2×), stone Bead, wooden Plate	
IM291	III	Stone Rectangular Circle	500×400	315	Stone	187×135-75	/	4	M (2×), F (1×)	/	Pottery spouted Cup, pottery Spinning wheel, pottery sherd, pottery double-handled Jar, pottery Cup, golden pieces (2×), stone ornament	One horse pit
IM292	III	Stone Rectangular Circle	400×340	301	Stone	165×139-65	/	4	M (2×), F (1×)	/	Pottery spouted Cup (3×), bronze Needle, wooden Spinning wheel, wooden Arrowshaft, g/s bone	
IM293	III	Stone Rectangular Circle	410×310	325	Stone	160×130-94	/	2	/	/	Pottery sherd, bronze Awl	
IM294	III	Stone Triangular Circle	400×340	311	Stone	183×162-63	/	6	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery Cup, bronze Knife	
IM295	/	Stone Circle	150	324	/	195×142-59	/	3	/	Supine flex	Pottery spouted Cup (2×)	
IM296	III	Stone Circle	370×220	317	Stone	197×161-88	/	5	M (1×), F (2×)	Supine flex	Pottery spouted Cup, pottery doubt-handled Jar, pottery Cup (2×), pottery Spinning wheel, pottery shallow Bowl, bronze Knife	One human body above the tomb cover
IM297	III	Stone Circle	520×340	325	Stone	180×100-60	Wooden mat	11	M (1×), F (4×)	Supine flex	Pottery spouted Jar, pottery spouted Cup (6×), pottery pot Fu (2×), pottery double-handled Jar, pottery Cup (2×), pottery Bowl, pottery sherds, bronze Knife, bone Button, bone Spinning wheel	One children pit
IM299	III	Stone Triangular Circle	450×410	315	Stone	230×90-125	Wood mat and stone row	14	/	/	Pottery Cup (3×), pottery Jug (4×), pottery sherds, bronze Knife (2×), gravel stone, stone cosmetic stick, stone bead	With tomb entrance door and one horse pit
IM300	III	/	460×250	294	Stone	200×142-135	/	/	F (1×)	Supine straight	Pottery spouted Cup (2×), pottery Cup (2×), pottery sherd, bronze Tube, gravel stone	With tomb entrance door
IM301	I	/	444×300	305	/	203×104-140	/	2	M (1×)	Supine straight	Pottery sherd, golden piece	
IM302	I	/	/	320	Stone	170×95-76	/	2	M (1×), F (1×)	Supine straight	Pottery spouted Cup (2×), pottery Jar, pottery Spouted Cup, pottery sherd, bronze Knife (2×)	
IM303	I	Stone Rectangular Circle	500×310	294	Stone	244×87-80	/	3	M (2×)	/	Pottery Cup	
IM304	I	Stone Circle	208×156	313	Stone	212×84-88	/	2	M (2×)	Supine straight	Pottery spouted Cup, bronze Knife	
IM305	I	Stone Triangular Circle	445×232	285	Stone	200×60-65	/	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery pot Fu, pottery double-handled Jar, pottery Jar, pottery spouted Jug, pottery sherds	
IM306	II	/	400×240	290	Wood	140×76-53	/	2	M (2×)	Supine flex	Pottery spouted Jar (2×), pottery spouted Cup, pottery Cup, pottery sherds, bronze Knife	
IM307	II	/	486×312	303	Stone	178×96-95	/	2	F (1×)	Supine flex	Bronze Circle	
IM308	II	Stone Circle	470×280	309	Wood & Stone	200×90-90	/	1	F (1×)	Supine flex	Pottery spouted Cup, pottery Jar, bronze Knife, bronze Button, bone Spinning wheel, wooden Plate, stone Bead	
IM309	I	/	470×280	266	Stone	144×80-57	/	1	Kid (1×)	Supine flex	Pottery pot Fu, pottery sherd, bronze Needle, bronze Knife	
IM310	/	Stone Circle	196×168	310	Stone	60×60-45	/	1	/	/	Pottery spouted Cup, pottery spouted Jar	
IM311	/	/	/	345	Stone	80×58-38	/	1	/	Supine flex	/	
IM312	I	Stone Triangular Circle	450×250	293	Stone	190×65-70	/	2	M (1×), F (1×)	Supine flex	Pottery pot Fu, pottery sherds, bone Spinning wheel, s/g rib	
IM313	I	Stone Circle	337×232	320	/	185×124-60	/	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery pot Fu, pottery Cup, pottery Jug, pottery sherd	
IM314	I	Stone Circle	340×300	312	Stone	198×70-65	/	3	M (1×), F (2×)	Supine straight	Pottery spouted Cup, pottery Spinning wheel	
IM315	I	Stone Triangular Circle	510×320	300	Stone	170×70-78	/	4	M (1×), F (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup (2×), pottery Cup, pottery shallow Bowl, pottery Spinning wheel, pottery sherds, bone Spinning wheel	
IM316	II	Stone Circle	420×220	316	Stone	176×86-72	/	4	M (1×), F (2×)	Supine straight	Pottery sherds, bronze Knife, bronze Awl, bone Spinning wheel, gravel stone	
IM317	I	Stone Triangular Circle	500×300	304	Stone	215×88-76	/	5	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery Cup (2×), pottery Spinning wheel, pottery sherds, bronze Knife, bronze Awl, wooden Arrowshaft	Three human body above the tomb cover
IM318	I	Stone Triangular Circle	510×280	296	Stone	240×74-90	/	2	M (1×), F (2×)	Supine flex	Pottery spouted Cup, pottery sherds, bronze Knife, bone Awl, stone Bead	One horse pit
IM319	II	Stone Triangular Circle	570×330	295	Stone	192×95-77	/	4	M (1×), F (2×)	Supine flex	Pottery spouted Jar (2×), pottery spouted Cup (2×), pottery Cup, pottery shallow Bowl, pottery Spinning wheel, pottery sherd, wooden Arrowshaft, wooden stick, wooden Bow, wooden object, bone Tube	
IM320	II	Stone Rectangular Circle	450×220	300	Wood	210×90-120	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup (2×), bone Check piece (2×), pottery pot Fu	
IM321	III	Stone Circle	500×260	314	Stone	268×100-80	Grass and wooden mat	5	M (2×), F (2×)	/	Pottery Cup (2×), pottery Jug, pottery sherd, bronze Awl (2×), bronze Knife (4×), bronze Tube (2×), bronze piece, wooden Basin, bone Spinning wheel	
IM322	III	/	/	280	Stone	180×106-35	/	4	M (2×), F (2×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery Cup, pottery Jug, pottery sherds, bronze Knife	
IM323	III	Stone Circle	500	313	Wood	220×120-80	Wooden mat	5	M (2×), F (2×)	Supine flex	Pottery spouted Cup (4×), pottery Cup, pottery Spinning wheel (2×), pottery Cup, pottery sherds	
IM324	IV	Stone Circle	300	324	/	122×136-45	/	3	M (3×)	Supine flex	Bronze Bowl, bronze Needle, bone Button	
IM325	I	/	/	312	Stone	170×80-50	/	1	M (1×)	Supine flex	Pottery pot Fu, pottery Jar, bronze Knife	
IM8301	IV	Stone Circle	500×430	300	/	198×152-110	/	4	M (2×), F (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup, pottery pot Fu, pottery double-handled Jar, pottery Cup, bronze Knife, bronze Button, bronze Circle	
IM8302	III	Stone Circle	550×360	90	Stone	220×150-130	/	4	M (3×), F (1×)	/	Pottery Spinning wheel, wooden Plate	
IM8303	IV	Stone Circle	420×360	315	/	275×189-164	/	11	M (4×), F (2×)	/	Pottery shallow Bowl, pottery Jug, pottery Spinning wheel, bronze Knife	One children pit
IM8304	IV	Stone Circle	560×400	90	/	280×190-160	/	1	/	/	Pottery Jug, pottery spouted Jar (3×), pottery spouted Cup (14×), pottery Cup (5×)	Two children pits
IM8305	IV	Stone Circle	450×380	312	/	265×175-155	/	7	M (3×), F (1×)	/	Pottery spouted Cup, pottery double-handled Jar, pottery Cup (2×), pottery Spinning wheel, bronze Knife, wooden Plate (2×), wooden Spinning wheel (6×), wooden plate (3×), wooden fire-making stick	
IM8306	IV	Stone Circle	/	314	/	210×166-164	/	2	M (1×), F (1×)	/	Pottery spouted Cup (3×), pottery Cup (4×), pottery shallow Bowl, pottery Jar, bronze Circle	
IM8307	III	Stone Triangular Circle	480×400	285	Stone	230×170-130	/	19	/	/	Pottery spouted Cup (3×), pottery Cup (3×), bronze Knife, bronze Tube	Two children pits and one horse pit
IM8308	III	Stone Triangular Circle	480×340	313	Stone	200×126-120	/	3	/	/	Pottery spouted Cup, pottery Cup, pottery Spinning wheel, bronze Button (2×), bronze Knife (2×), bronze Tube, bronze Awl (2×), gravel stone	

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 24 Chawuhu Nr. II Cemetery

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IIM201	IV	Stone Mound	675-44	68	/	230×110-120	/	10	M (5×), F (4×)	/	Pottery spouted Cup, pottery Jug (2×), pottery Cup, pottery Spinning wheel, pottery sherds, gravel stone, stone cosmetic stick, bronze Awl, bronze Knife, golden Earring, bone Spinning wheel, wooden fire-making stick, iron slag	One children pit and one cow pit
IIM202	IV	Stone Mound	620-34	71	/	190×160-220	/	9	M (3×), F (4×)	/	pottery double-handled Jar (2×), pottery spouted Jar (2×), pottery Jug, pottery sherd, bronze Button, bronze Knife, bronze Awl, stone Spinning wheel, stone cosmetic stick	
IIM203	IV	Stone Mound	600-30	15	/	210×140-115	/	14	M (4×), F (9×)	/	Pottery Jug (6×), pottery Cup (4×), pottery spouted, pottery Spinning wheel, bronze piece, wooden Spinning wheel, bone Spinning wheel, Cup with iron circle	One children pit with four kids
IIM204	/	Stone Mound	690-70	/	/	/	/	1	/	/	/	
IIM205	/	Stone Mound	590-40	6	/	/	/	1	/	/	/	
IIM206	/	Stone Circle	640-60	312	/	/	/	1	/	/	/	
IIM207	II	Stone Circle	360×260	/	/	140×90-104	/	9	M (3×), F (4×)	Supine flex	Pottery Cup (3×), pottery spouted (4×), pottery spouted pot Fu, bone Spinning wheel	One children pit
IIM208	III	Stone Circle	300×260	15	/	170×60-80	/	5	M (1×), F (2×)	Supine flex	Pottery spouted Cup (2×), stone Spinning wheel	
IIM209	II	Stone Circle	290×260	25	/	138×80-60	/	10	M (5×), F (3×)	Supine flex	Pottery spouted Cup (3×), pottery Spinning wheel, pottery spouted jug, pottery Cup, pottery cup Yi, bronze Awl	
IIM210	IV	/	/	4	Stone	180×190-130	/	3	M (2×), F (1×)	Supine straight	/	
IIM211	IV	Stone Mound	730×45	314	/	310×200-140	/	13	M (6×), F (4×)	/	Pottery Spinning wheel, pottery sherds, pottery spouted Cup, pottery Cup (2×), pottery Jug (2×), bone Ornament (2×)	Two children pits
IIM212	IV	Stone Mound	830-44	218	/	374×260-166	/	7	F (7×)	/	Pottery spouted Jar, pottery spouted Cup, pottery sherds, pottery Cup, pottery Jug (5×), bronze pieces (3×), bronze Tube, stone Bead, Agate bead, stone Cosmetic stick, bone Awl, bone Tube	Two children pits
IIM216	III	Stone Circle	460×460	360	Stone	200×153-100	/	4	M (3×), F (1×)	Supine flex	Pottery shallow Bowl, pottery sherds, pottery spouted Cup, bronze Arrowhead, bronze Earring, gravel stone, bone Bead, iron Knife	The human bodies are in two layers, in between is a layer of animal bones; there is another horse pit
IIM217	II	/	328×250	309	/	142×80-70	/	8	M (2×), F (2×)	Supine flex	pottery spouted Jar, pottery spouted Cup, pottery Cup	One children pit
IIM218	IV	Stone Mound	100	45	/	270×125-136	/	6	M (1×), F (5)	/	pottery spouted Cup, pottery Jug (2×), bronze piece, bronze Mirror, wooden Arrowshaft, wooden Spinning wheel, gravel stone, stone bead, stone Spinning wheel, bone object, bone Awl, iron slag	Two children pits
IIM221	IV	Stone Mound	340-58	35	/	215×100-100	/	5	M (1), F (4×)	/	Pottery Jug (2×), stone Spinning wheel, stone Bead, stone Cosmetic stick (2×)	
IIM222	/	Stone Mound	543-95	180	/	/	/	1	/	/	/	
IIM223	IV	Stone Mound	620-50	315	/	290×180-120	/	12	M (5×), F (5×)	/	Pottery spouted Cup (6×), pottery Cup (3×), pottery Jug (4×), pottery sherds, bronze Plaque (2×), bronze Awl, bronze Needle, bronze Earring, bronze Tube, bronze Knife, bone Tube, stone Cosmetic stick (2×), bone ornament, bone Awl (2×), iron slate	With tomb entrance door; the human bodies are in four layers; there is another children pit with two kids
IIM301	/	Stone Mound	450-60	310	/	/	/	1	/	/	/	
IIM302	/	Stone Mound	500×280-54	183	/	/	/	1	/	/	Stone Bead	
IIM303	/	Stone Mound	400×320-60	/	/	/	/	1	/	/	/	
IIM304	III	Stone Circle	340×320	326	/	152×74-76	/	1	/	Supine flex	Pottery Cup, stone Bead	
IIM305	IV	Stone Mound	490-72	310	/	186×113-90	/	6	M (1×), F (3×)	/	Pottery spouted Jar (2×), pottery spouted Cup (4×), pottery Cup, pottery Jug (3×), bronze Arrowhead, stone Bead, gravel stone	
IIM306	IV	Stone Mound	310-60/256×190	330	Stone	113×60-90	/	1	/	/	Pottery spouted Cup (2×)	

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 25 Chawuhu Nr. III Cemetery

Tomb No.	Tomb type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Secondary Platform H (cm)	Tomb Furnishings L×W-H (cm)	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IIIM1	Vertical shaft with side chamber	Stone Mound	300×240-40	Mud brick	210×60-50 222×43-60	/	/	2	M (2×)	Supine straight	Pottery Jar, pottery Spinning wheel	
IIIM2	vertical shaft with double side chamber	Stone Mound	400×360-50	Mud brick	181×44-10 203×30-43	/	/	2	M (1×), F (1×)	Supine straight	/	
IIIM3	Vertical shaft	Stone Mound	200×230-40	/	226×100-124	/	Wooden coffin, 222×58-(34-62)	1	M (1×)	Supine straight	/	One s/g head on the north of wooden coffin
IIIM4	Vertical shaft	Stone Mound	200×152-24	/	176×73-100	/	Wooden coffin, 148×40-13, no coffin top and bottom	1	Kid	Supine straight	Bronze Earring, golden Earring, iron Knife	
IIIM5	Vertical shaft with side chamber	Stone Mound	250×180-24	Mud brick	202×56-70	20	One wooden plank above the body	1	M (1×)	Supine straight	Bronze Nail, bronze Button (3×)	
IIIM6	Vertical shaft with side chamber	Stone Mound	300×220-40	Boulder	207×57-30	24	/	1	M (1×)	Supine straight	/	
IIIM7	Vertical shaft	Stone Mound	180×200-22	/	308×220-170	/	Wooden coffin, 227×114-(63-86)	2	M (1×), F (1×)	Supine straight	Pottery Jar (2×), bronze Plaque, iron Nail, golden ornament, bone dagger	
IIIM8	Vertical shaft with side chamber	Stone Mound	480×440-50	/	260×90-92	30	Wooden coffin, 200×60-60, no bottom	1	M (1×)	Supine straight	Bronze Bell, iron Hook, iron Harness (2×), iron Mirror, bone Comb, bone Awl, silver Ring	One horse on the secondary platform
IIIM9	Vertical shaft with side chamber	Stone Mound	450×320-50	Wood	302×100-70	35	Wooden frame, 250	1	M (1×)	Supine straight	Bone Plaque, gravel stone, iron Arrowhead, iron Knife with iron arrowhead, iron Sword	
IIIM10	Vertical shaft	Stone Mound	330×301-17	/	284×144-114	/	/	1	M (1×)	Supine straight	Iron Sword, iron object with golden coating, iron Knife, iron Hook	Buried with horse and s/g bone
IIIM11	Vertical shaft with side chamber	Stone Mound	320×230-25	Mud brick	205×62-45	25	/	1	M (1×)	Supine straight	/	
IIIM12	Vertical shaft with side chamber	Stone Mound	400×240-20	Mud brick	210×67-65	28	/	1	M (1×)	Supine straight	Silver ornament, golden Ball, wooden Basin	
IIIM13	Vertical stone chamber	Stone Mound	500×260-35/ 420×260	/	188×76-53	/	/	1	M (1×)	Supine straight	Iron object pieces (2×)	
IIIM14	Vertical shaft with side chamber	Stone Mound	380×241-20	Mud brick	240×63-60	20	/	1	M (1×)	Supine straight	Iron object, iron Mirror piece, wooden object, bone Dagger, bone object	
IIIM15	Vertical shaft	Stone Mound	300×210-37	/	118×40-46	/	/	1	Kid	Supine straight	Wooden Plate piece	
IIIM16	Vertical shaft with side chamber	Stone Mound	262×186-25	Mud brick	210×68-60	30	/	1	M (1×)	Supine straight	Iron object piece	
IIIM17	Vertical shaft with side chamber	Stone Mound	360×200-30	Mud brick	222×92-65	25	/	1	M (1×)	Supine straight	Wooden Plate piece	
IIIM18	Vertical shaft	Stone Mound	340×290-50	/	255×150-80	/	Square wooden frame, 230×102-114	1	M (1×)	Supine straight	Stone bead (37×)	One grass mat on the wooden frame
IIIM19	Vertical shaft with side chamber	Stone Mound	295×335-48	/	108×35-56	25	/	1	Kid	Supine straight	/	
IIIM20	Vertical shaft with side chamber	Stone Mound	360×323-27	Wood	297×90-80	35	Wooden frame, 204×80-10; one arc cover outside the frame, 214-40	1	F (1×)	Supine straight	Bronze Plaque, iron Sword, iron object with golden coating, iron Arrowhead, stone Bead	

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 26 Chawuhu IV Cemetery

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IVM1	III	Stone Circle	580×490	346	Stone	219125-92	/	5	M (3×), F (2×)	Supine flex	Pottery spouted Jar, pottery Cup (2×), pottery Spinning wheel, pottery Basin, pottery double-handled Jar, pottery sherds, bronze Button, bronze Knife, bronze Needle	
IVM2	III	Stone Triangular Circle	465×340	345	Stone	190×108-106	Wooden mat	5	M (2×), F (3×)	Supine flex	Pottery Jug, pottery spouted Jar, pottery Spinning wheel (3×), pottery Cup, pottery sherds, bronze Knife (2×), bronze Tube, bronze Needle, bronze Awl, bronze Plaque, golden roll, stone bead, s/g rib	One pottery Spinning wheel and few pottery sherds above the tomb cover; one horse pit
IVM3	III	Stone Rectangular Circle	450×260	350	Stone	155×54-106	Stone row, wooden mat and grass mat	5	/	/	Pottery spouted Cup, pottery Cup (4×), bronze Hook, bronze Tube, bronze Arrowhead, bronze Button, stone bead	One pottery Jar above the tomb cover
IVM4	IV	Stone Circle	580×490	10	/	320×160-88	Wooden mat and stone	6	M (4×), F (2×)	Supine flex	Pottery spouted Jar (2×), pottery spouted Cup (4×), pottery Cup, pottery sherds, bronze Circle (3×), bronze Awl, bronze Knife (2×), grave stone, stone bead	One horse pit with one pottery spouted Jar inside
IVM5	IV	Stone Triangular Circle	660×510	20	/	170×180-130	Stone row, wooden mat and grass mat	5	/	/	Pottery spouted Jar, pottery spouted Cup (4×), pottery Cup (3×), pottery Jug, bronze Awl (2×), bronze Bell, a×e, bronze Knife (2×), stone bead, gravel stone, golden piece	With tomb entrance door; one horse pit with three horse heads
IVM6	IV	Stone Circle	600×420	360	/	270×205-160	Wooden mat	4	M (1×), F (1×)	/	Pottery spouted Cup (3×), pottery Cup (4×), pottery Spinning wheel	With tomb entrance door; one horse pit
IVM7	IV	/	/	347	/	216×150-90	Stone row, wooden mat and grass mat	6	/	/	Pottery Cup, pottery sherd, bronze Knife, gravel stone	With tomb entrance door; one horse pit
IVM8	II	Stone Circle	480×340	346	Stone	230×150-100	Wooden mat	2	/	Supine flex	Pottery spouted Cup (3×), pottery double-handled Jar, pottery Cup (3×), pottery Spinning wheel, bronze Gag bot, bone Spinning wheel, gravel stone	With tomb entrance door; one horse pit with four horse heads
IVM9	II	Stone Circle	400×280	335	Stone	214×122-100	Stone row, wooden mat and grass mat	8	M (5×), F (1×)	/	Pottery spouted Cup (3×), pottery Cup (5×), pottery sherds, bronze Knife, bone Spinning wheel	
IVM10	II	Stone Triangular Circle	510×320	349	Stone	190×100-100	Wooden mat	8	M (2×)	/	Pottery spouted Cup, pottery Cup (4×), pottery Spinning wheel, pottery sherds	One horse pit
IVM11	III	Stone Circle	550×350	346	Stone	200×200-90	Wooden mat and stone	7	M (2×)	/	Pottery Cup (6×), pottery spouted Cup, pottery pot Fu, pottery sherds, bronze Plaque, bronze Awl, bronze Knife, stone bead	one children pit and one horse pit
IVM12	III	Stone Circle	425×350	18	Stone	200×140-100	Grass mat	3	M (1×), F (1×)	/	Pottery Cup, bronze Tube (3×), bronze Button, golden Earring (3×)	One horse pit with one horse head
IVM13	III	Stone Circle	620×420	345	Stone	220×120-140	Stone row, wooden mat and grass mat	4	M (2×)	Supine flex	pottery Cup, pottery double-handled Jar, pottery Spinning wheel, pottery Jar (2×), bronze Button, gravel stone, bone Spinning wheel	Some human bones are inside the pottery Jar; one horse pit with one horse head
IVM14	II	/	/	330	Stone	130×90-130	Grass mat	4	/	Supine flex	Pottery spouted Cup (2×), bronze Awl (2×), bronze Knife (2×), bronze Needle, bronze Plaque, gravel stone, bone Spinning wheel, bone Awl, bone Plaque	One horse pit with one horse head
IVM15	II	/	/	332	Stone	155×80-131	/	2	M (1×), F (1×)	/	Pottery spouted Cup, pottery Cup (2×), pottery Spinning wheel, pottery sherd	One horse pit with one horse head
IVM16	III	Stone Circle	505×340	335	Stone	200×90-95	/	5	M (1×), F (1×)	/	Pottery pot Weng (2×), pottery Cup (3×), pottery single-handled shallow Bowl, pottery Jug, pottery spouted Cup, pottery sherd, bronze Knife, bronze knife piece	One children pit with one kid, one horse pit with one horse head
IVM17	II	Stone Circle	400×320	320	Stone	214×83-90	Grass mat	5	M (3×), F (1×)	Supine flex	Pottery spouted Cup (4×), pottery Jar, pottery Spinning wheel, pottery sherd, bronze Nail, bone Spinning wheel, wooden Basin, wooden stick, wooden fire-making stick, wooden Spinning wheel	Two pottery Jars, one pottery Spinning wheel, two wooden Plates, one wooden Spinning wheel and s/g bone above the tomb cover
IVM18	II	Stone Circle	320×270	335	Stone	170×88-65	/	6	M (4×), F (2×)	Supine flex	Pottery spouted Cup (4×), pottery Cup (2×), pottery Jar, pottery pot Fu, wooden Basin (6×), wooden stick (2×), bone object, bone Spinning wheel, wooden fire-making stick, wooden Arrow, wooden Spinning wheel	One pottery jar and two wooden Plates above the tomb cover
IVM19	II	Stone Circle	310×330	345	Stone	145×90-140	Wooden mat, grass mat and stone	13	M (1×)	/	Pottery Cup (2×), pottery double-handled Jar, pottery sherds, bronze Knife, bronze Awl, stone bead, gravel stone golden Earring	One horse pit with one horse head
IVM20	II	Stone Circle	520×360	344	Stone	270×140-140	/	15	M (3×), F (2×)	Supine flex	pottery spouted Cup (9×), pottery Cup (7×), pottery pot Weng, pottery spouted pot Fu, pottery Spinning wheel (2×), bronze Awl, stone bead, wooden Basin, bone ornament	One horse pit with one horse head
IVM21	III	Stone Triangular Circle	480×340	358	Stone	190×110-150	Wooden mat	5	M (2×), F (2×)	Supine flex	Pottery spouted Cup (8×), pottery Cup (4×), pottery Crucible, pottery pot Fu, pottery sherd, bronze Awl, bronze Knife, stone cosmetic stick, gravel stone	Two children pits and one horse pit
IVM22	III	Stone Triangular Circle	560×340	348	Stone	235×130-125	Grass mat	4	/	/	Pottery spouted Jar, pottery spouted Cup, pottery double-handled Jar, pottery sherd, bronze Needle, bronze Plaque, bronze Knife (2×), wooden object, stone cosmetic stick, bone object	One horse pit with one horse head
IVM24	III	Stone Circle	590×360	355	Stone	201×180-110	Wooden mat	8	F (2×)	/	Pottery spouted Cup (4×), pottery Jar (2×), pottery Cup (6×), pottery double-handled Jar (2×), pottery sherd, bronze Needle (2×), bronze Earring, bronze Tube, stone cosmetic stick (3×), gravel stone (2×)	With tomb entrance door; one horse pit with two horse heads; two children pits
IVM25	II	Stone Triangular Circle	490×400	255	Wood	210×110-70	Wooden mat	4	M (3×)	/	Pottery spouted Cup (3×), pottery Cup (3×), pottery double-handled Jar (2×), pottery shallow Bowl, bronze Earring, bronze Button, stone bead	One horse pit with one horse head
IVM26	III	Stone Circle	480×280	10	Stone	180×120-140	Wooden mat	4	M (2×), F (2×)	Supine flex	Pottery spouted Jar (3×), pottery Cup, pottery Jar, pottery sherd, bronze Tube	
IVM27	I	Stone Mound	250	40	Stone	180×60-50	Grass mat	3	M (1×), F (1×)	/	Pottery spouted Cup, pottery spouted Jar, pottery pot Fu (2×), pottery Cup, pottery sherds, horn object	
IVM28	I	Stone Circle	280×210	7	Stone	190×62-60	/	2	M (2×)	Supine flex	Pottery spouted Cup, pottery sherds	Two horse pits with two horse heads
IVM29	I	Stone Triangular Circle	420×290	325	Stone	169×77-40	/	1	M (1×)	Supine flex	Pottery double-handled Jar, bronze Knife, bronze Awl, stone Button	
IVM30	II	Stone Triangular Circle	448×310	235	Stone	170×94-60	/	3	M (2×), F (1×)	Supine straight	Pottery spouted Cup (2×), pottery Jar (2×), pottery shallow Bowl, pottery Cup (3×), pottery shallow Bowl, bone Spinning wheel, gravel stone, stone bead	Pottery wares and bone objects above the tomb cover
IVM31	II	Stone Triangular Circle	500×330	327	Stone	190×110-52	/	6	M (3×), F (2×)	Supine flex	Pottery spouted Cup (6×), pottery Cup (2×), pottery double-handled Jar, bronze Knife, gravel stone, s/g bone	One painted pottery ware above the tomb cover
IVM32	II	Stone Triangular Circle	300×270	350	Stone	150×50-50	Grass mat	1	Kid	Supine flex	Pottery spouted Jar, pottery spouted Cup, pottery Cup, bronze Knife	
IVM33	III	Stone Triangular Circle	512×372	355	Stone	222-216-40	Wooden mat	9	M (6×), F (3×)	Supine straight	Pottery spouted Jar (2×), pottery Jar (3×), pottery Cup (3×), pottery Spinning wheel, pottery double-handled Jar, bronze Plaque, gravel stone, bladder stone, agate bead, cosmetic stick, wooden Arrowshaft, wooden Spinning wheel, wooden Basin (2×), bone object	One pottery ware above the tomb cover; one horse pit
IVM34	II	Stone Circle	475	334	Stone	234×104	Wooden mat	2	M (2×)	/	Pottery Cup	One horse pit with one horse head
IVM35	II	Stone Circle	268	345	Stone	150×86	/	9	M (5×), F (2×)	Supine flex	Pottery spouted Jar, pottery spouted Jar (2×), pottery Cup (3×), pottery Jug, pottery Jar, pottery shallow Bowl, pottery pot Fu, pottery sherds, bone Spinning wheel	

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IVM36	III	Stone Circle	530×400	358	Stone	220×180-112	Grass mat	3	/	/	Pottery spouted Jar (2×), pottery Cup (2×), pottery sherds, pottery Spinning wheel, bone ornament, bone Awl	With tomb entrance door; one children pit; one horse pit with four horse heads
IVM37	II	/	/	310	/	230×90-61	/	4	M (1×), F (2×)	Supine flex	Pottery spouted Cup (3×), pottery Cup (5×), pottery sherd, pottery Spinning wheel (2×), bronze plaque, bronze Knife, gravel stone	
IVM38	III	Stone Mound	390	303	Stone	120×82-53	/	2	F (1×)	/	Pottery sherds, gravel stone	
IVM39	II	Stone Circle	469×320	326	Stone	188×80	/	4	M (1×), F (1×)	Supine straight	Pottery spouted Cup (5×), pottery Cup, pottery Jar, pottery shallow Bowl, pottery sherds	pottery wares and human bones above the tomb cover
IVM40	III	Stone Rectangular Circle	460×320	360	Stone	286×166-150	/	21	M (16×), F (1×)	Supine flex & straight	Pottery spouted Cup (3×), pottery Cup (5×), pottery shallow Bowl, pottery Spinning wheel (2×), pottery sherd, bronze Knife, gravel stone	With tomb entrance door, outside the door is one bronze Knife, a row of s/g ribs and human bones; one horse pit with one horse head
IVM41	II	Stone Circle	554×367	353	Stone	210×112-98	Wooden mat	2	F (2×)	Supine flex	Pottery Cup, bronze Hook, bronze Tube, bronze Knife, silver Button, stone bead, golden Earring	S/g ribs
IVM42	II	Stone Mound	340	319	Stone	160×70-68	/	6	M (2×), F (2×)	Supine flex & straight	Pottery Cup (3×), pottery Jar, pottery Bowl, pottery double-handled Jar, pottery spouted Cup, pottery Spinning wheel, wooden Basin, bone Spinning wheel	One pottery Jar above the tomb cover
IVM43	II	Stone Triangular Circle	400×270	340	Stone	173×86-71	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup (2×), pottery Cup, pottery Jar, pottery Basin, pottery Jar, wooden Basin, wooden Spinning wheel, bone Spinning wheel (2×), bone ornament	
IVM44	II	Stone Circle	440×335	339	/	212×120-84	/	4	M (2×), F (1×)	Supine straight	Pottery spouted Cup (2×), pottery Cup (3×), pottery Spinning wheel, pottery Jar	A row of s/g ribs
IVM45	II	Stone Triangular Circle	600×390	324	Stone	238×120-80	Grass mat, wooden mat	8	M (2×)	/	pottery spouted Cup (3×), pottery Spinning wheel, pottery sherds, gravel stone, stone cosmetic, bone Spinning wheel, bone bead	One pottery ware above the tomb cover; one horse pit with one horse head and foot
IVM46	II	Stone Triangular Circle	345×268	356	Stone	156×74-68	Grass mat and stone	5	M (1×), F (2×)	Supine straight	Pottery spouted Jar, pottery spouted Cup (4×), pottery shallow Bowl, pottery Jar (3×), pottery double-handled Jar, pottery Spinning wheel, bronze Knife, bronze Circle, stone bead (2×)	
IVM47	II	Stone Circle	392×350	336	Stone	210×92-100	/	5	M (3×), F (2×)	/	Pottery spouted Cup (3×), pottery Cup, pottery sherd, bronze Needle, bone Tube	
IVM48	II	Stone Rectangular Circle	490×370	328	Stone	198×130-88	/	9	M (4×), F (2×)	Supine flex	Pottery spouted Cup (4×), pottery (3×), pottery shallow Bowl, pottery double-handled Jar, pottery Spinning wheel (2×), pottery sherds, gravel stone, stone cosmetic stick, bone Arrowhead, bone Spinning wheel, bone bead, bronze Needle (2×), bronze Knife, bronze Button, bronze pieces	One human body above the tomb cover
IVM49	/	Stone Circle	176×110	330	Stone	67×46-54	/	2	Kid	Supine flex	Pottery spouted Cup	
IVM50	II	Stone Triangular Circle	474×352	337	Stone	212×112-98	/	5	M (2×), F (2×)	Supine straight	Pottery spouted Cup (2×), pottery Cup, pottery Spinning wheel, pottery sherd, bronze Knife, bone object	One horse pit with one horse head
IVM51	II	Stone Circle	480×300	316	Wood	215×125-82	/	4	M (2×), F (2×)	Supine flex	Pottery Cup, pottery sherds, bronze Circle, bone Check piece, golden piece	With tomb entrance door, outside the door are pottery wares, human bones and s/g ribs
IVM52	III	Stone Rectangular Circle	563×310	355	Stone	206×150-100	/	8	/	/	Pottery spouted Cup (3×), pottery Spinning wheel, pottery Dou handle, bronze Knife, bronze Awl, bronze Tube, bone Spinning wheel	Pottery wares and s/g ribs above the tomb cover; one children pit with three kids
IVM53	II	Stone Rectangular Circle	480×460	360	Wood	210×70-40	Grass mat, wooden mat	11	M (6×), F (2×)	Supine flex	Pottery spouted Cup (2×), pottery Cup, pottery Jar, pottery Bowl, pottery sherd, bronze Knife	
IVM54	I	Stone Triangular Circle	310×296	345	Stone	136×58-64	/	2	M (1×), F (1×)	Supine straight	Pottery spouted Cup (2×), pottery shallow Bowl, pottery Cup (2×), pottery sherds	
IVM55	I	Stone Triangular Circle	426×330	338	Wood	244×80-140	/	2	M (1×), F (1×)	Supine straight	Pottery spouted Jar, pottery Cup (2×), pottery Jar, pottery double-handled Jar, golden piece	
IVM56	I	Stone Rectangular Circle	540×265	318	Wood	184×90-74	/	3	M (2×), F (1×)	Supine flex & straight	Pottery spouted Jar, pottery Jar (3×), pottery spouted Cup, bronze Knife, wooden Basin, bone Spinning wheel, s/g rib	
IVM57	II	Stone Triangular Circle	420×330	343	Wood	230×100-90	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup, pottery Cup (3×), pottery double-handled Jar, bone tube, s/g rib	
IVM58	II	Stone Triangular Circle	533×350	356	Wood	160×90-70	/	4	M (3×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery sherds, bronze Tube, golden piece, bone Awl, tooth object	
IVM59	II	Stone Triangular Circle	460×350	280	Wood	246×80-65	/	3	M (3×)	Supine flex	Pottery spouted Jar, pottery spouted Cup (2×), pottery Cup, pottery sherd, bronze Knife	
IVM60	II	Stone Circle	390×300	358	Wood	180×74-82	/	1	M (1×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery pot Fu	
IVM61	III	Stone Triangular Circle	370×280	320	Stone	124×81-52	Grass mat	5	M (2×)	/	Pottery Jar, pottery Cup, pottery Bowl, pottery double-handled Jar	
IVM62	III	Stone Triangular Circle	440×310	345	/	160×135-65	/	7	M (3×), F (2×)	Supine flex	pottery spouted Cup (3×), pottery Jar (2×), pottery pot Fu, pottery shallow Bowl, pottery sherd, bronze Needle	
IVM63	III	Stone Triangular Circle	450×310	345	Stone	170×195-70	/	4	F (2×)	Supine flex & straight	Pottery spouted Cup, bronze Knife, bone Spinning wheel	
IVM64	II	Stone Triangular Circle	540×320	350	Stone & Wood	210×100-70	Wooden mat	7	M (3×), F (2×)	Supine flex	Pottery spouted Cup (4×), pottery pot Weng, pottery Jug, pottery Cup, pottery shallow Bowl, pottery jar, bronze Needle	One horse pit with one horse head
IVM66	II	Stone Triangular Circle	430×310	22	Stone	200×80-71	/	3	M (2×), F (1×)	Supine flex	Pottery pot Fu, pottery double-handled Jar, pottery Jar, pottery Cup (2×), pottery sherd, bronze Knife	One children pit with five kids
IVM67	II	Stone Triangular Circle	420×340	3	Stone	240×120-50	/	2	M (2×)	Supine flex	Pottery spouted Cup, pottery Cup (2×), pottery double-handled Jar, pottery pot Fu, bronze Knife, bronze Spinning wheel	One horse pit with one horse head
IVM68	II	Stone Circle	410×320	10	Stone	210×110-80	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup (2×), pottery Cup, pottery pot For, pottery Jar, pottery sherds, bronze Awl	
IVM69	III	Stone Circle	320×290	350	Stone	184×70-68	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery Cup (2×), pottery double-handled Jar, bronze Awl, bronze Knife, bone Spinning wheel	
IVM70	II	Stone Triangular Circle	375×226	315	Stone	200×110-110	/	4	M (2×), F (2×)	Supine flex	Pottery spouted Cup, pottery Cup (2×), pottery sherds, bronze Awl, bone Spinning wheel	
IVM71	I	/	/	310	Stone	170×56-60	/	2	F (2×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery shallow Bowl, pottery sherds, pottery Spinning wheel, stone Spinning wheel, stone cosmetic stick, stone bead, woolen fabric	
IVM72	I	Stone Triangular Circle	440×240	290	Stone	140×60-82	/	3	F (2×)	Supine flex & straight	Pottery spouted Jar, pottery spouted Cup, pottery Cup, pottery Basin, pottery Spinning wheel, bronze Knife, stone cosmetic stick, bone Spinning wheel	
IVM73	I	Stone Circle	270×220	320	Stone	190×68-46	/	2	M (2×)	Supine flex	Pottery pot Fu, pottery shallow Bowl, s/g rib	
IVM74	I	Stone Circle	418×400	325	Stone	238×80-75	/	1	M (1×)	Supine flex	Pottery pot Fu, bronze Knife	
IVM75	I	Stone Triangular Circle	420×290	310	Stone	210×80-65	/	3	M (2×)	Supine flex	Pottery spouted Cup, pottery Cup (2×), pottery pot Fu, pottery Jar, pottery double-handled Jar, pottery shallow Bowl	
IVM76	I	Stone Triangular Circle	350×240	330	Stone	180×70-45	/	1	/	/	/	
IVM77	I	Stone Triangular Circle	500×380	336	Stone	240×90-80	/	3	M (1×), F (2×)	Supine straight	Pottery spouted Cup (3×), pottery Cup (2×), pottery Jar, pottery pot Fu, bronze Knife, stone bead	
IVM78	I	Stone Triangular Circle	400×320	305	Stone	230×70-56	/	1	M (1×)	Supine flex	Pottery pot Fu, pottery Cup, pottery shallow Bowl, pottery single-handled Jar, bronze Knife, bronze Awl, stone Button, stone bead necklace, s/g rib	
IVM79	I	/	/	314	Stone	170×70-62	/	1	M (1×)	Supine flex	Pottery pot Fu, pottery Spinning wheel, bronze Knife, bone Spinning wheel	
IVM80	I	/	/	322	Stone	150×60-60	/	1	M (1×)	Supine flex	Pottery double-handled Jar, pottery sherds, bronze Knife, bronze Awl	

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IVM81	II	Stone Triangular Circle	400×270	343	Stone	168×101-84	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup (3×), pottery Cup, pottery double-handled Jar, pottery Spinning wheel, pottery pot Fu, pottery single-handled Jar, bone Spinning wheel, bronze Knife	
IVM82	II	Stone Triangular Circle	464×326	338	Stone	/	Grass mat, wooden mat	6	M (3×), F (2×)	Supine flex	Pottery spouted Cup (3×), pottery double-handled Jar, bronze Knife (2×), bronze Awl, bone Spinning wheel	
IVM83	II	Stone Triangular Circle	420×316	318	Stone	194×96-85	Wooden mat	4	M (2×), F (2×)	Supine flex	pottery spouted Cup (2×), pottery sherd, bronze Button, golden roll ornament	
IVM84	II	Stone Circle	460×307	352	Stone & Wood	174×106-75	/	3	M (1×), F (2×)	Supine flex	Pottery Cup, pottery double-handled Jar, pottery Jug (2×), pottery sherds, bone Tube	One horse pit with one horse head
IVM85	II	/	/	358	Stone	180×105	/	5	M (3×), F (2×)	Supine flex	Pottery spouted Cup, pottery pot Weng, pottery jar, pottery sherds, bronze Knife	
IVM86	II	Stone Circle	500×330	5	Wood	200×94-103	/	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery Cup (2×), pottery pot Fu, pottery Jar, pottery Cup, bronze Awl	One horse pit with one horse head
IVM87	II	Stone Rectangular Circle	260×210	315	Stone	138×70-58	/	2	Kid	Supine flex	Pottery spouted Cup (2×), pottery Cup (3×), pottery pot Fu, pottery Jar, bronze Awl	
IVM88	I	Stone Circle	430×350	348	Wood	232×100-70	Grass mat	4	M (1×), F (2×)	Supine flex	Pottery spouted Jar, pottery spouted Cup, pottery Cup (2×), pottery double-handled Jar, gravel stone, stone bead, bronze Knife, bronze Awl, bone Awl	
IVM89	II	Stone Mound	280	325	/	158×64-42	Grass mat	5	M (2×), F (1×)	Supine straight	Pottery spouted Jar, pottery spouted Cup (3×), pottery Cup, pottery shallow Bowl, pottery double-handled jar, pottery sherds	
IVM90	I	Stone Circle	381×316	322	Stone	200×74-72	Grass mat	6	M (3×), F (2×)	Supine flex	pottery spouted Jar (2×), pottery spouted Cup (5×), pottery Cup (3×), pottery sherds, bronze Knife, bone bead, bone Tube, wooden object, wooden stick, wooden Bo×	
IVM91	I	Stone Circle	466×280	297	Stone	208×80-70	/	2	F (2×)	Supine flex	Pottery spouted Jar, pottery pot Fu, pottery Cup, pottery shallow Bowl, pottery Jar, pottery Spinning wheel, pottery sherds, bronze Circle, bronze Knife, stone bead (26×), bone Spinning wheel, horse bones, s/g rib	
IVM92	I	Stone Circle	400×320	292	Stone	260×96-80	/	3	M (2×), F (1×)	Supine flex & straight	Pottery spouted Jar, pottery pot Fu, pottery spouted Cup (4×), pottery Cup (3×), pottery Basin, pottery shallow Bowl (3×), bronze Knife, bronze Circle, bronze Button, bronze Awl, wooden Spinning wheel, bone Spinning wheel, gravel stone, stone bead, linen fabric	
IVM93	I	Stone Triangular Circle	410×300	316	Stone	220×70-96	/	2	M (1×), F (1×)	Supine flex	pottery spouted Cup, pottery pot Fu, pottery Spinning wheel, pottery double-handled Jar, bone Check piece (2×), woolen fabric	One horse pit with one horse head
IVM94	I	Stone Triangular Circle	400×260	297	Stone	190×70-60	/	2	M (2×)	Supine flex	Pottery pot Fu, pottery Cup, pottery double-handled Jar, wooden objects (2×), woolen fabric (3×)	One horse pit with one horse head
IVM95	I	Stone Triangular Circle	346×248	330	Stone	190×66-70	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery spouted Jar, pottery pot Fu, pottery Basin, pottery sherds, gravel stone	
IVM96	I	Stone Circle	350×240	329	Stone	180×84-80	/	1	M (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup	
IVM97	I	Stone Rectangular Circle	280×260	296	Stone	144×60-56	/	2	F (1×)	Supine flex	pottery spouted Cup (2×), pottery Cup, pottery Shallow Bowl, pottery Basin, pottery double-handled Jar, pottery sherd	
IVM98	I	Stone Circle	460×310	274	Stone	180×80-70	/	4	F (4×)	Supine straight	Pottery spouted Cup (3×), pottery spouted Jar, pottery pot Fu, pottery Cup (5×), pottery Spinning wheel, pottery sherds, iron piece, gravel stone, wooden Arrow, wooden fire-making stick (3×), bone Arrowhead, stone cosmetic stick	One horse pit with one horse head
IVM99	/	Stone Circle	180×140	18	Stone	90×50-44	/	1	Kid	/	Pottery spouted Cup, pottery sherds	
IVM100	I	Stone Triangular Circle	360×290	310	Stone	170×70-70	/	2	M (2×)	Supine straight	Pottery pot Fu, pottery Cup, pottery shallow Bowl, bronze Knife	
IVM101	I	Stone Triangular Circle	374×264	312	Stone	194×74-48	/	4	M (2×), F (2×)	Supine flex & straight	Pottery spouted Jar, pottery spouted Cup (2×), pottery Cup (2×), pottery Basin, pottery pot Fu, pottery single-handled Jar, wooden Arrow, wooden Bow, wooden Basin, wooden Knife, gravel stone	
IVM102	I	Stone Circle	440×250	292	Stone	176×70-86	/	2	M (1×)	Supine flex	pottery spouted Cup, pottery Jar (2×), cowry (2×), stone bead	
IVM103	I	Stone Rectangular Circle	310×280	310	Stone	174×76-65	/	2	M (2×)	Supine flex	Pottery spouted Cup (2×), pottery shallow Bowl, pottery double-handled Jar, bronze Knife, s/g bone	
IVM104	I	Stone Triangular Circle	390×320	323	Stone	215×82-90	/	3	M (2×), F (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup (2×), pottery double-handled Jar, bronze Awl (2×), stone Awl	
IVM105	I	Stone Triangular Circle	430×300	296	Stone	183×64-56	/	3	M (1×)	Supine straight	Pottery spouted Jar, pottery spouted Cup, pottery Cup (3×), Pottery shallow Bowl, pottery sherds, wooden Spinning wheel (2×), wooden Bow (2×), wooden Arrowshaft (2×), s/g rib	
IVM106	I	Stone Circle	340×320	270	Stone	186×74-52	/	1	M (1×)	Supine flex	Pottery pot Fu (2×), pottery Cup, bronze Knife	
IVM107	I	Stone Triangular Circle	390×240	311	Stone	190×90-60	/	2	M (1×), F (1×)	Supine flex	Pottery double-handled Jug, pottery Cup, bronze Awl, bronze Needle, bronze Knife, gravel stone	
IVM108	I	Stone Triangular Circle	346×230	247	Stone	190×70-50	/	1	/	/	Pottery pot, pottery Cup, bronze Knife, gravels tone	
IVM109	I	Stone Circle	300×240	336	Stone	140×70-50	/	3	M (1×), F (1×)	/	Pottery spouted Cup, pottery Cup, pottery pot Fu, pottery single-handled Jar, bronze Awl, golden Earring	One horse pit with one horse head; one human body above the tomb cover
IVM110	I	Stone Triangular Circle	420×340	307	Wood	190×90-64	/	4	M (4×)	Supine flex	Pottery spouted Cup, pottery double-handled Jar, pottery Cup, pottery pot Fu, pottery shallow Bowl (2×), wooden Basin (2×)	
IVM111	I	Stone Triangular Circle	364×290	296	Stone	191×72-80	Grass mat	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup, pottery Cup (2×), pottery double-handled Jar, pottery sherds, bronze Plaque, gravel stone (2×), wooden Arrowshaft, wooden Basin (2×), bone Button, woolen fabric (2×)	One horse pit with one horse head
IVM112	I	/	/	317	Stone	144×70-75	/	5	M (1×), F (3×)	Supine straight	Pottery spouted Cup (3×), pottery Cup (2×), pottery double-handled Jar, bronze Knife, bone Button	
IVM113	I	Stone Rectangular Circle	456×310	303	Stone & Wood	176×65-80	/	5	M (5×)	Supine flex & straight	Pottery spouted Cup (5×), pottery Cup (3×), pottery shallow Bowl, pottery pot Fu, bronze Knife (3×), bronze Awl, wooden Basin (2×), bone Check piece (2×), bone Arrowhead (2×), gravel stone, s/g rib, eagle claw	
IVM114	I	Stone Circle	460×303	310	Stone	230×88-80	/	5	M (3×), F (2×)	Supine flex & straight	Pottery spouted Cup, pottery Cup (3×), gravel stone, pottery pot Fu, pottery shallow Bowl, pottery single-handled Cup, bone Check piece, bronze Gag bit, bronze Mirror	One horse pit with one horse head
IVM115	I	/	/	350	/	242×90-94	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery Cup, pottery Jar, pottery pot Weng, pottery Basin, pottery sherds	One horse pit with one horse head
IVM116	II	/	/	330	/	140×64-60	/	3	F (2×)	Supine flex	Pottery Cup (2×), pottery double-handled Jar (2×), pottery Spinning wheel	
IVM117	I	/	/	335	Stone	200×84-84	Grass mat	2	F (1×)	Supine flex	Pottery Cup (4×), pottery double-handled Jar, pottery spouted Cup	
IVM118	I	Stone Triangular Circle	350×250	325	Stone	110×110-60	Stone	5	M (1×)	/	Pottery spouted Cup (4×), pottery Cup (2×)	
IVM119	I	Stone Circle	360×330	340	Wood	140×110-70	/	5	M (4×), F (1×)	/	Pottery spouted Jar, pottery double-handled Jar, pottery single-handled Cup, bone Spinning wheel, pottery Cup, pottery Jar, pottery pot Weng, pottery Jug, bronze Knife, bone Spinning wheel	
IVM120	I	/	/	318	Stone	200×100-40	/	2	M (2×)	Supine flex	Pottery spouted Cup, pottery pot Fu	
IVM121	I	Stone Triangular Circle	474×300	310	Wood	248×76-75	Grass mat	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery Jar, pottery pot Fu, pottery double-handled Jar, pottery Cup, bone Spinning wheel (2×), bronze Knife, bronze Tube, stone bead, bone bead	
IVM122	I	Stone Triangular Circle	280×220	320	Stone	140×80-40	Grass mat	1	M (1×)	Supine flex	Pottery Cup (2×), bronze Awl	
IVM123	I	/	/	260	Stone	154×80-40	/	3	M (1×), F (2×)	Supine straight	Pottery spouted Cup, pottery Cup (3×), pottery single-handled Cup (2×), bronze Awl	
IVM124	I	Stone Triangular Circle	460×260	335	Stone	250×80-70	/	4	M (2×), F (2×)	Supine flex	Pottery Cup, pottery pot Fu, stone bead	
IVM125	I	Stone Triangular Circle	440×290	290	Stone	230×90-55	/	5	M (2×), F (2×)	Supine flex	Pottery spouted Jar, pottery Cup, pottery double-handled Jar, pottery Jug, pottery sherds, bronze Knife, wooden Basin (3×), stone bead, woolen fabric	

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IVM126	I	Stone Circle	400×280	250	Stone	230×80-70	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup (2×), pottery Cup, pottery Bowl (2×), pottery shallow Bowl, stone bead	
IVM127	I	Stone Triangular Circle	/	355	Stone	110×80-70	/	2	M (2×)	Supine flex	Pottery Cup (2×), pottery Basin	
IVM128	I	/	/	300	Stone	90×60-40	Grass mat	1	Kid	Supine flex	Pottery spouted Cup, pottery shallow Bowl, pottery pot Fu	
IVM129	I	/	/	255	Stone	190×60-40	Wooden mat	7	M (3×), F (3×)	Supine flex	Pottery spouted Cup, pottery Cup (2×), pottery pot Fu, pottery shallow Bowl, pottery sherds, wooden Basin, bone Check piece	
IVM130	I	/	/	307	Stone	230×80-60	Wooden mat	5	M (3×), F (2×)	Supine flex	Pottery spouted Jar, pottery spouted Cup (3×), pottery shallow Bowl, pottery Cup, pottery pot Fu, pottery Spinning wheel, pottery sherd, bronze Awl, gravel stone	
IVM131	I	Stone Circle	520×390	330	Stone & Wood	227×88-66	Wooden mat	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup (6×), pottery double-handled Jar (2×), pottery pot Fu (2×), pottery Cup, pottery Spinning wheel, bronze Knife, gravel stone stone bead	
IVM132	I	/	/	318	Stone	210×80-60	/	3	M (1×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery shallow Bowl	
IVM133	I	/	/	280	Stone	190×60-60	/	1	F (1×)	Supine flex	Pottery spouted Jar, pottery pot Fu, pottery Cup	
IVM134	I	Stone Triangular Circle	340×280	312	Stone	180×90-60	/	2	F (2×)	Supine flex	Pottery spouted Cup (2×), pottery Cup, pottery pot Fu, pottery sherds	
IVM135	I	Stone Triangular Circle	500×320	294	Stone	240×60-60	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery Bowl, pottery Cup	
IVM136	I	Stone Triangular Circle	400×290	283	Stone	200×70-60	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery double-handled Jar, bronze Knife, bone Spinning wheel	
IVM137	I	/	/	303	Stone	200×60-60	/	1	M (1×)	Supine flex	Pottery Jar, pottery spouted Cup, pottery pot Fu, bronze Knife, bronze Awl	
IVM138	I	Stone Triangular Circle	410×290	274	Stone	180×50-50	/	2	F (1×)	Supine flex	Pottery sherds	
IVM139	I	/	/	280	Stone	200×60-180	/	2	M (1×), F (1×)	Supine straight	Pottery Basin, pottery spouted Jar, bronze Knife, wooden Arrowshaft, bone Awl	
IVM140	I	/	/	292	Stone	160×70-60	/	1	M (1×)	Supine flex	Pottery single-handled Jar, bone Button	
IVM141	I	/	/	220	Stone & Wood	186×66-60	/	4	M (1×), F (1×)	Supine flex	pottery Cup (4×), pottery Basin, pottery double-handled Jar, pottery pot Bowl, bone Spinning wheel, wooden Spinning wheel, wooden object	
IVM142	I	Stone Circle	420×280	290	Stone	230×70-70	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery Basin, pottery pot Fu, pottery Jar	
IVM143	I	Stone Triangular Circle	410×340	300	Stone	190×100-60	/	2	/	Supine flex	Pottery spouted Cup	
IVM144	I	Stone Circle	286×186	3	Stone	84×96-30	/	1	M (1×)	Supine flex	Pottery Cup	
IVM145	I	/	/	290	Stone	170×60-66	/	1	F (1×)	Supine straight	Pottery pot Weng, pottery Jar	
IVM146	I	/	/	303	Stone	180×70-60	/	1	M (1×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery shallow Bowl, bronze Knife, bronze Awl	
IVM147	I	Stone Triangular Circle	500×390	278	Stone	200×80-54	/	2	F (1×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery Basin, pottery spouted Jar, wooden object	
IVM148	I	Stone Triangular Circle	440×300	283	Stone	186×70-50	/	2	M (2×)	Supine flex	pottery spouted Cup, pottery single-handled Cup, pottery sherds, bronze Knife	
IVM149	I	/	/	338	Stone	150×90-60	/	/	/	/	Pottery spouted Cup, pottery Cup, pottery Bowl, pottery sherd	
IVM150	I	/	/	330	Stone	170×100-70	/	7	M (5×), F (2×)	Supine straight	Pottery spouted Cup, pottery Cup (2×), bronze Knife, bone Awl, bone Arrowhead	
IVM151	I	Stone Triangular Circle	420×380	315	Stone	200×100-64	/	3	M (2×), F (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup, pottery pot Fu, pottery Cup (2×), pottery sherds, bronze Spinning wheel, bronze Button	
IVM152	I	/	/	337	Stone	140×60-40	/	1	M (1×)	Supine flex	Pottery double-handled Jar, bronze Knife, stone bead	
IVM153	I	Stone Circle	500×280	301	Stone	210×86-70	/	2	M (1×), F (1×)	Supine straight	Pottery pot Fu, pottery double-handled Jar, bone Awl, stone bead golden piece	
IVM154	I	Stone Triangular Circle	490×355	322	Wood	270×100-90	Grass mat, wooden mat	6	M (3×), F (2×)	Supine flex	pottery spouted Cup (5×), pottery Cup (4×), pottery Jar, pottery double-handled Jar, bronze Mirror, bronze Awl, bronze Knife, wooden object, wooden Basin (4×), Wooden arrow shaft (2×), wooden Bow, wooden Spinning wheel (2×), wooden Arrow, wooden Stick, bone bead, stone bead (8×)	One horse pit with two horse heads and foot
IVM155	I	/	/	302	Stone	146×80	/	2	M (1×), F (1×)	/	Pottery spouted Cup (2×), pottery pot Fu, pottery sherds, bronze Button, bronze Awl, bronze Tube	
IVM156	I	Stone Triangular Circle	420×270	314	Stone	200×85	/	7	M (5×), F (2×)	Supine flex	Pottery spouted Jar (2×), pottery spouted Cup (4×), pottery Cup (5×), pottery pot Fu, wooden Stick, wooden Basin (7×), wooden Spinning wheel, stone bead, bronze Mirror	
IVM157	I	Stone Triangular Circle	300×270	307	Stone & Wood	130×80-42	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery Basin, pottery sherds, bronze Awl	
IVM158	II	Stone Triangular Circle	460×360	356	Stone & Wood	210×80-110	Wooden mat	6	M (2×), F (4×)	Supine flex & straight	Pottery spouted Jar, pottery spouted Cup (3×), pottery Cup (3×), pottery shallow Bowl, pottery Spinning wheel, pottery pot Fu, bone Spinning wheel, stone Spinning wheel, wooden Arrow	One horse pit with one horse head
IVM159	II	Stone Triangular Circle	270×230	322	Stone	110×80-66	/	4	/	Supine flex	Pottery spouted Cup (3×), pottery spouted Jar, pottery sherd	
IVM160	II	Stone Triangular Circle	420×330	358	Stone	240×120-68	Wooden mat	2	M (2×)	Supine flex	pottery spouted Cup, pottery Cup, bronze Knife, bronze Needle, bronze Button, s/g bones, horse rib	
IVM161	I	/	/	290	Stone	226×70-60	Grass mat	2	M (2×)	Supine straight	Pottery spouted Cup (3×), pottery shallow Bowl, bronze Knife, bronze Awl, wooden Arrowshaft, wooden Bow, wooden Basin, wooden object, wooden button, bone button, bone Awl, bone Check piece, stone bead, stone Button	
IVM162	I	Stone Triangular Circle	380×280	267	Stone	180×60-50	/	2	M (1×)	Supine flex	Pottery sherds, bronze Awl	
IVM163	I	Stone Circle	325×210	273	Stone	176×73-45	/	2	F (1×)	Supine flex	Pottery pot Fu, pottery double-handled Jar, pottery shallow Bowl, pottery Cup (2×), bronze knife	
IVM164	I	Stone Circle	370×280	315	Stone	190×90-70	/	2	F (1×)	Supine flex	Pottery spouted Cup (2×), pottery double-handled Jar, pottery sherds, bronze Knife	
IVM165	I	Stone Circle	220×170	307	Stone	192×62-65	/	3	F (2×)	Supine flex	pottery spouted jar, pottery Cup (4×), pottery shallow Bowl, pottery sherds, bronze Mirror, bronze Knife, stone bead	
IVM166	I	/	/	310	Stone	135×72-44	/	3	Kid	Supine flex	/	
IVM167	I	/	/	290	Stone	134×80-45	/	4	F (4×)	Supine straight	Pottery spouted Cup (4×), pottery Spinning wheel, pottery sherds, wooden Bow, wooden Basin, woolen fabric, s/g rib	
IVM168	I	/	/	261	Stone	180×50-50	/	1	F (1×)	Supine flex	Pottery spouted Cup, pottery pot Fu, pottery sherd, bronze Knife, bone Tube, bone Awl	
IVM169	I	Stone Triangular Circle	340×280	260	/	176×90-70	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup, pottery Basin, pottery Bowl, pottery Cup, bronze Knife	
IVM170	I	/	/	288	Stone	150×60-50	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup, pottery Cup (2×), pottery double-handled Jar, pottery shallow Bowl	
IVM171	I	/	/	280	Stone	186×60-55	/	1	M (1×)	Supine flex	Pottery spouted Jar, pottery Cup	
IVM172	I	/	/	280	Stone	166×60-50	/	2	M (2×)	Supine flex	Pottery spouted Cup, pottery spouted pot Fu, pottery pot Fu, pottery Cup, pottery sherd, bronze Awl, wooden Basin	
IVM173	I	/	/	275	Stone	170×50-40	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Jar, pottery double-handled Jar, pottery single-handled Jar, pottery spouted Cup, wooden Basin	
IVM174	I	Stone Triangular Circle	440×360	330	Stone	170×70-50	/	2	M (2×)	Supine flex	Pottery pot Fu, pottery sherd, wooden Basin	
IVM175	I	Stone Circle	380×230	310	Stone	180×60-60	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Jar, pottery pot Fu, pottery spouted Cup, pottery spouted pot Fu, pottery shallow bowl, pottery pot Fu, stone bead	
IVM176	I	/	/	326	Stone	20×95-60	/	2	M (2×)	Supine flex	Pottery pot Fu, pottery pot Yi, pottery Cup, bronze Awl, bronze Needle, bronze Knife, bone Awl	
IVM177	I	/	/	207	/	125×64-30	/	1	/	/	Pottery spouted pot Fu, pottery Spinning wheel, pottery spouted Cup	
IVM178	I	/	/	355	/	156×34-55	/	1	/	/	Pottery spouted Jar, pottery double-handled Jar, pottery Cup	
IVM179	I	/	/	215	/	130×50-45	/	1	/	/	Pottery spouted Cup, pottery pot Fu	
IVM180	I	/	/	317	Stone	170×50-40	/	2	F (2×)	Supine flex	Pottery spouted Cup (2×), pottery double-handled Jar, pottery Cup	
IVM181	I	/	/	310	/	280×110-70	/	4	M (1×), F (1×)	Supine flex	Pottery spouted Jar, pottery spouted Cup, pottery Jar, pottery sherds	
IVM182	I	Stone Triangular Circle	440×310	323	Stone & Wood	180×80-64	/	1	F (1×)	Supine flex	Pottery Jar, pottery shallow Bowl, pottery double-handled Jar, bronze Knife (3×),	
IVM183	I	Stone Circle	370×290	353	Wood	160×80-45	/	3	M (1×), F (1×)	Supine straight	Pottery Cup, pottery Jar, pottery pot Fu, pottery double-handled Jar, bronze Knife (2×), stone cosmetic stick	

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IVM184	II	Stone Triangular Circle	370×308	338	Stone	168×93-52	Grass mat	8	M (1×), F (2×)	/	Pottery spouted Cup (2×), pottery Cup (2×), pottery Spinning wheel, pottery shallow Bowl, pottery Jar, bronze Knife, bronze Awl, bone Spinning wheel, gravel stone, stone bead	One horse pit
IVM185	II	Stone Circle	440×330	20	Wood	200×90-150	/	3	M (3×)	/	Pottery spouted Cup (2×), pottery Jar, pottery pot Fu, pottery Cup, bronze Awl	
IVM186	II	Stone Triangular Circle	/	340	Stone & Wood	170×80-60	/	4	M (2×), F (2×)	Supine flex	Pottery spouted Cup (3×), pottery spouted Jar, pottery Jug, pottery pot Fu, pottery Cup (2×), pottery Spinning wheel, bronze Awl (2×), bronze Knife (2×), bone Spinning wheel	
IVM187	II	Stone Circle	420×340	350	Stone	180×90-100	/	1	M (1×)	Supine flex	Pottery Jar, pottery shallow Bowl	
IVM188	III	Stone Triangular Circle	440×320	10	Stone	180×94-62	/	3	M (1×), F (1×)	Supine flex	Pottery pot Fu, pottery double-handled Jar, pottery Cup, pottery spouted Cup, bronze Knife	
IVM189	III	/	/	10	Stone	176×80-60	/	3	F (3×)	Supine flex	Pottery Cup (3×), pottery spouted Cup, pottery Jar (2×), pottery spouted Jar, pottery sherds, bronze Awl, wooden Bow, bone Awl, bone Spinning wheel	
IVM190	III	/	/	350	Stone	176×86-60	/	5	M (4×)	Supine flex	Pottery spouted Cup (2×), bronze Tube, bronze Knife, gravel stone	
IVM191	III	Stone Square Circle	640×400	355	Stone	220×135-110	Wooden mat	2	M (1×), F (1×)	Supine flex	Pottery sherds, bronze Button, s/g rib	One horse pit with one horse head
IVM192	III	Stone Circle	540×460	345	Stone	240×160-100	Wooden mat	5	M (4×)	Supine flex	Pottery spouted Cup (6×), pottery Cup, pottery pot Fu, pottery shallow Bowl, gravel stone (3×)	One horse pit with one horse head
IVM193	III	/	/	15	Stone	250×170-100	Wooden mat	4	F (3×)	Supine flex	Pottery Basin, pottery Cup, pottery double-handled Jar, bronze Arrowhead, bronze Tube	One children pit with one kid; one horse pit with one horse head
IVM194	III	Stone Circle	450×340	330	Stone	222×160-102	Wooden mat	4	M (1×)	/	Pottery spouted Cup (5×), pottery Cup (2×), pottery Spinning wheel (2×), pottery sherds, bronze Knife	Two horse pits with two horse heads; one children pit with four kids
IVM195	III	/	/	350	Stone	20×120-130	Wooden mat	1	M (1×)	/	Pottery spouted Cup (2×), pottery Cup, pottery double-handled Jar pottery sherds	One children pit with three kids; one horse pit
IVM196	III	Stone Circle	560×360	345	Stone	200×120-130	Wooden mat	3	/	Supine flex	Pottery Bowl, pottery sherds, bronze Gag bit, bone Spinning wheel	
IVM197	III	Stone Circle	520×364	350	Stone	195×125-100	Stone row, wooden mat	5	M (2×), F (3×)	/	Pottery spouted Cup, pottery Cup, pottery sherds, bronze Knife, stone cosmetic stick, bone bead	
IVM198	III	/	/	345	Stone	180×136-50	/	2	F (2×)	/	Pottery sherds, s/g and horse rib	
IVM199	II	Stone Circle	400×320	350	Stone	200×80-80	/	3	M (3×)	Supine flex	Pottery spouted Cup (3×), pottery Cup (2×), pottery pot Fu, pottery sherds, bronze Knife, bronze Needle, stone Spinning wheel, bone Awl (2×)	
IVM200	II	/	/	350	Stone	200×86-80	/	2	M (1×), F (1×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery double-handled Jar, pottery pot Fu, bronze Knife, bone Spinning wheel	
IVM201	I	Stone Circle	420×260	301	Stone	210×80-204	/	5	M (2×), F (1×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery double-handled Jar, pottery Basin, pottery sherds, wooden basin piece	
IVM202	II	Stone Triangular Circle	410×260	336	Stone	182×74	/	4	M (1×), F (2×)	Supine flex	Pottery spouted Cup, pottery Jar, pottery Jug, pottery Bowl, pottery Cup (3×), pottery pot Weng, pottery sherds, bronze Button, bronze Knife, wooden basin piece	
IVM203	I	Stone Triangular Circle	370×280	307	Stone	196×90-160	/	2	F (2×)	/	Pottery spouted Cup, pottery pot Fu, pottery Cup	
IVM204	/	Stone Circle	170×170	202	Stone	/	/	3	/	/	pottery spouted Cup (2×)	
IVM205	I	Stone Circle	326×280	263	Stone	171×104-88	/	4	M (2×), F (2×)	Supine flex	Pottery spouted Cup (2×), pottery Cup (2×), pottery pot Fu	
IVM206	I	Stone Triangular Circle	364×240	300	Stone	194×70-150	/	4	M (3×)	Supine straight	Pottery spouted Cup, pottery double-handled Jar (2×), pottery shallow Bowl, pottery sherds, bronze Knife, wooden Basin, bone Spinning wheel, gravel stone, stone bead	
IVM207	I	Stone Circle	420×290	305	Stone	217×72-140	/	3	M (2×), F (1×)	Supine flex & straight	Pottery spouted Cup (2×), pottery Cup (3×), pottery double-handled Jar, pottery sherds, wooden Spinning wheel, wooden Plate, wooden Stick, wooden Cup, stone cosmetic stick, bronze Awl, woolen felt fabric, woolen fabric	
IVM208	I	Stone Rectangular Circle	400×260	337	Stone	193×70-130	/	2	F (2×)	Supine flex	Pottery Cup (4×), pottery Jar, wooden Basin, stone Spinning wheel	
IVM209	I	Stone Triangular Circle	330×240	314	Stone	170×80-120	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup, pottery Basin, pottery double-handled Jar (2×), wooden Spinning wheel	
IVM210	I	Stone Triangular Circle	360×260	318	Stone	160×90-100	Grass mat	4	M (4×)	Supine flex & straight	Pottery spouted Cup, pottery Cup, pottery double-handled Jar, pottery Jug	
IVM211	I	Stone Circle	304×326	318	Wood	213×80-80	/	3	M (1×), F (2×)	Supine flex	pottery spouted Jar, pottery Cup, pottery pot Weng, pottery Basin, pottery sherds, wooden Basin	
IVM212	I	/	/	276	Stone	210×80	/	1	M (1×)	Supine flex	Pottery pot Fu, bronze Knife (3×), bronze Arrowhead (2×), bronze Needle, gravels tone	One horse pit
IVM213	I	Stone Triangular Circle	320×210	298	Stone	150×60-80	/	1	M (1×)	Supine flex	Bronze Button	
IVM214	I	Stone Triangular Circle	400×300	326	/	275×90-80	/	4	M (3×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery Jug, pottery Cup, pottery shallow Bowl, pottery Double-handled Jar, pottery pot Weng, pottery pot Fu, pottery Jar, bronze Awl (2×), bronze Knife (2×)	One horse pit with one horse head
IVM215	I	Stone Triangular Circle	/	300	Stone	160×60-70	/	1	M (1×)	Supine flex	Pottery pot Fu, pottery sherds, bronze Knife, bronze Awl, gravel stone, s/g rib	
IVM216	I	Stone Triangular Circle	400×260	326	/	190×120-80	/	6	M (2×), F (2×)	Supine flex	Pottery pot Fu, pottery Cup (4×)	
IVM217	I	Stone Circle	390×350	308	Stone	190×92-60	/	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup (3×), pottery Cup (2×), pottery spouted Jar, pottery sherds, bronze Knife (2×), woolen fabric, wooden Bowl wooden Basin (1×), wooden Plate, wooden Spinning wheel	
IVM218	I	Stone Triangular Circle	220×170	320	Stone	150×49-50	/	1	Kid	Supine flex	Pottery spouted Cup (2×)	One horse pit with one horse head
IVM219	I	Stone Triangular Circle	330×264	322	Stone	160×70-56	/	3	F (2×)	Supine flex	Pottery double-handled Jar	One children pit with one kid
IVM220	I	Stone Mound	330	313	Stone	180×70-160	/	1	M (2×)	Supine flex	Pottery spouted Cup, pottery pot Fu, bronze Knife	
IVM221	I	/	/	310	Stone & Wood	200×100-86	/	2	M (2×)	Supine flex	Pottery Cup (2×), pottery shallow Bowl, pottery pot Fu	
IVM222	I	/	/	320	Stone	205×82-80	/	1	M (1×)	Supine flex	Pottery Cup, pottery Jar, pottery pot Fu, bronze Awl, bronze Knife	
IVM223	I	/	/	334	Stone	210×70-80	/	3	M (1×)	Supine flex	Pottery Cup (2×), pottery pot Fu	
IVM224	I	Stone Circle	265×230	336	Stone	158×58-30	/	1	/	Supine flex	Pottery spouted Cup (2×), pottery Cup, pottery double-handled Jar, pottery sherds	
IVM225	I	/	/	310	Stone	210×95-70	/	3	M (3×)	Supine flex	Pottery spouted Cup (2×), pottery Jar, pottery Cup, bronze Awl, bronze Knife, bone Button	
IVM226	I	/	/	307	/	210×120-80	/	3	M (3×)	Supine flex	Pottery shallow Bowl, pottery Jar, pottery spouted Cup, wooden object	
IVM227	I	/	/	290	Stone	215×60-40	/	2	F (1×)	Supine flex	Pottery spouted Jar	
IVM228	III	/	/	310	Stone	225×110-70	Wooden mat	8	F (3×)	Supine flex	Pottery spouted Cup (3×), pottery double-handled Jar, bronze Knife (2×), wooden Plate, wooden Basin (3×), gravel stone, stone cosmetic stick (2×), s/g rib	
IVM229	I	/	/	295	Stone	250×100-90	/	3	M (1×), F (2×)	Supine flex	Pottery Cup, pottery Bowl, pottery pot Fu, bronze Awl, bone ornament	
IVM230	I	Stone Circle	265×330	295	Stone	300×90-80	/	3	M (1×), F (2×)	Supine flex & straight	Pottery spouted Cup, pottery pot Fu, pottery shallow Bowl, pottery jar, pottery Cup, pottery sherds, bronze Knife, wooden Basin, wooden Arrowshaft (2×), wooden fire-making stick, wooden Bow, bow ornament	One horse pit with one horse head and several bones
IVM231	I	Stone Triangular Circle	380×320	332	Stone	19-×80-58	Grass mat	2	M (2×)	Supine flex	Pottery Cup (2×), pottery shallow Bowl (2×), pottery double-handled jar, bronze Knife, wooden Basin, wooden Stick	
IVM232	I	Stone Triangular Circle	500×330	344	Stone	218×100-85	Wooden mat	4	M (3×), F (1×)	Supine straight	Pottery spouted Cup, pottery shallow Bowl pottery sherds, bronze Knife (2×), gravel stone, bone Button, s/g rib	

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
IVM233	II	Stone Triangular Circle	/	2	/	224×90-60	/	5	M (3×), F (2×)	Supine flex	Pottery spouted Cup (4×), pottery Cup (2×), pottery Bowl, pottery Cup, pottery Jug, pottery double-handled jar, pottery Spinning wheel, bronze Needle	One horse pit
IVM234	I	Stone Triangular Circle	360×240	302	Stone	180×70-60	Grass mat	6	M (3×), F (2×)	Supine flex	Pottery spouted Cup, pottery pot Fu (2×), pottery double-handled Jar, pottery Basin, pottery Cup (4×), bronze Awl, bone Plaque, stone bead	
IVM235	I	Stone Triangular Circle	400×280	340	Stone & Wood	164×90-60	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup (3×), pottery spouted Jar, pottery Cup, pottery pot Fu, s/g rib	One horse pit with one horse head
IVM236	I	Stone Triangular Circle	400×260	334	Stone	284×90	/	4	M (3×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery shallow Bowl, pottery Cup (2×), pottery sherds, stone cosmetic stick, bronze Awl, wooden Stick, wooden Basin	One horse pit with one horse head
IVM237	I	Stone Triangular Circle	300×200	340	Stone	160×4-68	/	3	M (2×), F (1×)	Supine flex & straight	Pottery spouted Cup (2×), pottery pot Fu, pottery shallow Bowl, bronze Awl, bronze Knife	
IVM238	I	Stone Triangular Circle	442×300	22	Wood	214×90-0	/	3	M (1×), F (2×)	Supine flex	Pottery spouted Cup (2×), pottery Cup (2×), pottery pot Fu, pottery single-handled Cup, bronze Knife, bone object	
IVM239	I	Stone Triangular Circle	430×290	353	Wood	198×84-70	Grass mat	3	M (2×), F (1×)	Supine flex	Pottery spouted Cup (2×), pottery double-handled Jar, bronze Needle, wooden Bo×, s/g rib	
IVM240	/	Stone Triangular Circle	260×220	40	Stone	130×54-100	/	2	F (1×)	/	Pottery spouted Jar, pottery spouted Jug, pottery Cup (3×), pottery double-handled jar (2×), pottery Spinning wheel, bronze Knife, gravel stone	
IVM241	I	Stone Circle	400×240	303	Stone	108×80-60	/	4	M (2×)	Supine flex	Pottery spouted Cup (2×), pottery pot Fu, pottery Cup, pottery piece, pottery sherds, pottery double-handled Jar, bronze Knife, wooden Basin, stone ornament	
IVM242	I	Stone Circle	460×320	300	Stone	196×100-15	/	4	M (4×)	Supine flex & straight	Pottery spouted Cup (3×), pottery double-handled Jar, pottery Cup, pottery sherds, bronze Needle (2×), bone Awl	
IVM243	I	/	/	305	Stone	180×60	/	1	M (1×)	Supine flex	Pottery Cup, pottery pot Fu, bronze Knife, bronze Button, bronze Hook, stone bead	
IVM244	I	Stone Circle	390×290	220	Stone	200×140-125	/	4	M (4×)	Supine flex	Pottery spouted Cup, pottery Cup, pottery Jar, pottery sherds, bronze Knife, bronze Check piece, bronze Button	
IVM245	I	Stone Circle	/	307	Stone	180×80-96	/	4	M (3×), F (1×)	Supine flex	Pottery spouted Cup (3×), pottery Cup, pottery sherds, pottery Spinning wheel, bronze Knife (2×), bronze Awl, bone Plaque	
IVM246	I	/	/	326	/	165×60-75	/	1	/	/	Pottery Jar (2×), pottery pot Fu, pottery bronze Knife	
IVM247	I	/	390×270	301	/	190×84-68	/	1	/	/	Pottery Cup, pottery single-handled Cup, pottery sherds, bronze Knife, bronze Gag bit	
IVM248	I	/	/	310	Stone	240×94-195	/	2	M (1×)	Supine flex	pottery pot Fu, pottery Cup (3×), pottery double-handled Jar, pottery Jug, pottery sherds, bronze Knife, bronze Awl, bone Spinning wheel (2×), bone Arrowhead	
IVM249	I	/	/	285	Stone	180×73-50	/	1	M (1×)	Supine flex	Pottery pot Fu, pottery Cup (2×), bronze Knife	
IVM250	I	/	/	278	/	150×98-40	/	4	M (3×), F (1×)	Supine flex	Pottery Cup, pottery sherds, bronze Circle, bronze Button, stone ornament, bone Spin	

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 27 Chawuhu Nr. V Cemetery

Tomb No.	Tomb Type	Surface Structure	Dimension of surface mound L×W/Dm-H (cm)	Tomb Orientation (°)	Tomb Cover	Dimension of Tomb Chamber L×W-D (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
VM1	I	Stone Circle	197×156	290	Stone	197×80-82	/	2	M (2×)	Supine flex	Pottery Jar (2×)	
VM2	I	Stone Circle	190×230	275	Stone	166×50-80	/	2	M (2×)	Supine flex	Pottery single-handled Jar, pottery shallow Bowl	
VM3	I	/	/	280	Stone	194×87-58	/	1	F (1×)	Supine straight	Pottery spouted Jar, bronze Button, bronze ornament (7×)	One s/g bone on the right hand
VM4	I	Stone Triangular Circle	400×356	273	Stone & Wood	240×122-60	/	5	M (1×)	Supine straight	Pottery pot Fu, pottery spouted Jug	One row of s/g ribs on the western chamber
VM5	I	Stone Triangular Circle	490×300	305	Stone & Wood	234×110-64	Wooden mat	1	M (1×)	/	Pottery spouted Cup (2×), pottery pot Fu, pottery Cup, wooden Basin, wooden fire-making stick, wooden stick, wooden Bow, tooth object	
VM6	I	Stone Triangular Circle	/	244	Stone	212×71-56	/	1	/	Supine flex	pottery pot Fu	
VM7	I	Stone Triangular Circle	310×266	291	Stone	190×74-50	/	2	M (1×)	Supine flex	Pottery spouted Cup (2×), pottery Jar	
VM8	I	Stone Triangular Circle	400×345	315	Stone	214×90-60	/	1	/	/	pottery pot Fu	
VM9	I	/	/	247	Stone	232×80-60	/	2	/	/	pottery spouted Jar	
VM10	I	/	/	314	Stone	219×87-35	/	2	M (1×)	Supine flex	Pottery pot Fu, pottery Cup (2×), bronze Gag bit	
VM11	I	/	/	283	Stone	180×80-65	/	1	F (1×)	Supine flex	Pottery single-handled Jar, pottery Cup	S/g ribs on the waist
VM12	I	/	/	263	Stone	210×90-50	/	2	M (2×)	Supine flex	pottery single-handled Jar, pottery Cup, bronze Knife, bronze Awl	
VM13	I	/	/	281	Stone	166×62-50	/	1	F (1×)	Supine flex	Pottery Jar, wooden Arrowshaft	S/g bones
VM14	I	/	/	240	Stone	179×63-60	/	1	F (1×)	Supine flex	pottery Jar (2×), bronze Button, stone Cosmetic stick	
VM15	I	/	190×130	263	Stone	190×80-60	/	1	M (1×)	Supine flex	Pottery spouted Jar, horn Cup, wooden object	
VM16	I	/	/	283	Stone	180×75-70	/	1	F (1×)	Supine flex	pottery single-handled Jar	
VM17	I	/	/	292	Stone	170×60-46	/	1	F (1×)	Supine flex	pottery pot Fu	
VM18	I	/	/	250	Stone	160×72-40	/	1	F (1×)	Supine flex	pottery single-handled Jar	
VM19	I	/	/	241	Stone	230×70-60	/	1	F (1×)	Supine flex	pottery pot Fu	
VM20	I	/	/	303	Stone	164×54-40	/	1	M (1×)	Supine flex	Pottery Cup	
VM21	I	/	/	268	Stone	190×80-60	/	1	F (1×)	Supine flex	pottery spouted jar, pottery double-handled Jar, pottery single-handled Jar	
VM22	I	/	/	293	Stone	163×84-50	/	1	/	Supine flex	pottery pot Fu	
VM23	I	/	/	253	Stone	196×67-60	/	1	M (1×)	Supine flex	pottery spouted Jar	
VM24	I	/	/	291	Stone	150×60-50	/	1	F (1×)	Supine flex	Pottery jar Yi	

Table 29 Gumugou tombs

Tomb No.	Wooden Objects	Metal Items	Stone Items	Bone objects	Plant Remains	Textile Fabrics	Leather Pieces
79LQ2M2	79LQ2M2: 3, Wooden Awl (3x), used to connect two pieces of woolen blanket		79LQ2M2: 7, Jade Bead		79LQ2M2: 1, Grass Basket, the lip diameter is 11cm, height is 12cm; there are several wheat grains found inside; the lip has two holes for the woolen rope	79LQ2M2: 2, Woolen Blanket	79LQ2M2: 4, Leather Boots with felt textile, the height is 9.5cm, the bottom length is 14.5cm; the felt piece is sewed as the junction between the upper and the bottom 9LQ2M2: 5, Sheep Leather 79LQ2M2: 6, Felt Hat
79LQ2M3	79LQ2M3: 1, Wooden Figurine, the height is 37.5cm, the base is 4.8cm high. The figurine is a male		79LQ2M3: 2, Jade Bead, the length is 2cm, width is 0.9cm, the hole diameter is 0.6cm	79LQ2M3: 3, Bracelet stringed by bone bead, the bead diameter is 0.35-0.4cm, the thickness is 0.15-0.25cm, there are 28 beads in total			
79LQ2M4			79LQ2M4: 5, Jade Bead, the length is 1.5-1.6cm, the hole diameter is 0.6cm	79LQ2M4: 4, Animal Horn Object with wooden handle, the length is 20cm, width is 5cm	79LQ2M4: 1, Ephedra Branches 9LQ2M4: 2, Grass Basket, the lip diameter is 12.5cm, height is 12.5cm, with some wheat grains found inside 9LQ2M4: 3, Grass Basket, the lip diameter is 7.8cm, height is 12cm, belly diameter is 9cm, 166 wheat grains found inside		79LQ2M4: 6, Leather Shoes with felt pieces, the felt is sewed to the bottom
79LQ2M5					79LQ2M5: 1, Grass Basket, the lip diameter is 7cm, height is 11cm, wrapped by woolen rope, the rope is 18cm long; with several wheat grains found inside	79LQ2M5: 5, Felt Hat	79LQ2M5: 2, Leather Shoes with furs; one is found on foot, the other one is under the body 9LQ2M5: 4, Leather Pouch with felt rope 9LQ2M5: 6, Leather Jacket with furs, the length is 53cm, the sleeve is 40cm long, the collar is 12cm high; sewed by several pieces of leather
79LQ2M6	79LQ2M6: 1, Wooden Board, the length is 36cm, width is 7-9.5cm, the thickness is 5cm 9LQ2M6: 2, Wooden Object in wedge-shape, the length is 39cm, diameter is 2.2-5.5cm						
79LQ2M7		79LQ2M7: 1, Bronze Roll, the length is 1.6cm, diameter is 0.5cm, the thickness is 0.1cm					
79LQ2M8	79LQ2M8: 1, Wooden Figurine, the height is 55cm						
79LQ2M10		79LQ2M10: 4, Bronze Piece, the length is 2.5cm, width is 1.1-1.5cm, thickness is 0.4cm	79LQ2M10: 1, Necklace with bone bead, the bead diameter is 0.5cm, thickness is 0.2cm; there are 767 bead in total 9LQ2M10: 5, Stone, the length is 7cm, width is 3cm, thickness is 1.8cm 9LQ2M10: 6 & 7 & 8, Amber Bead, with one hole in the center, the hole diameter is 0.6cm	79LQ2M10: 2, Bone Awl, the length is 10cm, one end is point, 2.8cm long 9LQ2M10: 3, Bone Awl, the length is 10.7cm, one end is point, 3.2cm long			
79LQ2M11	79LQ2M11: 1, Wooden Basin, open lip, round base, the lip diameter is 28.7cm, height is 13.5cm 9LQ2M11: 3, Wooden Awl, the length is 9.2cm, used for the connection of the blanket 9LQ2M11: 8, Wooden Object, the length is 22.5cm, width is 7cm, thickness is 1.5-4.5cm 9LQ2M11: 12, Wooden Object, the length is 24cm, diameter is 10cm			79LQ2M11: 4, Bone Awl, the length is 7.2cm	79LQ2M11: 2, Grass Basket, the lip diameter is 8.5cm, base diameter is 2.5cm, height is 11.8cm; there are some woolen ropes found inside 9LQ2M11: 5, Ephedra Branches 9LQ2M11: 7, Reed Arrow, the length is 16cm 9LQ2M11: 9, Grass Basket, the belly diameter is 8.5cm, height is 16cm	79LQ2M11: 10, Woolen Blanket	79LQ2M11: 11, Leather Boots with furs, the length is 14cm, bottom length is 20.5cm 9LQ2M11: 13, Felt Hat
79LQ2M12	79LQ2M12: 1, Wooden Figurine, the height is 57cm, made of poplar, it is a female figurine 9LQ2M12: 2, Wooden Object, the length is 24cm, width is 5.5cm, thickness is 1-3cm 9LQ2M12: 3, Wooden Bow, the lip diameter is 16.4cm, base diameter is 6cm, height is 7.5cm 9LQ2M12: 5, Wooden Stick, the length is 19cm, one end is 4cm in diameter, with one small hole on it, the hole diameter is 0.9cm, depth is 2.5cm 9LQ2M12: 8, Wooden Object (3x), rectangular, the length is 33-35cm, width is 7-8cm, thickness is 1.2-8cm 9LQ2M12: 10, Wooden Cup, straight belly, point base; the lip diameter is 7.4cm, height is 24.5cm, the thickness is 0.8cm, the belly is 14cm deep; the cup is in red painting			79LQ2M12: 9, Ox horn (3x) 9LQ2M12: 12, Bone Tube (35x), the length is 5-7cm, the diameter is 1-1.5cm	79LQ2M12: 4, Grass Basket, the lip diameter is 16cm, belly diameter is 15.5cm, height is 28cm 9LQ2M12: 6, Grass Dustpan 9LQ2M12: 7, Grass Basket, the height is 10cm 9LQ2M12: 13, Ephedra Branches in a small bag, the branches is 8cm long, 3.5cm wide	79LQ2M12: 11, Woolen Blanket	
79LQ2M13	79LQ2M13: 1, Wooden Bow, deep belly and flat base; the lip diameter is 13.5cm, height is 11.7cm, the thickness is 1.7-2cm 9LQ2M13: 2, Wooden Object, the length is 18cm, diameter is 9-13cm 9LQ2M13: 4, Wooden Spoon, the long diameter is 7cm, short diameter is 4cm, the thickness is 0.1-1cm 9LQ2M13: 5, Wooden Cup, flat lip and base, straight belly; the belly deep is 7.5cm, the height is 16.5cm, the thickness is 1.5cm 9LQ2M13: 7, Wooden Object, the length is 39.5cm, width is 9.5cm, the thickness is 1-2.5cm			79LQ2M13: 8, Ox-horn Cup, the lip diameter is 7.5cm, height is 16.5cm; there is one small hole under the lip, the hole diameter is 0.5cm	79LQ2M13: 6, Grass Basket, flat base; the height is 7cm		

Tomb No.	Wooden Objects	Metal Items	Stone Items	Bone objects	Plant Remains	Textile Fabrics	Leather Pieces
79LQ2M14	79LQ2M14: 1, Wooden Figurine, the height is 51cm 9LQ2M14: 2, Wooden Bowl, open lip and flat base; the long diameter is 17.5cm, short diameter is 14.5cm, the height is 8.5cm, the base diameter is 1cm 9LQ2M14: 3, Wooden Object, made by poplar, the length is 30cm, width is 5-6cm, thickness is 1.3-2.8cm 9LQ2M14: 4, Wooden Object, the length is 26.5cm, width is 6-7cm, thickness is 1-2cm.						
79LQ2M15					79LQ2M15: 1, Grass Basket, flat lip, curved belly, round base; the lip diameter is 11cm, belly diameter is 12cm, the height is 13.5cm; with some millet grains found inside 9LQ2M15: 2, Ephedra Branches in small bag	79LQ2M15: 3, Woolen Fabrics, found under the body 9LQ2M15: 4, Woolen Rope (3x), the length is 28cm, 42cm, 49cm respectively; all in red color	
79LQ2M17	79LQ2M17: 1, Wooden Cup, flat lip and base; the lip diameter is 4.5cm, belly depth is 11cm.						
79LQ2M18	79LQ2M18: 1, Wooden Bowl (2x), flat lip, round base; the lip diameter is 13cm, height is 9cm, thickness is 1cm	79LQ2M18: 3, Bronze Bead, the diameter is 0.7-1cm	79LQ2M18: 2, Stone Figurine, the height is 27.5cm; it represent a female				
79LQ2M19	79LQ2M19: 1, Wooden Figurine Face, the length is 8cm, width is 6cm, thickness is 2cm		79LQ2M19: 2, Stone, the height is 4cm, width is 3.5cm; found inside the hand 9LQ2M19: 3, Jade Bracelet, the jade is 2cm long, 1.4cm wide, the hole diameter is 0.3cm	79LQ2M19: 4, Bone Awl, the length is 5.8cm		79LQ2M19: 5, Woolen Blanket fabrics	
79LQ2M20	79LQ2M20: 4, Wooden Object, the length is 12cm, diameter is 4.7cm; there is one hole on the middle, the hole depth is 3.5cm 9LQ2M20: 6, Wooden Female Figurine, the height is 44.5cm, head length is 12.5cm, shoulder width is 10cm	79LQ2M20: 8, Bronze Roll, the diameter is 0.3-0.9cm, length is 1.5cm	79LQ2M20: 1 & 2 & 3, Cattle/Sheep Horn with wooden handle(26x), the length is 28-58cm	79LQ2M20: 7, Bone Bead Necklace, the bead diameter is 0.4cm, width is 0.2-0.3cm, there are 945 beads in total			
79LQ2M21			79LQ2M21: 3 & 4 & 5, Jade Bead 9LQ2M21: 6, Stone, the length is 4.7cm, width is 4cm, width is 0.8cm	79LQ2M21: 1 & 2, Bone Awl, one is broken, the length is 8.7cm; the other length is 13cm 9LQ2M21: 7, Bone Bead Bracelet (87x), the diameter is 0.3-0.4cm			
79LQ2M22			79LQ2M22: 1, Jade Bead, the length is 1.4cm				
79LQ2M23					79LQ2M23: 4, Grass Basket, flat lip, curved belly; the lip diameter is 3.6cm, the height is 7cm 9LQ2M23: 5, Dustpan, the length is 49cm, width is 31.5cm, height is 7cm; made by willow and tamarisk branches	79LQ2M23: 1, Felt Hat, the thickness is 0.3cm	79LQ2M23: 3, Leather Shoes, the height is 16cm, the surface length is 11cm, the thickness is 0.4cm
79LQ2M24					79LQ2M24: 1 & 2, Dustpan, made by cannabis branches, the length is 49.5-51cm, width is 24-41cm, the height is 4-9cm 9LQ2M24: 3, Grass Basket		

Table 30 Xiaohetombs

Tomb No.	Leather	Wooden	Woolen	Stone	Plant Product	Metal	Others
02XHM1	M1: 1, Cow Leather (4x)	M1: 2, Standing Stick, 152cm high, upper widnes 10-13cm, lower witness 9cm M1: 3, Arrow (3x), M1: 3-1, length is 79.3cm, diameter is 0.8cm, tamarisk part is 26.3cm long, arrow head is 3.4cm long; M1: 3-2, length is 75.5cm, diameter is 0.8cm, tamarisk part is 19.9cm long; M1: 3-3, length is 77.1cm, diameter is 0.9cm, the tamarisk part is 27.3cm, the arrow head is 3.3cm long M1: 4, Leather Arrow (4x), length is 67.5cm, diameter is 0.5-0.7cm M1: 5, Standing Stick, the height is 92cm, diameter is 4.2cm					
02XHM2	M2: 2, Cow Leather (3x) M2: 10, Leather Boots, 20cm high, bottom length is 28cm, 8-14cm wide M2: 12, Sheep leather M2: 19, Cowhell rope	M2: 1, Tamarisk Branch (10x); M2: 3, Bow, length is 30.3cm, bow string is 14.5cm long M2: 4, Arrow (3x), M2: 4-1, length is 77.3cm, diameter is 0.8cm, the tamarisk part is 36.3cm long; M2: 4-2, length is 77.3cm, diameter is 0.9cm, the tamarisk part is 36cm long; M2: 4-3, length is 77.7cm, diameter is 0.7cm, the tamarisk part is 25.1cm long M2: 5, Standing Stick, 153cm high M2: 6, Standing Stick, 110cm high, made by tamarisk M2: 13, Wooden Pin, length is 10.6cm, diameter is 0.4cm M2: 17, Arrow (4x), the length is 71cm, diameter is 0.5cm M2: 20, Ephedra branch; M2: 21, Tamarisk Branch	M2: 8, Woolen Cloak, 166cm long, 122cm wide M2: 9, Felt Hat, 22cm high M2: 15, Woolen Belt, the length is 60cm, width is 2.3cm, tassel is 20cm long	M2: 14, Jade Bracelet, the jade is 2.3cm long, 2.2cm wide, 1.1cm thick	M2: 11, Grass Basket, round base, straight belly, 14cm high, diameter is 12.5cm M2: 18, Wheat, Millet grain	M2: 16, Bronze Piece (2x)	
02XHM3	M3: 2, Leather (2x)	M3: 3, Arrow (3x), M3: 3-1, length is 25.9cm, diameter is 0.6cm; M3: 3-2, the length is 25.2cm, diameter is 0.7cm; M3: 3-3, the length is 27.8cm, diameter is 0.7cm M3: 4, Standing Stick, the length is 28cm, diameter is 5cm M3: 5, Standing Stick, the length is 32cm, diameter is 2.5cm					
02XHM4	M4: 2, Cow Leather (3x) M4: 8, Leather Boots (2x), the height is 19cm, bottom length is 27cm, width is 8-13cm M4: 10, Sheep leather M4: 14, Leather Pouch, round base, bucket shape, the diameter is 4.5cm M4: 20, Cowhell rope	M4: 1, Tamarisk Branch (12x) M4: 4, Standing Stick, the height is 146cm, diameter is 15cm M4: 5, Standing Stick, the length is 97cm, diameter is 2.5cm, made by tamarisk branch M4: 11, Wooden Pin (2x), M4: 11-1, the length is 19.8cm, diameter is 1.5cm; M4: 11-2, the length is 20.2cm, diameter is 1.1cm M4: 15, Wooden Decoration with feather M4: 16, Wooden Stick (Zu), the length is 7.1cm M4: 19, Wooden Comb, the length is 21.5cm, the width is 7-13cm, thickness is 2-4.5cm, the upper part is red.; M4: 22, Tamarisk Stick, the length is 70cm, diameter is 0.8cm; M4: 26, Ephedra Branch	M4: 3, Felt Bag, the length is 3.5-4.5cm. M4: 6, Woolen Cloak, rectangular, the length is 170cm, width is 117cm, tassel length is 12.5-13cm M4: 7, Felt Hat, the height is 25.6cm, thickness is 2cm M4: 17, Woolen Belt, the length is 70cm, width is 10.5cm, tassel length is 33cm M4: 18, Woolen Cloak, the length is 160cm, width is 95cm M4: 24, Woolen rope, the thickness is 0.3cm M4: 25, Woolen rope, the thickness is 0.4cm	M4: 12, Necklace, the bead diameter is 0.4-1.8cm, thickness is 0.1-0.4cm, the jade piece is 2cm long M4: 13, Jade Bracelet, the jade diameter is 2.4cm, thickness is 1cm	M4: 9, Grass Basket, round base, the height is 16.6cm, diameter is 15.3cm		M4: 21, Cow Ear M4: 23, unknown piece, look like dairy product
MC	MC: 33, Leather Pouch, the height is 14.4cm, 20 tassel	MC: 34, Wooden Stick, the length is 25cm, diameter is 2.2cm; MC: 35, Wooden Piece, in horse leg shape, the length is 24.1cm; MC: 36, Wooden Piece, in horse leg shape, the length is 24cm; MC: 37, Wooden Stick (Zu), the length is 7cm; MC: 38, Wooden Stick (Zu), the length is 15.5cm; MC: 39, Wooden Piece, in horse leg shape, the length is 18.5cm; MC: 40, Wooden Bow, the length is 34.2cm long, string is 11cm long; MC: 41, Wooden Bow, the length is 27.5cm; MC: 51, Wooden Arrow, the length is 71cm, diameter is 0.7cm; MC: 54, Wooden Arrow, the length is 71cm, diameter is 0.65cm; MC: 57, Wooden Arrow, the length is 44cm, diameter is 1.1cm; MC: 62, Wooden Arrow, the length is 55cm, diameter is 0.9cm; MC: 63, Wooden Arrow, the length is 73cm, diameter is 0.75cm; MC: 64, Wooden Arrow, the length is 61.5cm, diameter is 0.6cm; MC: 66, Wooden Arrow, the length is 36cm, diameter is 0.6cm; MC: 73, Wooden Arrow, the length is 23cm, diameter is 0.8cm; MC: 75, Wooden Arrow, the length is 28cm, diameter is 9cm; MC: 76, Wooden Arrow, the length is 30cm, the diameter is 1cm; MC: 77, Wooden Pin, the length is 23cm, diameter is 1.4cm; MC: 78, Wooden Pin, the length is 20.4cm, diameter is 0.9cm; MC: 79, Wooden Pin, the length is 16.5cm, diameter is 1.1cm; MC: 80, Wooden Pin, the length is 19.1cm, diameter is 1.67cm; MC: 81, Wooden Comb, the length is 10.3cm, width is 0.7cm, thickness is 0.5cm; MC: 82, Wooden Comb, the length is 9.1cm; MC: 83, Wooden Comb, the length is 14.7cm; MC: 84, Wooden Comb, the length is 13cm; MC: 86-1, Wooden Arrow with feather, the length is 22-29cm, diameter is 0.5-1.1cm; MC: 86-2, Wooden Arrow with feather, the length is 26-42cm, diameter is 0.7-1cm; MC: 90, Wooden Stick, the length is 22cm, wrapped by feather; MC: 91, Tamarisk Pole, the length is 75cm, wrapped by red woolen rope; MC: 92, Wooden Stick, the length is 64cm, diameter is 1-1.8cm; MC: 93, Wooden Human Face, the length is 8.7cm, width is 5.1cm, thickness is 6.1cm; MC: 95, Wooden Board, the height is 31cm, width is 2.2-6cm, thickness is 1.2cm; MC: 97, Wooden Board, the length is 39.2cm, width is 4.5cm, thickness is 1.2cm; MC: 98, Wooden Board, the length is 32cm, width is 4cm, thickness is 2cm; MC: 99, Wooden Stick, the height is 24cm, diameter is 12.1cm; MC: 100, Wooden Stick, the length is 31.5cm, diameter is 4cm; MC: 101, Wooden Stick, the length is 21.3cm, diameter is 2cm; MC: 102, Wooden Stick, the length is 20cm, diameter is 3.7cm; MC: 103, Tamarisk Branch, the length is 44cm; MC: 104, Ephedra Branch, the length is 9-15cm, diameter is 2.2-3.6cm; MC: 105, Wooden Object, the length is 12cm, width is 5cm, thickness is 1.2cm; MC: 117, Wooden Figure, the overall height is 305cm, the figure height is 167cm; the base is 22cm high, 36cm wide, 20cm thick; the supporting pole is 116cm high, 18cm wide, 13cm thick; MC: 118, Wooden Figure, the overall height is 297cm, the figure height is 160cm; the base is 17cm high, 25cm wide, 16cm thick; the supporting pole is 120cm, 19cm wide, 12cm thick MC: 119, Wooden Figure, the overall height is 222cm, the figure height is 82cm, the supporting pole is 140cm high, 16cm wide, 15cm thick; MC: 121, Wooden Standing Stick, the height is 151cm; MC: 122, Wooden Standing Stick, in paddle shape, the length is 202cm; MC: 123, Wooden Standing Stick, in paddle shape, the length is 152cm	MC: 1, Woolen Cloak, the length is 238cm, width is 126cm, the tassel length is 10-15cm MC: 2, Woolen Cloak, the length is 180cm, width is 166.5cm MC: 3, Woolen Cloak, the length is 67cm, width is 46cm, the tassel length is 5.5cm MC: 5, Woolen Belt, the length is 53cm, width is 11.5cm, tassel length is 15cm MC: 7, Woolen Belt, the length is 32cm, width is 3.6cm, tassel length is 24cm MC: 9, Woolen Cloak, the length is 16cm, width is 20cm MC: 15, White Felt Hat, the height is 27cm, thickness is 1.5cm MC: 16, Brown Felt Hat, the height is 26cm MC: 17, Dark-Brown Felt Hat, the height is 18cm, thickness is 1.3cm MC: 18, Dar-Brown Felt Hat Piece, the thickness is 2.5-3cm, height is 24cm MC: 19, Woolen Textile, the length is 34cm, width is 14cm MC: 20, Woolen Rope, the length is 60cm MC: 21, Woolen Woven Belt, the length is 45cm, width is 1.2cm MC: 111, Felt Piece MC: 124, Woolen Cloak, the length is 130cm, width is 50cm	MC: 110, Stone (6x), the length is 2.9-7.5cm MC: 113, Jade Bead, the height is 1cm, diameter is 1.1cm, with one hole in the centre, the hole diameter is 0.36cm MC: 114, Jade Bead, the height is 2cm, diameter is 1-1.8cm, with one hole in the centre, the hole diameter is 0.6cm MC: 115, String Bead (66x), the bead height is 0.1-0.3cm, diameter is 0.3-0.6cm, the hole diameter is 0.1-0.3cm MC: 116, String Bead (45x), the bead height is 0.1-0.3cm, diameter is 0.4cm, hole diameter is 0.1-0.2cm	MC: 22, Grass Basket, round base, straight belt, the height is 16.6cm, diameter is 12cm MC: 24, Grass Basket, slightly round base, the height is 22cm, diameter is 16.6cm MC: 25, round base, the height is 14.8cm diameter is 10.6cm MC: 29, Grass Basket, curved belly, round base, the height is 23.5cm, diameter is 16.9cm MC: 23, Grass Basket, flat base, the height is 12.8cm, diameter is 16cm MC: 27, Grass Basket	MC: 109, Bronze Piece	MC: 87, Feather Har Decoration (3x), the length is 23cm MC: 88, Feather Decoration (6x), the length is 24cm MC: 106, Cow Skeleton (2x), the surfaces is red MC: 107, Goat Ear MC: 108, Cow Ear

Table 31 Xiaohe tombs

Tomb No.	Wooden	Woolen	Leather	Stone	Plant Product	Metal	Others
M11	M11: 1, Wooden Stick (Zu), the height is 180cm, diameter is 14cm M11: 2, Tamarisk Branch (12x), the length is 70cm, diameter is 0.3cm M11: 6, Wooden Pin (4x), the length are 19.7cm, 22cm, 23cm, 24cm respectively M11: 21, Wooden Comb, the length is 8.5cm, width is 4.5cm, the tooth diameter is 0.5cm M11: 15, Wooden Stick (Zu), the height is 7.9cm, diameter is 1.5-2cm M11: 12, Tamarisk Branch, the length is 77cm, diameter is 0.6-0.8cm M11: 18, Ephedra Branch, the weight is 331g	M11: 3, Woolen Cloak, the length is 130cm, width is 142cm M11: 5, Woolen Felt Hat, the height is 25cm, diameter is 23.5cm M11: 9, Woolen Cloak, the length is 225cm, width is 130cm M11: 16, Woolen Woven Belt, the length is 80cm, width is 10cm, tassel length is 35cm	M11: 4, Cow Leather (3x), the length is 110cm, width is 70cm M11: 8, Leather Boots, the height is 19cm, bottom length is 24cm, width is 7-11.5cm M11: 10, Sheep Leather, the length is 28cm, width is 21cm M11: 14, Leather Pouch, the height is 20cm, width is 7cm, tassel length is 2.5cm M11: 23, Leather tendon rope (40x), the length is 1-2cm, diameter is 1cm, the overall weight is 17.3g	M11: 11, Necklace, with three bead, one jade bead's diameter is 0.7-0.8cm, one whit bead's diameter is 0.6cm, one black bead's diameter is 0.8cm; the overall length is 69cm M11: 17, Bracelet, the jade's diameter is 1.2cm, length is 1.3cm; the overall length is 48cm, width is 0.5cm	M11: 7, Grass Basket, round base, slightly curved belly, the height is 18.2cm, diameter is 16.2cm; with dry food found inside M11: 22, grains, the weight is 25.3g		M11: 13, Feather, the length is 31.5cm M11: 19, Animal Ear (10x), the weight is 11.4g M11: 20, dairy product piece, the weight is 16.3g
M13	M13: 1, Wooden Stick, the height is 187cm, diameter is 28cm M13: 2, Tamarisk Branch (12x), the length is 80cm, diameter is 0.3cm M13: 8, Wooden Pin, the length is 18.5-26.2cm, diameter is 1.1-1.3cm M13: 14, Wooden Figure Face, the height is 9.1cm, width is 6.7cm M13: 21, Wooden Stick (Zu), the length is 10cm, diameter is 2.3-3.8cm M13: 27, Wooden Comb, the length is 22cm, width is 6.8cm M13: 16, Wooden Stick, the length is 77cm, diameter is 0.8cm M13: 17, Tamarisk Stick, the length is 73.5cm, diameter is 0.9cm M13: 23, Ephedra Branches, the overall weight is 464g	M13: 7, Woolen Cloak, the length is 232cm, width is 137cm M13: 9, Felt Hat, the height is 32cm, diameter is 26.5cm M13: 19, Woolen Belt, the length is 80cm, width is 20cm M13: 11, Woolen Cloak, the length is 180cm, width is 120cm, tassel length is 10cm	M13: 3, Cow Leather, the length is 80cm, width is 70cm M13: 4, Cow Leather, the length is 150cm, width is 100cm M13: 10, Leather Boots, the height is 22.5cm, bottom length is 29cm, width is 9-13.5cm M13: 12, Sheep Leather, the length is 50cm, width is 22cm M13: 13, Leather Pouch, the height is 28cm, diameter is 9.5cm	M13: 18, Necklace, made by red woolen rope and bead; the bead diameters are between 0.8-1.8cm; the overall length is 80cm M13: 20, Jade Bracelet, the jade diameter is 3.6-4.1cm, the overall length is 64cm M13: 22, Stone (2x), the length is 2-4cm, thickness is 1.5-1.6cm	M13: 5, Grass Basket, round base, slightly curved belly, the height is 17.8cm, diameter 9.5cm; with dry food and grains found inside M13: 28, Millet Grains, the overall weight is 57.2g		M13: 6, Cow Head M13: 15, Feather Decoration (3x), the length is 31-33.5cm M13: 24, Animal Tendon rope (120x), the length is 4-8cm, diameter is 0.25-1.5cm, the overall weight is 117g M13: 25, Animal Ears (50g), the overall weight is 10.7g M13: 26, Dairy Products, the overall weight is 9.66g
M24	M24: 1, Wooden Standing Stick, in paddle shape, the length is 180cm, width is 67cm M24: 2, Wooden Standing Pole, the height is 330cm, diameter is 38cm M24: 3, Wooden Bow, the length is 40.6cm, width is 0.7cm M24: 4, Wooden Arrow (3x), the length is 57.5-69cm M24: 5, Tamarisk Branches (10x), the length is 60cm, diameter is 0.3cm M24: 14 (4x), Wooden Pin, the length is 16.7-24.5cm, diameter is 1.4-1.6cm M24: 9, Wooden Stick with human face, the height is 66cm, the face is 11cm high, 1.2cm wide M24: 10, Wooden Stick with human face, the height is 66cm M24: 37, Wooden Object in horseshoe shape, the length is 25.5cm, width is 2-2.8cm, thickness is 1.6cm M24: 17, Wooden Figure Face, the length is 10.3cm, width is 6.5cm, thickness is 5cm M24: 25, Wooden Stick with leather cover (2x), the length is 71-72.5cm, the leather cover is 43.5cm long, 3cm wide M24: 26, Wooden Carving in sneak shape (2x), the length is 72-73cm, diameter is 1.3cm M24: 27, Wooden Arrow with bone arrow head, the length is 73cm, arrow head is 10cm long, the diameter is 1.2cm M24: 28/34/35, Wooden Arrow with feather (12x), the length is 74-75cm, diameter is 0.4-0.9cm M24: 29, Wooden Stick (3x), the length is 68-76.5cm, the diameter is 0.7-1cm M24: 31, Wooden Carving in sneak shape, the length is 70cm, diameter is 1.1cm M24: 32, Tamarisk Stick (2x), the length is 73-74.5cm, the diameter is 0.6-1cm M24: 38, Tamarisk Stick, the length is 76cm, diameter is 0.6cm M24: 30, Wooden Stick with two points (2x), the length is 73-76.5cm, diameter is 0.7-1cm M24: 34, Wooden Stick with two points (6x), the length is 77cm, diameter is 0.5-1.1cm M24: 41, Ephedra Branches, the overall weight is 271g	M24: 15, Felt Hat, the height is 28cm, diameter is 19.5cm M24: 13, Woolen Cloak, the length is 273cm, width is 140-170cm, tassel length is 16cm M24: 19, Woven Belt, the length is 50cm, width is 11cm M24: 43, Woolen Cloak, the length is 180cm, width is 130cm	M24: 6, Cow Leather (4x), the length is 170cm, width is 80cm M24: 16, Leather Boots, the height is 28cm, bottom length is 29cm, the width is 9-14cm M24: 39, Sheep Leather	M24: 20, Bracelet with bead, the bead diameter is 0.35-0.7cm, the length is 87cm M24: 21, Stone, the length is 5cm, width is 3cm, thickness is 1.8cm	M24: 7, Grass Basket, round base, slightly curved belly, the height is 23.5cm, diameter is 21cm M24: 12, Grass Basket, the height is 17.6cm, diameter is 14.5cm; with dry food found inside M24: 18, Ephedra Branches, the length is 15cm, diameter is 3.5cm	M24: 42, Metal Earring, the ring diameter is 1.5cm	M24: 8, Grass Branch and Sheep Bone, the length is 20cm, diameter is 1.5cm M24: 11, Cow Head M24: 22, Feather Decoration, the length is 30cm M24: 23, Feather Decoration, the length is 26cm M24: 24, the length is 35.3cm M24: 40, Animal Ears (20x), the overall weight is 8.2g
M33	M33: 1, Tamarisk Branch (9x), the length is 50cm, diameter is 0.3cm M33: 9, Wooden Arrow with feathers (4x), the length is 58.5cm, diameter is 0.6cm M33: 10, Tamarisk Stick, the length is 66cm, diameter is 0.4-0.6cm M33: 13, Ephedra Branch, the overall weight is 301g	M33: 4, Felt Hat, the height is 35cm, diameter is 24cm, the length is 25cm, width is 7cm, tassel length is 35cm M33: 6, Woolen Cloak, the length is 196cm, width is 115cm, the tassel length is 12cm M33: 12, Woolen Woven Belt,	M33: 2, Cow Leather (2x), the length is 140cm, width is 70cm M33: 7, Leather Boots, the height is 24cm, Bottom length is 23cm, width is 8-11cm M33: 8, Sheep Leather, the length is 80cm, width is 64cm	M33: 11, Bracelet, made by two black woolen rope, and decorated by one jade, the rope is 53cm long, the jade bead is round, diameter is 1.5-1.7cm, thickness is 0.5-0.7cm M33: 20, Stone, the length is 5.5cm, width is 3.7cm, thickness is 1cm	M33: 5, Grass Basket, round base, slightly curved belly, the height is 14cm, diameter is 7-14cm; with dry food found inside, cover by one piece of dark-grey woolen felt M33: 14, Grains, the overall weight is 857g M33: 19, Plant Seeds, the overall weight is 340g	M33: 18, Bronze Piece, the length is 2.5cm, width is 0.7cm, thickness is 0.03cm	M33: 15, Animal Tendon ropes (80x), the length is 2-5.5cm, thickness is 0.3-0.9cm, the overall weight is 47.8g M33: 16, Dairy Products, the overall weight is 40.8g M33: 17, Animal Ears (20x), the overall weight is 28.9g
M34	M34: 1, Tamarisk Branch (12x), the length is 80cm, diameter is 0.3cm M34: 3, Wooden Arrow (3x), the length is 27.7-34.5cm, the diameter is 0.9-1cm M34: 19, Wooden Pin, the length is 13.8cm, diameter is 0.7cm M34: 9, Tamarisk Stick, the length is 59.3cm, thickness is 0.25-0.7cm M34: 17, Ephedra Branches, the overall weight is 165.2g	M34: 4, Felt Hat, the height is 26cm, diameter is 21cm M34: 1, Woolen Cloak, the length is 170cm, width is 130cm, the tassel length is 9cm M34: 11, Woolen Woven Belt, the length is 64cm, width is 3.3cm, tassel length is 30cm M34: 7, Woolen Cloak, the length is 100cm, width is 80cm	M34: 2, Leather (3x), the length is 110cm, width is 60cm M34: 8, Leather Boots, made by three pieces of leather, the height is 20cm, bottom length is 30cm, width is 8-13cm M34: 10, Sheep Leather, the length is 40cm	M34: 12, Bracelet, the length and width is 1.6cm, thickness is 0.7cm	M34: 6, Grass Basket, bucket shape, straight belly, round base, the height is 18.5cm, diameter is 11.5cm; with dry food found inside M34: 14, Millet Grain, the overall weight is 26.8g	M34: 13, Bronze Piece, round, the diameter is 1.5cm, thickness is 0.02cm	M34: 15, Dairy Products, the overall weight is 72.5g M34: 16, Animal Tendon Ropes (30x), the length is 2.5-4.5cm, diameter is 0.3-1cm, the overall weight is 22.8g M34: 18, Animal Ears (10x), the overall weight is 8g

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 32 Mohuchahan Nr. 1 Cemetery

Tomb No.	Surface Circle	Tomb Orientation (°)	Tomb Structure	Dimension of Pit Chamber L×W-D (cm)	Tomb Entrance	Dimension of Stone Chamber L×W-D (cm)	No.of buried people	Gender & Age	Burial Form	Burial Objects	Sub-Phase
IM1	Oval	0	Vertical stone shaft	240×132-83	Southern entrance	224×60-30	1	F (1×)	Side flex	Bronze Tube, bronze Button (2×), bronze ornament (5×),	/
IM2	Oval	20	Vertical stone shaft	216×166-64	Southern entrance	176×82-36	1	/	Side flex	/	/
IM3	Round	15	Vertical stone shaft	206×140-120	Southern entrance	140×76-48	1	F (1×), 35	/	Pottery single-handled Jar, s/g bones	I
IM4	Round	15	Vertical stone shaft	180×158-60	Northern entrance	142×72-48	1	M (1×), 45-50	/	Horse tooth	/
IM5	/	30	Vertical stone shaft	104×92-18	/	75×58-26	0	/	Supine flex	Pottery double-handled Jar, pottery single-handled Cup, bronze Knife	I
IM6	/	0	Vertical stone shaft	170×116-20	/	120×74-37	1	M (1×)	Side flex	Pottery sherds	/
IM7	/	10	Vertical stone shaft	150×108-17	Northern entrance	120×75-25	1	F (1×), 35-45	Side flex	Pottery sherds	/
IM8	Oval	0	Vertical stone shaft	156×132-53	Northern entrance	120×87-44	2	M (1×), 35, Kid (1×), 10	/	Bronze Mirror, bronze bead	/
IM9	/	85	Vertical stone shaft	156×116-14	/	90×80-28	0	/	Side flex	Bronze Check piece, bronze Gag bit, horse head, s/g bones	/
IM10	Oval	5	Vertical stone shaft	170×122-50	Southern entrance	134×66-35	1	F (1×), 35-40	/	Pottery Jar, bronze Mirror, bronze piece, bronze Knife, s/g bones	I
IM11	Round	20	Vertical stone shaft	200×106-25	/	176×74-25	1	F (1×), 30-35	Supine flex	Pottery single-handled Cup	I
IM12	Round	20	Vertical stone shaft	146×126-92	/	110×70-36	1	F (1×), 30	Prone flex	Pottery single-handled Jar, pottery single-handled spouted Jar, bronze Button (2×), bronze bead, bronze Spinning wheel, s/g bone	/
IM13	Round	30	Vertical stone shaft	150×120-80	Two entrances	130×73-40	2	M (2×), 60/40-45	Prone flex	Bronze Knife	/
IM14	Oval	35	Vertical stone shaft	150×120-40	Two entrances	130×66-30	1	F (1×), 25-30	Side flex	Bronze bead	/
IM15	Round	5	Vertical stone shaft	170×120-120	/	116×66-64	1	M (1×), 50-55	Side flex	Pottery Jar	I
IM16	/	15	Vertical stone shaft	130×110-40	/	94×64-44	1	F (1×), 50	Side flex	Pottery single-handled Cup	I
IM17	Oval	0	Vertical stone shaft	160×150-75	/	100×80-70	1	M (1×), 50	Prone flex	Pottery Jar, s/g bone	/
IM18	Oval	46	Vertical stone shaft	160×90-30	/	120×70-38	1	F (1×), 50-60	Side flex	Pottery Jar	I
IM19	Irregular round	35	Vertical stone shaft	210×170-100	Northern entrance	190×90-62	2	M (2×), 20/40	Side flex	Pottery Jar, pottery single-handled spouted Jar (2×), bronze Knife (2×), s/g bones	I
IM20	/	314	Vertical stone shaft	200×102-42	/	156×54-52	1	M (1×)	Prone flex	/	I
IM21	Oval	15	Vertical stone shaft	180×138-92	/	120×76-34	1	F (1×), 60	Side flex	Bronze Pin, bronze Tube, bone Arrowhead, s/g bones	I
IM22	Round	0	Vertical stone shaft	172×120-80	Southern entrance	131×60-50	1	F (1×), 50-55	Side flex	Pottery Jar, bronze Knife	/
IM23	Oval	0	Vertical stone shaft	163×128-63	/	121×88-42	1	M (1×), 30-35	Side flex	Pottery Jar, bronze Knife, s/g bone	I
IM24	Oval	20	Vertical stone shaft	138×94-50	/	116×56-46	1	M (1×), 50-55	Prone flex	Pottery single-Cup	I
IM25	/	40	Vertical stone shaft	156×102-50	Northern entrance	130×70-50	1	F (1×), 45-55	Supine flex	Pottery Jar, s/g bones	I
IM26	Triangle	40	Vertical stone shaft	200×150-170	Two entrances	180×78-70	1	F (1×), 50	Side flex	Pottery single-handled Jar, bronze Pin, pottery Button, s/g bones	I
IM27	Irregular round	40	Vertical stone shaft	170×119-110	Southern entrance	124×70-38	1	F (1×), 40	Prone flex	/	I
IM28	Round	22	Vertical stone shaft	172×122-118	Two entrances	152×74-68	1	F (1×), 30-35	Prone flex	Pottery single-handled spouted Jar, pottery single-handled Jar (2×), bronze objects, bronze bead, s/g bones	/
IM29	Oval	50	Vertical stone shaft	210×128-100	Northern entrance	120×75-40	1	/	Side flex	Pottery double-handled Jar, pottery single-handled spouted Jar, s/g bones	I
IM30	Oval	15	Vertical stone shaft	160×120-102	Northern entrance	114×76-34	1	M (1×), 50	Side flex	Pottery single-handled Jar	I
IM31	Oval	45	Vertical stone shaft	180×112-80	/	/	0	/	/	Pottery double-handled Jar, bronze Knife (6×), bronze Awl, s/g bone	I
IM32	Oval	0	Vertical stone shaft	200×142-40	/	150×78-28	0	/	/	Bone Check piece, horse head, s/g heads (5×)	/
IM33	Oval	12	Vertical stone shaft	220×148-102	Northern entrance	140×94-50	1	M (1×), 55	Supine flex	Bronze beads, cowry, bronze Knife, s/g bones	I
IM34	Oval	0	Vertical stone shaft	180×114-50	/	/	0	/	/	Horse bones	/
IM35	Oval	20	Vertical stone shaft	162×124-120	Northern entrance	110×64-58	1	M (1×), 60	Side flex	S/g bones	/
IM36	Round	25	Vertical stone shaft	220×150-106	Two entrances	180×84-46	1	M (1×), 18-20	Supine flex	Bronze knife, s/g bones	/
IM37	Round	30	Vertical stone shaft	160×130-120	Two entrances	130×64-28	1	M (1×), 50-55	Side flex	/	/
IM38	Round	20	Vertical stone shaft	200×150-100	Southern entrance	170×92-42	2	M (2×), 40-45/60	Side flex	Pottery single-handled spouted Jar	/
IM39	/	35	Vertical stone shaft	170×130-100	Two entrances	130×66-44	1	/	Supine flex	Bone Check piece, bone object, bone necklace (6×), bronze Button	/
IM40	Round	35	Vertical stone shaft	190×130-102	Two entrances	180×76-42	3	M (2×), 25/60 F (1×), 50-55	Side flex	Pottery single-handled spouted Jar (2×), s/g bones	I
IM41	Round	30	Vertical stone shaft	162×120-90	Two entrances	148×62-34	1	/	Side flex	Pottery Jar	I
IM42	Oval	15	Vertical stone shaft	140×116-80	Two entrances	130×60-36	1	M (1×), 35-40	Supine flex	Pottery single-handled spouted Jar	I
IM43	Round	20	Vertical stone shaft	172×132-110	Two entrances	140×90-51	1	M (1×), 50-60	Side flex	Pottery single-handled spouted Jar, s/g bones	I
IM44	Round	30	Vertical stone shaft	150×130-100	Two entrances	120×62-34	1	F (1×), 60	Supine flex	Pottery single-handled spouted Jar, s/g bones	I
IM45	/	345	Vertical stone shaft	170×130-86	Northern entrance	150×80-44	1	F (1×), 55-65	Side flex	Pottery Jar, golden Earring, bronze ornament (8×), bronze bead (3×), cowry, bronze Button, bronze Knife, s/g bones	I
IM46	/	0	Vertical stone shaft	185×130-80	Northern entrance	144×76-44	1	Kid (1×)	Side flex	Bronze Gag bit, bronze Check piece, bone Check piece, bronze Button (2×), bronze beads (5×), s/g bones	I
IM47	/	10	Vertical stone shaft	190-160-100	Two entrances	142×102-52	1	M (1×), 50-55	Side flex	Bronze Knife, s/g bones	/
IM48	Oval	15	Vertical stone shaft	198×220-100	Northern entrance	178×150-54	2	M (2×), 30/40-45	Supine flex	Bronze Knife (2×), pottery single-handled Jar, s/g bones	I
IM49	/	55	Vertical stone shaft	150×138-90	Two entrances	130×70-50	1	F (1×), 45-50	Side flex	Pottery single-handled Jar, s/g bones	I
IM50	/	340	Vertical stone shaft	140×120-50	Northern entrance	100×66-36	1	M (1×), 50	Supine flex	Pottery Jar	I
IM51	Round	20	Vertical stone shaft	140×120-80	/	100×66-50	1	M (1×), 35-45	Supine flex	S/g bones	/
IM52	/	20	Vertical stone shaft	132×124-30	/	98×76-26	1	/	/	/	/
IM53	Round	0	Vertical stone shaft	190×140-100	Northern entrance	140×82-42	1	M (1×), 55-60	Side flex	Pottery single-handled Cut, bronze Knife, bronze Button	I
IM54	/	35	Vertical stone shaft	166×118-120	Southern entrance	144×74-40	1	M (1×), 35	Side flex	Bronze Knife, bronze Gag bit (3×), bronze Button (2×), bronze Check piece, pottery Jar, s/g heads (7×), horse heads (2×), s/g bones	I
IM55	Round	50	Vertical stone shaft	140×130-54	/	100×74-25	1	/	Side flex	/	I
IM56	/	60	Vertical stone shaft	146×112-12	Southern entrance	110×60-20	1	/	Side flex	Pottery double-handled Jar	/
IM57	Oval	0	Vertical stone shaft	140×95-38	/	124×52-32	1	F (1×), 35	Prone flex	Bronze Button, bronze Bracelet, s/g bones	/
IM58	/	45	Vertical stone shaft	146×88-16	Southern entrance	120×56-26	1	/	/	/	I
IM59	/	45	Vertical stone shaft	160×114-30	Two entrances	152×66-30	1	F (1×), 55	Side flex	Pottery double-handled Jar, bronze Button, s/g bones	I

Tomb No.	Surface Circle	Tomb Orientation (°)	Tomb Structure	Dimension of Pit Chamber L×W-D (cm)	Tomb Entrance	Dimension of Stone Chamber L×W-D (cm)	No.of buried people	Gender & Age	Burial Form	Burial Objects	Sub-Phase
IM60	Round	40	Vertical stone shaft	222×140-108	Two entrances	158×68-49	1	M (1×), 20	Prone fle×	Bronze Knife, bronze Button, horse head	/
IM61	/	345	Vertical stone shaft	140×120-110	Two entrances	114×58-49	1	F (1×), 70	Side flex	Pottery single-handled Jar, s/g bone	I
IM62	/	0	Vertical stone shaft	230×210-110	Two entrances	180×156-58	2	M (2×), 35-40/40-45	Side flex	Pottery single-handled spouted Jar	I
IM63	/	55	Vertical stone shaft	140×106-60	Northern entrance	110×58-44	1	Kid (1×)	Side flex	/	/
IM64	/	0	Vertical stone shaft	156×100-60	Southern entrance	120×60-36	1	F (1×), 25	Side flex	Pottery double-handled Jar, bronze bead, s/g bone	I
IM65	/	90	Vertical stone shaft	180×160-70	/	142×108-38	2	M (2×), 25-30/35-40	Supine flex	Pottery Jar, bronze Button	I
IM66	/	20	Vertical stone shaft	164×140-120	Northern entrance	134×80-60	1	F (1×), 60	Supine flex	Bronze beads, s/g bone	/
IM67	/	10	Vertical stone shaft	190×154-130	Northern entrance	150×100-58	1	M (1×), 40-45	Side flex	Bronze Knife, s/g bones	/
IM68	Round	40	Vertical stone shaft	170×126-98	Two entrances	150×75-48	1	M (1×), 20-25	Side flex	Bronze Bracelet, bronze Arrowhead (2×), bronze bead, bronze Button, pottery single-handled spouted Jar, pottery Jar, bronze harness	I
IM69	/	335	Vertical stone shaft	140×110-70	Two entrances	120×68-44	1	F (1×), 60	Side flex	Pottery single-handled Jar, s/g bone	I
IM70	Round	322	Vertical shaft pit	140×90-48	/	/	1	M (1×), 50-55	Side flex	Bronze Knife	/
IM71	/	0	Vertical stone shaft	140×110-100	Two entrances	120×70-42	1	F (1×), 45-50	Side flex	Pottery single-handled spouted Jar, s/g bones	I
IM72	/	52	Vertical stone shaft	156×110-90	Two entrances	144×68-34	1	M (1×), 30-35	Side flex	/	/
IM73	/	8	Vertical stone shaft	150×10-50	/	112×63-36	1	F (1×), 60-70	Side flex	/	/
IM74	/	10	Vertical stone shaft	140×104-80	Two entrances	130×55-42	1	F (1×), 35-40	Side flex	S/g head	/
IM75	/	20	Vertical stone shaft	190×170-110	Northern entrance	162×80-50	2	M (1×), 40-45 F (1×), 40	Side flex	Pottery single-handled spouted Jar, pottery single-handled Jar, bone Spinning wheel, bronze bead, eyebrows pencil	I
IM76	/	22	Vertical stone shaft	160×146-110	Two entrances	150×80-42	1	M (1×), 35-40	Prone fle×	Bronze Knife, bronze Spear, bronze Button, s/g bones	I
IM77	/	3	Vertical stone shaft	180×120-100	Two entrances	130×62-48	1	F (1×), 55	Side flex	Pottery single-handled Jar, bronze piece, s/g heads (4×), s/g bone	I
IM78	/	0	Vertical stone shaft	180×150-90	/	140×90-50	1	M (1×), 50-55	Side flex	/	/
IM79	/	2	Vertical stone shaft	194×116-110	Northern entrance	136×68-68	1	F (1×), 50	Supine flex	Bronze Mirror, pottery double-handled Jar, s/g bones	I
IM80	/	46	Vertical stone shaft	170×140-100	Northern entrance	150×100-43	2	M (1×), 45-55 Kid (1×)	Supine flex	S/g bone	/
IM81	/	345	Vertical stone shaft	192×130-70	Northern entrance	163×82-30	1	F (1×), 25-30	Supine flex	pottery Jar, bronze Tube, bronze Pin, bronze Comb, bronze ornament, bronze bead, s/g rib	I
IM82	/	44	Vertical stone shaft	160×130-70	Northern entrance	150×82-42	1	M (1×), 45-50	Prone fle×	Pottery single-handled Jar, bronze Knife, s/g bones	I
IM83	/	32	Vertical stone shaft	250×230-130	Southern entrance	172×102-76	3	M (1×), 40-45 F (2×), 35/50	Supine flex	Pottery Jar	/
IM84	/	5	Vertical stone shaft	172×140-110	Northern entrance	152×98-50	1	M (1×), 30-35	Side flex	Bronze Knife, s/g bones	/
IM85	/	6	Vertical stone shaft	110×90-40	Two entrances	90×47-48	1	Kid (1×)	Side flex	/	/
IM86	/	30	Vertical stone shaft	182×128-120	/	120×82-50	1	F (1×), 30	Side flex	Pottery single-handled Jar, bronze Pin, s/g bone	I
IM87	Oval	10	Vertical stone shaft	170×134-130	Two entrances	155×80-50	1	F (1×), 40-45	Side flex	Pottery double-handled Jar, s/g rib	I
IM88	/	40	Vertical stone shaft	200×150-60	/	150×124-36	0	/	/	/	/
IM89	Irregular round	25	Vertical stone shaft	202×140-140	/	152×96-65	2	M (1×), 60	Supine flex	Bronze Knife, pottery single-handled spouted Jar, pottery Jar	I
IM90	/	36	Vertical stone shaft	182×158-130	Two entrances	150×98-42	1	M (1×), 50	Side flex	Bronze ornament, bronze Button, s/g bones	I
IM91	/	22	Vertical stone shaft	130×90-92	Northern entrance	114×56-42	1	/	Side flex	S/g bones	/
IM92	Irregular round	36	Vertical stone shaft	200×140-120	Northern entrance	160×82-60	1	M (1×), 40-45	Supine flex	Bronze Knife, s/g bones	/
IM93	Irregular round	25	Vertical stone shaft	160×114-116	Two entrances	140×60-46	1	/	Side flex	Bronze Knife, s/g bones	/
IM94	Round	31	Vertical stone shaft	188×140-160	Two entrances	150×90-64	1	M (1×), 65	Side flex	Bone Awl, pottery double-handled Jar, s/g bones	/
IM95	/	15	Vertical stone shaft	182×120-120	Southern entrance	150×72-43	1	M (1×), 30-35	Supine flex	Bronze Knife, bronze piece, s/g bones	I
IM96	Round	12	Vertical stone shaft	140×84-30	/	/	1	F (1×), 45	Side flex	/	/
IM97	Irregular round	20	Vertical stone shaft	170×104-110	Two entrances	140×50-40	1	M (1×), 40-45	Side flex	Bronze Awl, s/g bones	/
IM98	Irregular round	32	Vertical stone shaft	170×150-152	Two entrances	152×100-50	1	M (1×), 50-55	Prone fle×	Bronze bead, bronze Knife, bronze Button, s/g bones	/
IM99	Round	39	Vertical stone shaft	180×160-162	Two entrances	160×100-52	1	F (1×), 35-40	/	Pottery single-handled spouted Jar, bronze bead	I
IM100	Irregular round	36	Vertical stone shaft	184×110-130	Two entrances	160×64-46	1	M (1×), 25-30	Supine flex	Pottery Jar	/
IM101	Round	335	Vertical stone shaft	178×134-140	Two entrances	150×88-44	1	M (1×), 40-45	Prone fle×	Pottery single-handled Jar, bronze Sword, bronze Knife, bone Button, s/g bones	I
IM102	Irregular round	350	Vertical shaft pit	100×62-110	/	/	2	M (1×), 50 F (1×), 20	Side flex	/	/
IM103	Oval	30	Vertical stone shaft	160×140-215	/	/	1	M (1×), 50-55	Supine flex	Bronze Knife, s/g bones	/
IM104	Irregular round	16	Vertical stone shaft	162×140-160	Two entrances	150×88-60	1	F (1×), 30-35	Side flex	Pottery single-handled Jar, bronze Knife, golden Earring, s/g bones	II
IM105	Irregular round	1	Vertical stone shaft	220×150-170	Two entrances	172×100-60	1	M (1×), 25	Side flex	Pottery single-handled Jar, bronze Knife, s/g bones	II
IM106	Irregular round	20	Vertical stone shaft	182×140-185	Northern entrance	166×85-80	1	F (1×), 15	Side flex	Bronze Tube, bronze ornament (7×), bronze Button (4×), wooden Pin, pottery single-handled spouted Jar, bronze bead (2×), bronze Mirror, s/g bones	II
IM107	/	0	Vertical stone shaft	200×152-100	Two entrances	170×96-68	0	/	Side flex	/	/
IM108	Round	25	Vertical stone shaft	180×166-130	Two entrances	160×100-54	1	M (1×), 25	Side flex	/	/
IM109	/	25	Vertical stone shaft	192×160-190	Two entrances	150×90-52	2	M (1×), 45-55 F (1×), 65-70	Prone fle×	pottery single-handled spouted Jar, bone Spinning wheel	II
IM110	Round	355	Vertical shaft pit	120×80-100	/	/	1	F (1×), 25	Side flex	Pottery double-handled Jar, s/g bones	II
IM111	/	11	Vertical stone shaft	172×158-162	Two entrances	160×84-55	1	M (1×), 30	Side flex	Bronze Knife, s/g bones	/
IM112	Round	15	Vertical stone shaft	150×120-146	Two entrances	120×73-53	1	M (1×), 30-35	Side flex	Bronze Knife, pottery Jar, s/g bones	/
IM113	Irregular round	35	Vertical stone shaft	200×158-194	Two entrances	170×102-56	1	M (1×), 60-65	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IM114	/	30	Vertical stone shaft	190×134-150	Northern entrance	162×80-52	1	M (1×), 20-25	Side flex	Bone Sheath, s/g bones	/
IM115	/	65	Vertical stone shaft	162×132-150	Southern entrance	130×76-45	1	F (1×), 50	Side flex	S/g bones	/
IM116	Irregular round	40	Vertical stone shaft	152×100-140	Northern entrance	132×56-44	1	M (1×), 50-55	Side flex	Pottery Bowl, s/g rib	II
IM117	Irregular round	20	Vertical stone shaft	172×120-150	Two entrances	150×76-54	1	M (1×), 25-30	/	Pottery single-handled Jar, bronze bead	II
IM118	/	20	Vertical stone shaft	208×145-190	/	170×88-64	1	M (1×), 25	Side flex	Pottery single-handled spouted Jar, bone ornament, golden ornament, s/g bones	II
IM119	Irregular round	30	Vertical stone shaft	172×122-105	/	/	1	/	/	/	/
IM120	Irregular round	10	Vertical stone shaft	150×116-140	Two entrances	130×74-43	1	/	Side flex	Bronze Knife, bone Sheath, s/g bones	/
IM121	/	25	Vertical stone shaft	162×128-150	Two entrances	150×80-51	1	F (1×), 70	Side flex	Pottery Jar, bronze Knife, s/g bones	II
IM122	Round	20	Vertical stone shaft	192×130-150	Northern entrance	170×80-56	2	M (1×), 70 F (1×), 45	Side flex	Bone Tube, s/g bones	/
IM123	/	15	Vertical stone shaft	180×126-112	Northern entrance	150×83-54	1	M (1×), 40-45	Side flex	Pottery Jar (3×), s/g bones	II
IM124	Irregular round	65	Vertical stone shaft	200×124-170	Two entrances	160×84-54	1	M (1×), 15	Side flex	Bronze Mirror, bronze Button, bronze Bead, s/g bones	/
IM125	Irregular round	15	Vertical stone shaft	198×128-150	Northern entrance	160×80-60	1	F (1×), 20-25	Supine flex	Pottery pot Fu, bronze bead, bronze Mirror, bronze Knife, s/g bones	II
IM126	/	20	Vertical stone shaft	170×124-152	Two entrances	150×84-54	1	M (1×), 35-40	Side flex	Bronze bead, bronze Knife, s/g bones	/
IM127	/	20	Vertical stone shaft	142×80-110	/	109×52-32	1	/	/	Bronze Knife	/
IM128	Irregular round	40	Vertical stone shaft	190×136-170	Two entrances	175×94-60	1	F (1×), 20	Supine flex	Pottery single-handled spouted Jar, bronze Mirror, bronze button (5×), bronze Pin, bronze Necklace, s/g bones	II
IM129	Irregular round	350	Vertical stone shaft	210×118-150	Two entrances	190×90-56	1	M (1×), 50-55	Side flex	Pottery single-handled spouted Jar, bronze Knife, s/g bones	II
IM130	Round	35	Vertical stone shaft	172×140-140	Northern entrance	158×96-50	1	F (1×), 40	Supine flex	Pottery single-handled Jar, bronze Mirror, s/g bones	/
IM131	/	40	Vertical stone shaft	190×150-160	Two entrances	170×98-50	1	M (1×), 20-25	Supine flex	Bronze Knife, s/g bones	/
IM132	/	22	Vertical stone shaft	158×120-160	Northern entrance	130×72-44	2	F (2×), 50-70	Side flex	Pottery single-handled Jar, s/g bones	/
IM133	/	29	Vertical stone shaft	190×120-120	/	150×78-40	1	M (1×), 60-65	Side flex	Bronze Knife, s/g bones	/

Tomb No.	Surface Circle	Tomb Orientation (°)	Tomb Structure	Dimension of Pit Chamber L×W-D (cm)	Tomb Entrance	Dimension of Stone Chamber L×W-D (cm)	No.of buried people	Gender & Age	Burial Form	Burial Objects	Sub-Phase
IM134	/	20	Vertical stone shaft	170×120-100	Two entrances	155×82-37	1	F (1×), 50	Side flex	Pottery ware (2×), s/g bones	/
IM135	Irregular round	356	Vertical stone shaft	180×140-154	Two entrances	160×86-53	1	M (1×), 20-25	Side flex	Bronze Knife, pottery single-handled spouted Jar, s/g bones	II
IM136	/	20	Vertical stone shaft	150×110-130	Two entrances	130×74-42	1	M (1×), 35	Side flex	Pottery single-handled Jar, s/g bones	II
IM137	Round	350	Vertical stone shaft	198×130-150	Two entrances	170×92-45	1	F (1×), 60	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IM138	/	22	Vertical stone shaft	190×150-150	Two entrances	155×90-58	1	M (1×), 50-55	Side flex	Bronze bead, bronze Knife, s/g bones	/
IM139	Oval	29	Vertical stone shaft	190×140-140	Two entrances	160×76-52	2	M (1×), 55-65 F (1×), 35-40	Side flex	Pottery double-handled Jar, bronze Knife, s/g bones	II
IM140	/	20	Vertical stone shaft	174×130-130	Northern entrance	146×72-50	1	F (1×), 15	Supine flex	Pottery single-handled Jar, bronze Button, cowry	II
IM141	/	20	Vertical stone shaft	150×90-128	Two entrances	130×58-38	1	Kid (1×), 10	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IM142	/	55	Vertical stone shaft	162×120-150	Northern entrance	140×75-55	1	M (91×), 70	Supine flex	Bronze Knife, s/g bones	/
IM143	/	25	Vertical stone shaft	192×150-160	Northern entrance	170×106-46	1	M (1×), 3-35	Prone flex	Bronze Knife, s/g bones	/
IM144	/	348	Vertical stone shaft	130×82-110	Two entrances	110×45-34	0	/	/	Pottery double-handled Jar, bronze Knife	II
IM145	/	26	Vertical stone shaft	150×110-130	/	/	0	/	/	S/g bones	/
IM146	/	25	Vertical stone shaft	160×120-150	Two entrances	140×78-32	1	Kid (1×)	Side flex	S/g bones	/
IM147	/	21	Vertical stone shaft	182×140-140	Two entrances	162×78-40	1	M (1×), 25-30	Side flex	Bronze Knife, pottery double-handled Jar, s/g bones	II
IM148	/	2	Vertical stone shaft	210×148-185	Two entrances	170×92-50	1	M (1×), 25	Side flex	Golden Earring, bronze Knife, bronze Arrowhead, bronze Awl, s/g bones	/
IM149	/	10	Vertical stone shaft	202×130-150	Northern entrance	180×90-44	1	M (1×), 30-35	Side flex	Bronze Earring, bronze Knife, s/g bones	/
IM150	Irregular round	21	Vertical stone shaft	190×130-150	Two entrances	180×170-40	1	F (1×), 40-45	Prone flex	Pottery double-handled Jar, pottery single-handled spouted Jar, bronze Tube, bronze Pin, bronze Bell (2×), bronze Mirror, bone Spinning wheel, s/g bone	/
IM151	/	20	Vertical stone shaft	200×170-152	Two entrances	170×106-52	1	F (1×), 65	Side flex	Pottery single-handled Jar, bronze Mirror, bronze Knife, bronze bead (2×), s/g bones	/
IM152	/	10	Vertical stone shaft	160×100-120	Northern entrance	130×56-61	1	F (1×), 15	Side flex	Pottery Jar, s/g bones	/
IM153	/	8	Vertical stone shaft	190×124-230	Two entrances	170×78-68	1	M (1×), 25	Supine flex	Pottery single-handled spouted Jar, bronze Knife, s/g bones	II
IM154	Round	40	Vertical stone shaft	184×124-150	Two entrances	160×68-50	1	M (1×), 40	Prone flex	Pottery single-handled Jar, bronze Knife, s/g bones	II
IM155	/	20	Vertical stone shaft	190×124-200	Two entrances	170×78-50	1	M (1×), 35	Side flex	Pottery single-handled spouted Jar, bronze Knife, s/g bones	II
IM156	/	22	Vertical stone shaft	224×164-220	Northern entrance	200×110-60	1	M (1×), 60	Side flex	Pottery single-handled spouted Jar, bronze Knife, s/g bones	II
IM157	/	42	Vertical stone shaft	190×120-160	/	150×76-60	1	M (1×), 50	Side flex	Bronze Knife, s/g bones	/
IM158	Irregular round	42	Vertical stone shaft	200×150-140	Two entrances	180×80-56	2	F (2×), 15/35-40	Side flex	Pottery single-handled spouted Jar (2×), s/g bones	II
IM159	/	17	Vertical stone shaft	124×80-120	/	/	1	Kid (1×), 15	Side flex	Pottery single-handled jar	II
IM160	/	30	Vertical stone shaft	170×120-150	Two entrances	150×80-44	1	M (1×), 60-65	Side flex	Pottery double-handled Jar, bronze Knife, s/g bones	II
IM161	Round	20	Vertical stone shaft	140×100-130	Two entrances	120×56-40	1	Kid (1×)	Side flex	Pottery double-handled Jar, s/g bones	II
IM162	/	43	Vertical stone shaft	200×110-150	Two entrances	170×70-50	1	M (1×), 35-40	Supine flex	Bronze Knife, s/g bones	/
IM163	/	30	Vertical stone shaft	140×110-80	Two entrances	120×80-36	1	F (1×)	Prone flex	Pottery double-handled Jar, pottery Cup	II
IM164	/	43	Vertical stone shaft	210×150-21	Two entrances	190×86-70	1	M (1×), 45-50	Side flex	Pottery single-handled spouted Jar, bronze Knife, s/g bones	II
IM165	/	42	Vertical stone shaft	150×126-130	/	120×80-62	1	M (1×), 45-50	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IM166	/	31	Vertical stone shaft	206×104-0	Northern entrance	180×74-44	1	/	Side flex	/	/
IM167	/	20	Vertical stone shaft	210×140-180	Two entrances	160×92-56	1	M (1×), 30-35	Side flex	Pottery single-handled Jar, bronze Knife, bone Button, s/g bones	/
IM168	/	2	Vertical stone shaft	182×150-220	Two entrances	150×80-54	1	M (1×), 40-45	Side flex	Pottery double-handled Jar, bronze Knife, horse bone, s/g bones	/
IM169	/	16	Vertical stone shaft	182×118-200	/	118×70-50	1	F (1×), 15	Supine flex	Bronze Knife, s/g bone	/
IM170	/	59	Vertical stone shaft	180×110-114	Northern entrance	120×56-42	1	Kid (1×), 15	Side flex	/	/

Table 33 Mohuchahan Nr. II Cemetery

Tomb No.	Surface Circle/Mound	Tomb Orientation (°)	Tomb Structure	Dimension of Pit Chamber L×W-D (cm)	Tomb Entrance	Dimension of Stone Chamber L×W-D (cm)	No.of buried people	Gender & Age	Burial Form	Burial Objects	Sub-Phase
IIM1	Stirrup-shape	1	Vertical stone shaft	182×132-110	Two entrances	162×80-38	1	M (1×), 40-45	Side flex	Pottery single-handled Jar	II
IIM2	Stirrup-shape	0	Vertical stone shaft	174×130-120	Two entrances	155×98-60	1	M (1×), 60	Side flex	Pottery single-handled spouted Jar, bronze Knife, s/g bones	II
IIM3	Stirrup-shape	359	Vertical stone shaft	202×160-150	Two entrances	160×110-52	2	M (1×), 55-60 F (1×), 40-45	Side flex	Pottery single-handled spouted Jar, pottery pot Fu, s/g bones	II
IIM4	Irregular round	350	Vertical stone shaft	172×122-140	Southern entrance	150×74-27	1	Kid (1×), 6-7	Side straight	/	/
IIM5	Irregular round	331	Vertical stone shaft	202×142-162	Two entrances	180×110-44	1	M (1×), 25-30	/	Pottery Jar, golden ornament	/
IIM6	Irregular round	46	Vertical stone shaft	160×120-102	Northern entrance	138×78-37	0	/	/	Pottery single-handled spouted Jar	II
IIM7	/	0	Vertical stone shaft	170×128-80	Two entrances	160×88-34	1	F (1×), 50-60	/	Pottery single-handled Jar, bronze Knife, tooth Button	II
IIM8	Round	6	Vertical stone shaft	190×142-130	Two entrances	174×92-42	1	M (1×), 20	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IIM9	/	55	Vertical stone shaft	162×118-60	Two entrances	152×80-30	1	M (1×), 50-55	/	S/g bones	/
IIM10	Round	16	Vertical stone shaft	162×120-140	Two entrances	152×74-40	1	F (1×), 35-40	Side flex	Pottery single-handled Jar, bronze Tube, bronze bead, s/g bones	II
IIM11	Round	16	Vertical stone shaft	180×130-60	Two entrances	150×88-18	1	F (1×), 20	Side flex	/	/
IIM12	Round	6	Vertical stone shaft	170×120-117	Two entrances	160×76-34	1	M (1×), 40-45	Supine flex	Pottery single-handled Cup	II
IIM13	Round	26	Vertical stone shaft	180×130-110	Two entrances	160×82-40	1	M (1×), 45-50	Side flex	Pottery single-handled Jar, bronze Knife, s/g bones	II
IIM14	Round	21	Vertical stone shaft	190×150-100	Northern entrance	158×84-48	1	F (1×), 50	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IIM15	Round	12	Vertical stone shaft	172×118-110	Northern entrance	150×78-46	1	F (1×), 60	Side flex	Pottery single-handled spouted Jar, bronze bead, bronze Mirror, bone Spinning wheel, bronze Necklace, s/g bones	II
IIM16	Round	356	Vertical stone shaft	160×112-110	Two entrances	132×74-36	1	F (1×), 60	Side flex	Pottery single-handled Jar (2×), s/g bones	II
IIM17	Irregular round	9	Vertical stone shaft	160×105-60	Two entrances	160×58-24	1	/	Prone flex	Pottery double-handled Jar	II
IIM18	Irregular round	20	Vertical stone shaft	182×100-122	Two entrances	170×60-32	1	M (1×), 30-35	Side flex	Pottery single-handled Jar, s/g bones	II
IIM19	Stirrup-shape	12	Vertical stone shaft	190×130-118	Northern entrance	170×78-57	1	M (1×), 30-35	Side flex	Pottery single-handled Jar, bronze Gag bit, bone Check piece, bone Knife (2×), bronze object, s/g bones	II
IIM20	Stirrup-shape	350	Vertical stone shaft	142×106-90	Northern entrance	114×66-30	1	F (1×), 50-55	Side flex	Pottery single-handled spouted Jar	/
IIM21	Stirrup-shape	11	Vertical stone shaft	200×146-130	Two entrances	160×102-38	2	M (2×), 30-35/40-45	Side flex	Pottery single-handled Jar, pottery single-handled spouted Jar (2×), s/g bones	II
IIM22	/	15	Vertical stone shaft	102×86-72	/	/	0	/	Side flex	Pottery single-handled spouted Jar, s/g rib	/
IIM23	Irregular round	1	Vertical stone shaft	196×136-110	/	160×90-40	1	M (1×), 35	Side flex	Pottery single-handled spouted Jar, bronze Knife, bronze Bracelet, bone ornament, s/g bones	II
IIM24	Stirrup-shape	328	Vertical stone shaft	200×142-96	Northern entrance	180×86-56	1	F (1×), 60	Side flex	Pottery single-handled Jar, pottery single-handled spouted Jar, horse head in the pit	II
IIM25	/	354	Vertical stone shaft	214×140-160	Two entrances	165×76-60	1	M (1×), 35	Side flex	Pottery pot Fu, bone Arrowhead, s/g bone	/
IIM26	Irregular round	350	Vertical stone shaft	220×138-100	Southern entrance	164×72-43	1	M (1×), 50-55	Side flex	Pottery sherds, bronze Knife, s/g bones	/
IIM27	Irregular round	10	Vertical stone shaft	160×116-120	Northern entrance	140×72-40	1	F (1×), 65	Side flex	Pottery single-handled spouted Jar	II
IIM28	/	7	Vertical stone shaft	210×140-150	Two entrances	185×94-54	2	M (2×), 35/15	Side flex	Pottery single-handled spouted Jar, bronze Arrowhead, bone Arrowhead, bronze Knife, s/g bone	II
IIM29	Irregular round	345	Vertical stone shaft	200×160-110	Two entrances	160×80-50	1	M (1×), 35-40	Side flex	Bronze Knife, s/g bones	/
IIM30	Stirrup-shape	12	Vertical stone shaft	190×130-150	Northern entrance	130×85-46	1	M (1×), 35-40	Side flex	Pottery single-handled Jar, s/g bones	II
IIM31	Irregular round	354	Vertical stone shaft	230×140-140	/	180×80-50	1	F (1×), 12-15	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IIM32	Irregular round	350	Vertical stone shaft	182×154-120	Two entrances	126×100-56	1	M (1×), 30-35	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IIM33	Irregular round	350	Vertical stone shaft	210×150-135	Northern entrance	140×90-56	2	M (1×), 60 F (1×), 60	Supine flex	Pottery Jar	/
IIM34	Irregular round	346	Vertical stone shaft	220×150-130	Southern entrance	160×80-50	2	M (2×), 15/30-35	Side flex	Pottery single-handled spouted Jar (2×), wooden single-handled Basin, bone Awl, s/g bone	II
IIM35	/	356	Vertical stone shaft	210×140-130	/	150×70-42	2	M (1×), 60	Side flex	Pottery single-handled spouted Jar, pottery single-handled Jar, bone Awl, bone Spinning wheel	II
IIM36	/	358	Vertical stone shaft	212×160-130	Northern entrance	150×80-44	1	M (1×), 40-45	Side flex	Pottery single-handled spouted Jar, bronze Knife, s/g bones	II
IIM37	/	12	Vertical stone shaft	220×160-11-	/	130×80-60	1	F (1×), 20-25	Side flex	Pottery double-handled Jar, s/g bones	II
IIM38	/	6	Vertical stone shaft	220×150-120	Two entrances	185×90-52	1	F (1×), 60	Side flex	Pottery double-handled Jar, pottery Cup, s/g bones	II
IIM39	/	354	Vertical stone shaft	190×150-116	Two entrances	156×84-56	1	F (1×), 45-50	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IIM40	Irregular round	350	Vertical stone shaft	200×120-140	Two entrances	176×60-50	1	F (1×), 65	Side flex	Pottery single-handled spouted Jar, s/g bones	/
IIM41	Irregular round	358	Vertical stone shaft	210×130-120	/	160×72-60	2	M (2×), 44-45/60	Side flex	Pottery single-handled spouted Jar (3×), bronze Knife, bone Awl, s/g bones	II
IIM42	Irregular round	352	Vertical stone shaft	220×140-130	Two entrances	180×70-40	3	F (3×), 60-70	Side flex	Pottery single-handled spouted Jar	II
IIM43	Irregular round	35	Vertical stone shaft	180×120-130	Two entrances	150×80-50	1	M (1×), 55-60	Side flex	Pottery single-handled spouted Jar, pottery double-handled Jar	II
IIM44	Irregular round	355	Vertical stone shaft	210×150-120	Northern entrance	170×100-55	1	F (1×), 25-30	Side flex	Pottery Jar, s/g bones	II
IIM45	Stirrup-shape	8	Vertical stone shaft	190×130-120	Northern entrance	150×80-54	1	M (1×), 60	Side flex	Pottery single-handled spouted Jar, s/g bones	/
IIM46	Irregular round	28	Vertical stone shaft	180×160-140	Southern entrance	150×60-50	1	F (1×), 15	Side flex	Pottery single-handled spouted Jar, s/g bones	II
IIM47	Irregular round	345	Vertical stone shaft	200×130-130	/	170×80-60	2	F (1×), 60	Supine flex	Pottery single-handled spouted Jar	/
IIM48	Irregular round	10	Vertical stone shaft	180×150-120	/	144×96-46	1	M (1×), 60	Side flex	Bronze Knife, bone Arrowhead, tooth Button, stone Button, bronze knife Handle, s/g bones	/
IIM49	Irregular round	354	Vertical stone shaft	210×130-130	Southern entrance	150×80-50	1	F (1×), 40-45	Side flex	Pottery single-handled Jar, s/g bones	/
IIM50	Irregular round	3	Vertical stone shaft	203×130-118	Two entrances	180×70-56	1	F (1×), 45	Side flex	Pottery single-handled Jar, bone Spinning wheel, s/g bones	II
IIM51	Irregular round	344	Vertical stone shaft	202×140-140	Northern entrance	170×80-40	1	F (1×), 65	Side flex	Pottery single-handled spouted Jar, s/g bone	II
IIM52	Stirrup-shape	355	Vertical stone shaft	190×140-115	/	120×80-60	1	M (1×), 65	Side flex	/	/
IIM53	Round	21	Vertical stone shaft	220×160-130	Southern entrance	170×80-72	1	M (1×), 25-30	Side flex	Pottery single-handled spouted Jar, bronze Knife, bone ornament, bone-horn object	II
IIM54	/	2	Vertical stone shaft	180×150-100	Northern entrance	140×70-66	1	M (1×), 20	Side flex	Pottery single-handled spouted Jar, bronze Arrowhead, bone Arrowhead, bronze Knife, s/g bones	II
IIM55	Irregular round	356	Vertical stone shaft	180×140-120	Northern entrance	140×90-60	1	F (1×)	Side flex	Pottery single-handled spouted Jar, pottery sherd	II
IIM56	Irregular round	0	Vertical stone shaft	170×120-130	Two entrances	120×74-50	1	M (1×), 45-50	Side flex	Bronze Knife	/
IIM57	Irregular round	345	Vertical stone shaft	150×120-95	Northern entrance	115×65-45	1	F (1×), 45-55	Side flex	Pottery Jar, s/g bones	II
IIM58	Irregular round	22	Vertical stone shaft	190×130-70	Two entrances	162×72-30	1	M (1×), 45	Side flex	Pottery single-handled spouted Jar	II
IIM59	Irregular round	348	Vertical stone shaft	160×102-100	Northern entrance	125×80-60	1	F (1×), 40-45	Side flex	/	/
IIM60	Round Mound	90	Vertical shaft pit	180×80-50	Dm: 450cm H: 45cm	/	1	M (1×), 50	Supine straight	/	Han
IIM61	Round Mound	130	Vertical shaft pit	200×70-50	Dm: 495cm H: 50cm	/	1	M (1×), 55-60	Supine straight	/	Han
IIM62	Round	19	Vertical stone shaft	202×145-70	/	156×102-53	2	M (2×), 35-40	Side flex	Pottery single-handled spouted Jar (2×), bone bead, stone Button, bronze Knife, tooth Button	II
IIM63	Round Mound	10	Vertical stone shaft	200×120-80	Two entrances	200×60-58	1	F (1×), 55-60	Supine straight	Bronze Pin, pottery Spinning wheel, bronze Mirror, iron Knife	Han

Tomb No.	Surface Circle/Mound	Tomb Orientation (°)	Tomb Structure	Dimension of Pit Chamber L×W-D (cm)	Tomb Entrance	Dimension of Stone Chamber L×W-D (cm)	No.of buried people	Gender & Age	Burial Form	Burial Objects	Sub-Phase
IIM64	Rectangular Mound	91	Vertical stone shaft	280×205-60	/	164×65-40	1	F (1×), 30	Supine flex	S/g head	/
IIM65	Rectangular Mound	78	Vertical stone shaft	220×96-50	Eastern entrance	210×62-35	1	M (1×)	Supine straight	S/g bones	Han
IIM66	Rectangular Mound	82	Vertical stone shaft	200×102-50	Two entrances	194×64-42	1	M (1×), 45-50	Supine straight	S/g bones	Han
IIM67	Irregular round	40	Vertical stone shaft	220×148-70	Northern entrance	180×92-44	4	M (4×), 25/55-60/45-50/24	Supine straight	Pottery single-handed spouted Jar, pottery shallow Bowl, s/g bones	II
IIM68	Round Mound	126	Vertical stone shaft	204×100-80	Eastern entrance	192×62-40	1	F (1×)	Supine straight	Pottery Spinning wheel	Han
IIM69	Round	18	Vertical stone shaft	192×140-130	Northern entrance	152×86-52	4	M/F, 30-35/60/50-55	Side flex	pottery single-handed spouted Jar (2×), pottery double-handed Jar, pottery Jar (2×), pottery single-handed Cup, gravel stone, bronze Awl (2×), bone Tube, bronze Knife, bronze Awl	II
IIM70	Irregular round	358	Vertical stone shaft	208×190-50	/	158×142-46	/	F (1×), 40	/	Pottery Jar (2×), bronze Knife, s/g bones	II
IIM71	Rectangular Mound	110	Vertical stone shaft	210×88-50	/	190×50-38	1	M (1×), 20-25	Supine straight	Bronze Button	Han
IIM72	Rectangular Mound	89	Vertical stone shaft	226×120-40	/	174×50-36	1	M (1×), 40-45	Supine straight	/	Han
IIM73	Rectangular Mound	87	Vertical stone shaft	208×74-30	/	168×38-26	1	M (1×), 30-35	Supine straight	/	Han
IIM74	Rectangular Mound	116	Vertical stone shaft	180×82-30	Two entrances	180×38-28	1	/	Supine straight	Bronze Hook, bronze Button	Han
IIM75	Irregular round	348	Vertical stone shaft	190×122-90	/	146×82-50	2	M (2×), 25-30/50-55	Side flex	Pottery Jar, pottery single-handed spouted Jar, bone object, s/g bones	II
IIM76	Irregular round	320	Vertical stone shaft	192×120-120	Two entrances	180×72-58	1	M (1×), 35-40	Side flex	Pottery single-handed spouted Jar, bronze Button	/
IIM77	Rectangular Circle	90	Vertical stone shaft	216×84-50	/	180×48-40	1	F (1×), 40-45	Supine straight	/	Han
IIM78	Rectangular Mound	92	Vertical stone shaft	248×84-65	/	206×44-50	1	M (1×), 35-40	Supine straight	Bronze Button, s/g bones	Han

Table 34 Baileqier tombs

Tomb No.	Buried Individual					Grave Goods
	No.	Head Direction	Gender	Age	Burial Form	
M202	A	W	M	25-30	Supine flex	Pottery single-handed spouted Jar (2×), Pottery single-handed spouted Cup (12×), Pottery Cup (6×), Pottery Jug (6×), Pottery shallow Bowl, Pottery Jar, Pottery wares (9×), Bronze Needle, Bronze Knife (2×), Iron Knife, Bronze-iron object, Gravel stone, Bone Spinning wheel, Wooden fire-making stick, S/g heads (2×), s/g bones
	B	W	M	35-40	Supine flex	
	C	W	M	40-45	Supine flex	
	D	W	M	20-25	Supine	
	E	NW	/	/	/	
	F	N	M	40-45	/	
	G	N	M	20-23	/	
	H	NW	F	A	Supine flex	
	I	N	F	A	Supine flex	
	J	/	F	23-25	Supine flex	
	K	/	/	/	/	
	L	NW	M	20-25	Supine flex	
	M	NW	M	30-35	Supine flex	
	N	NW	F	25-30	Supine	
	O	/	/	/	/	
	P	NW	M	20-23	Supine flex	
	Q	NW	/	30-35	/	
	R	NW	/	25-30	/	
	S	NW	/	6-10	/	
	T	/	M	A	Supine flex	
U	/	/	/	/		
V	/	F	A	Supine flex		
W	/	M	40-45	Supine		
X	/	M	A	Supine flex		
Y	N	M	20-23	/		
Z	/	/	55-60	/		
A'	NW	M	25-30	Supine flex		
B'	N	F	18-23	/		
C'	N	M	45-50	Supine flex		
D'	NW	M	50-55	Supine		
E'	/	M	55-60	Supine flex		
F'	NW	M	/	/		
G'	/	/	Infant	/		
H'	SW	M	A	Supine		

Tomb No.	Buried Individual				Grave Goods	
	I'	NW	M	53-58	Supine flex	
	J'	NW	M	A	/	
	K'	NW	F	14-16	/	
	L'	NW	F	18-23	/	
	M'	N	F	14-16	Supine flex	
	N'	NW	/	6-10	Supine flex	
	O'	NE	/	/	Supine flex	
	P'	NW	F	A	Supine flex	
	Q'	SW	M	55-60	Supine flex	
	R'	NW	/	6-7	/	
	S'	NW	/	6-7	/	
	T'	N	F	45-50	/	
	U'	NW	M	30-35	Supine straight	
	V'	NW	/	3-4	Supine straight	
W'	/	/	/	/		
M203	A	/	/	A	Secondary burial	Pottery single-handed spouted Cup, Pottery Jar, Bronze Knife, Bronze Awl (2×)
M205	A	W	M	A	Supine	Pottery single-handed spouted Jar, Pottery single-handed spouted Cup (4×), pottery Cup, Pottery ware, Bronze Knife, Bronze Needle, Bone Tube, S/g head, s/g bones
	B	SW	M	A	Supine	
	C	E	M	A	Supine	
	D	E	F	25-30	Supine flex	
	E	/	/	Kid	/	
	F	NW	F	25-30	Prone flex	
	G	N	M	45-55	Supine flex	
	H	NW	M	A	Supine flex	
	I	NW	M	40-45	Supine flex	
	J	N	F	45-50	Supine flex	
	K	/	F	35	/	
	L	NW	M	A	Prone flex	
	M	NW	F	35-40	Supine flex	
	N	N	M	A	Supine flex	
	O	/	F	50-55	/	
	P	N	M	25-35	Supine	
	Q	NW	M	A	Supine flex	
	R	NW	M	35-40	Supine	
S	W	M	55-60	Prone flex		
M206	A	/	M	A	/	Pottery wares (18×), Bronze Knife (2×), Bronze Needle, Iron Knife, Golden Earring, Eyebrow Stick (5×), Gravel stone (6×), Stone bead, Bone Check piece (2×), Bone Awl, Cowry ornament, S/g bone, horse bones
	B	/	/	A	/	
	C	E	M	/	/	
	D	E	M	35-40	Supine flex	
	E	N	M	45-50	Supine flex	
	F	/	F	25-28	/	
	G	E	M	35-40	Supine flex	
	H	E	M	50-55	Supine flex	
	I	S	M	55-60	/	
	J	E	/	35-40	Supine flex	
	K	NE	/	A	Supine flex	
	L	SE	M	50-55	Supine flex	
	M	E	M	A	Supine flex	
	N	N	M	30-35	Supine flex	
	O	/	/	A	Secondary burial	
	P	NE	M	40-45	/	
	Q	N	M	22-25	Supine	
	R	NE	/	A	Supine straight	
S	/	/	A	/		
T	N	M	A	Supine flex		
U	N	F	35-40	Supine flex		
V	NE	M	55-60	/		

Tomb No.	Buried Individual				Grave Goods
	W	NE	M	40-42	/
	X	N	M	25-28	Supine flex
	Y	N	M	18-20	Supine flex
	Z	NE	M	30-33	Supine flex
	A'	N	F	20-25	Supine flex
	B'	N	F	22-28	Supine flex
	C'	N	F	25-30	Supine flex
	D'	N	F	A	/
	E'	S	M	18-20	/
	F'	N	M	23-28	Supine flex
	G'	NW	M	32-35	/
	H'	N	M	28-25	Supine flex
	I'	E	M	40-45	/
	J'	/	M	18-22	/
	K'	/	/	Kid	/
L'	/	F	A	Supine flex	
M207	A	NW	F	50-60	Supine flex
	B	NW	M	45-50	Supine flex
	C	NW	M	30-35	Supine flex
	D	N	M	27-32	Supine flex
	E	N	M	22-25	Side
	F	N	M	45-50	Supine flex
	G	/	F	25-30	Supine straight
	H	NW	M	A	Supine straight
	I	E	M	35-40	Supine straight
	J	SE	M	45-50	Supine flex
	K	NW	M	45-50	Supine flex
	L	N	M	38-42	Supine flex
	M	N	F	28-32	Supine flex
	N	N	M	30-35	Supine
	O	NW	F	22-25	/
	P	NW	M	35-40	Supine flex
	Q	NW	M	30-35	Supine flex
	R	NW	F	/	Supine
	S	NW	F	15-18	Supine flex
	T	/	F	50-55	/
	U	N	M	45-50	Side flex
	V	NW	M	18-22	Supine
	W	W	/	30-35	Supine
	X	SE	M	A	/
	Y	N	M	/	Supine straight
	Z	N	F	A	Side flex
	A'	NW	M	30-35	Supine flex
	B'	NW	M	25-30	Supine flex
	C'	/	/	A	Prone straight
	D'	N	M	A	Prone
	E'	N	M	25-30	Supine straight
	F'	NE	M	25-28	Supine straight
G'	W	F	25-30	Supine flex	
H'	NW	F	30-35	/	
I'	NW	M	20-25	/	
J'	NW	F	28-32	Supine flex	
K'	N	M	A	/	
L'	NW	F	15-18	/	
M'	NW	M	15-30	/	
M208	A	NW	/	2-3	Supine flex
	B	NW	/	3-4	Supine flex

Pottery single-handled spouted Jae (6×), Pottery single-handled spouted Cup (32×), Pottery Cup (20×), Pottery Jug (2×), Pottery shallow Bowl (2×), Pottery single-handled Jar, Pottery Spinning wheel, Pottery ware (4×), Bronze Knife (5×), Bronze Needle, Bronze Arrowhead, Iron Knife (2×), Eyebrow stick (5×), Stone bead, S/g bones

Pottery single-handled spouted Cup, pottery single-handled Jar (2×)

Tomb No.	Buried Individual				Grave Goods
	C	NW	/	6-7	
D	NW	/	2	Secondary burial	

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male

Table 35 Kezier tombs

Tomb No.	Dimension of surface mound Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	No.of buried people	Gender	Burial Form	Burial Objects	Remarks
M1	600×60	98	Oval vertical shaft pit	150×126	1	/	Secondary-burial	Pottery sherds	Irregular stone circles on the east of tomb opening
M2	950×90	27	Oval vertical shaft pit	220×186-116	1	M (1×)	Secondary-burial	Pottery single-handled spouted pot Fu, pottery single-handled painted shallow Bowl, pottery single-handled painted Bowl, bronze Knife, stone bead string, s/g rib	One oval stone circle on the tomb opening
M3	500×55	250	Oval vertical shaft pit	156×120-56	1	M (1×)	/	Bronze tube, gravels tone, carbon stone	
M4	800×40	83	Irregular shaft pit	404×174-114	1	F (1×)	Secondary-burial	Pottery double-handled pot Fu, pottery single-handled painted Basin, pottery single-handled spouted painted pot Fu, pottery single-handled painted Bowl, pottery single-handled painted shallow Bowl, bone Spinning wheel, green bead, stone bead string, bronze Tube, stone cosmetics stick, s/g bone	
M5	700×600	104	Oval vertical shaft pit	156×116-130	2	F (1×), Infant (1×)	Secondary-burial	Pottery sherds	
M6	120×150	275	Oval vertical shaft pit	288×209-130	1	F (1×)	Secondary-burial	Pottery single-handled painted spouted pot Fu, pottery single-handled painted Bowl	
M7	500×20	285	Oval vertical shaft pit	160×124-74	1	Kid (1×)	/	Pottery Jar	
M8	950×100	108	Oval vertical shaft pit	240×200-140	1	M (1×)	/	Pottery single-handled painted spouted pot Fu, pottery Basin, pottery single-handled Bowl, stone cosmetic stick, s/g bone	
M9	600×85	275	Oval vertical shaft pit	175×107-93	1	Infant (1×)	Secondary-burial	Pottery sherd with painted patterns	
M10	600×85	100	Oval vertical shaft pit	182×122-90	1	F (1×)	Secondary-burial	Pottery single-handled painted shallow Bowl, pottery single-handled painted spouted pot Fu, stone bead string	
M11	1140×160	285	Oval vertical shaft pit	250×192-210	1	F (1×)	Secondary-burial	Pottery single-handled painted spouted pot Fu, pottery single-handled painted shallow Bowl, pottery single-handled painted Bowl, stone cosmetic stick, green bead, stone bead string	One oval stone circle on the tomb opening
M12	800×45	275	Oval vertical shaft pit with secondary platform	224×166-102	4	M (2×), F (2×)	/	Pottery single-handled painted spouted pot Fu, pottery single-handled painted Bowl, bone Tube, s/g bones	
M13	500×20	105	Oval vertical shaft pit	158×139-90	2	Kid (2×)	/	Pottery sherds	
M14	800×30	194	Oval vertical shaft pit	210×132-167	1	M (1×)	Secondary-burial	Pottery single-handled painted spouted pot Fu, bronze Knife, stone cosmetic stick, stone bead string, s/g bone	
M15	1200×160	248-255	Oval vertical shaft pit with three chambers	A: 306×185-186 B: 70×100 C: 102×91-15	5	M (3×), Kid (2×)	Secondary-burial	Pottery painted pot Fu, pottery painted Jar (2×), bronze ornament, s/g bones	
M16	700×40	30	Vertical shaft pit with secondary platform	290×195-122	4	Kid (2×)	Secondary-burial	/	
M17	800×50	305	Irregular shaft pit	340×310-108	5	M (3×), F (1×), Infant	Secondary-burial	Pottery double-handled pot Fu, pottery single-handled Bowl, pottery single-handled painted pot Fu, pottery single-handled painted Bowl, bronze Button, bone Awl, s/g bone	
M18	880×50	60	Round vertical shaft pit	206×198-103	2	M (1×), F (1×)	Secondary-burial	Pottery single-handled painted pot Fu, pottery single-handled Bowl	One stone circle on tomb opening
M19	700×40	260	Oval vertical shaft pit	264×188-110	2	M (1×), F (1×)	/	Pottery single-handled painted pot Fu, pottery painted shallow Bowl	
M20	800×50	243	Oval vertical shaft pit	200×142-112	4	M (2×), F (2×)	/	Pottery single-handled painted shallow Bowl, pottery painted shallow Bowl, pottery single-handled shallow Bowl, pottery single-handled painted spouted pot Fu, pottery single-handled painted Bowl, pottery single-handled spouted pot Fu, pottery single-handled painted Bowl, pottery single-handled spouted pot Fu, pottery single-handled painted shallow Bowl, pottery Spinning wheel, stone ornament (2×)	
M21	700×40	252	Oval vertical shaft with two chambers	140×100-56	4	F (2×), Kid (2×)	Secondary-burial	Pottery painted pot Fu, pottery single-handled painted Bowl, pottery single-handled Bowl	
M22	600×60	266	Oval vertical shaft pit	220×176-122	1	M (1×)	/	Pottery single-handled painted pot Fu, animal bones	
M23	/	280	Oval vertical shaft pit	166×152-11	1	Kid (1×)	/	/	Disturbed by the city site
M24	/	277	Oval vertical shaft pit	176×144-75	/	/	/	/	Disturbed by the city site
M25	800×70	277	Round-rectangular vertical shaft pit	220×190-102	2	M (1×), F (1×)	/	Pottery double-handled spouted pot Fu, pottery single-handled Bowl, pottery single-handled painted shallow Bowl, bone Spinning wheel	
M26	1000×80	215	Oval vertical shaft pit	226×124-125	4	M (2×), F (2×)	/	Pottery single-handled spouted pot Fu, pottery double-handled Basin, pottery single-handled painted Bowl, pottery single-handled pot Fu, pottery single-handled Bowl, green bead, stone bead string, s/g bones	
M27	1000×80	248	Round-rectangular vertical shaft pit	236×142-111	7	M (4×), F (2×), Kid	Secondary-burial	pottery single-handled painted Bowl, pottery single-handled painted spouted pot Fu (2×), pottery single-handled painted pot Fu (4×), pottery single-handled shallow Bowl, pottery single-handled painted Bowl (3×), pottery sherd, bone Spinning wheel (2×), bronze knife, bronze Earring, stone bead, s/g bones	

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g=sheep/goat; F=Female; M=Male

Table 36 Duogang tombs

Tomb No.	Dimension of surface mound L×W-H / Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D/Dm×H (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Sub-Phase	Remarks
M101	1056×932-110	268	Oval vertical shaft	328×248-210	/	1	/	/	Pottery Cup, pottery double-handled pot Fu, pottery single-handled shallow Bowl, cattle bones	IV	One appending pit on western wall, with beam cover
M102	800×640-50	276	Round vertical shaft	186×100	/	2	/	/	Pottery spouted Cup, pottery sherd	I	
M103	1715×165	240	Round vertical shaft	359×200-143	/	1	/	/	Bronze Plaque, iron pieces	IIB	One stone circle on tomb opening, with beam cover
M104	1145×100	270	Oval vertical shaft	238×196-134	/	1	/	/	Pottery shallow Bowl, pottery sherd, bronze Button (2×)	IIB	
M105	940×80	257	Oval vertical shaft	220×150-96	/	1	/	/	Pottery single-handled shallow Bowl	IIB	One appending pit with one infant inside
M106	940×80	265	Oval vertical shaft	346×186-102	/	1	/	/	Pottery sherds, Pottery Jug (2×)	IIIB	One appending pit with one kid inside
M107	1330×75	268	Oval vertical shaft	320×180-129	/	/	/	/	Bronze object, bronze Check piece (2×), bronze button (73×)	IIIB	With beam cover
M108	1100×800-130	263	Round-rectangular shaft with chamber passage	480×(130-240)-130	Grass mat	4	M (3×), F (1×)	/	Pottery Jug, pottery Fu (2×), pottery shallow Bowl (2×), pottery single-handled pot Fu, gravel stone, cattle bone, bronze Pin, stone cosmetic stick (2×)	IIIA	With beam cover
M109	14×××980-100	260	Oval vertical shaft with chamber passage	300×200-150 Passage: 60×60-50	Grass mat	3	M (2×), F (1×)	Side flex	Necklace (agate bead, cowry ornament, tooth ornament), bronze circle, pottery Jug, bronze ornament, gravel stone, pottery shallow Bowl (2×), pottery single-handled shallow Bowl, stone cosmetic stick (2×), eyebrow stick, pottery single-handled pot Fu, bronze Pin (2×), bronze Circle (2×), stone bead, wooden Spinning wheel	IV	One appending pit with one male inside, with beam cover and a stone circle on the tomb opening
M110	1500×820-30	267	Oval vertical shaft	280×160-150	/	1	M (1×)	Flex	Pottery single-handled shallow Bowl, stone bead	IIIB	Two appending pits with two infants inside, with beam cover
M111	720×40	/	Round pit	150×65	/	1	Kid	/	Pottery sherds, bronze Tube	/	
M112	800×100	276	Oval vertical shaft	190×150-90	/	/	/	/	Pottery sherds with triangle patterns, golden pieces, bronze Tube	/	
M113	800×60	266	Oval vertical shaft	186×130-100	/	/	/	/	/	/	One stone circle around the tomb opening
M114	1500×120	76	Oval vertical shaft	334×225-100	/	13	/	/	Pottery spouted pot Fu, bronze ornament (2×)	IIB	With beam cover and grass mat above the tomb opening, one stone circle around the tomb opening; 3 Skeltons above the beam cover, 10 skulls inside the chamber
M201	1020×630-40	108	Oval vertical shaft	210×140-94	/	2	/	/	Pottery spouted pot Fu, pottery single-handled black shallow Bowl	I	With beam cover
M202	800×700-50	250	Oval vertical shaft	190×148-100	/	2	/	Side flex	Pottery single-handled pot Fu, pottery shallow Bowl (2×), stone Spinning wheel	I	One spending pit on western wall
M203	980×76	270	Oval vertical shaft	200×114-106	Grass mat and wooden couch	1	F (1×)	Side flex	Pottery single-handled spouted pot Fu, stone cosmetic, pottery shallow Bowl, bronze Spinning wheel, cinnabar powder	I	One appending pit on western wall, with beam cover
M204	560×34	270	Oval vertical shaft	210×135-80	/	2	F (1×)	Side flex	Pottery single-handled shallow Bowl, stone Spinning, iron piece	IIB	Stone pieces surrounding the tomb opening
M205	760×550-30	275	Oval vertical shaft	160×100-90	/	1	/	/	Pottery single-handled spouted pot Fu	IIB	One stone circle on the east of tomb opening, one appending pit on western wall
M206	910×99	258	Oval vertical shaft	172×110-78	/	2	M (1×), F (1×)	Supine flex/Side flex	Pottery single-handled shallow Bowl, pottery shallow Bowl, pottery spouted pot Fu, stone Spinning wheel, stone cosmetic stick	IIB	With several stone pieces and beam cover pieces on tomb opening
M207	600×30	290	Oval vertical shaft	144×108-42	/	2	M (1×), F (1×)	Side flex	Pottery shallow Bowl, stone cosmetic stick, pottery Spinning wheel	IIB	One appending pit on western wall
M208	460×750-35	256	Oval vertical shaft	150×100-80	/	2	/	Flex	Pottery spouted pot Fu, pottery single-handled shallow Bowl	IIB	One appending pit on western wall, with beam cover
M209	800×760-110	270	Oval vertical shaft	193×140-170	/	5	/	Supine flex	Bead (97×)	IIB	
M210	780×700-140	272	Oval vertical shaft	190×108-140	/	1	/	/	Pottery sherds, pottery single-handled pot Fu, pottery shallow Bowl (2×)	IIB	
M211	690×480	250	Oval vertical shaft	244×150-110	Wooden couch	1	/	Supine flex	Pottery sherds, pottery pot Fu, pottery single-handled shallow Bowl, cereal grains	IIIA	Cereal grains are found inside the Fu and Bowl; one appending pit on the western wall; with beam cover above the tomb opening
M212	420×590-80	281	Oval vertical shaft	210×120-60	/	2/3	/	Secondary- burial	Pottery single-handled pot Fu, food powder	IIIA	One appending pit on the southern chamber, two kids in the pit, side flex
M213	680×890-112	85	Oval vertical shaft with chamber passage	390×180-150	Grass mat and wooden couch	10	/	/	Pottery single-handled spouted pot Fu (2×), pottery single-handled shallow Bowl (3×), pottery Jug, bead (25×)	IIIB	
M214	720×810-60	270	Oval-rectangular vertical shaft	290×155-170	/	1	/	/	Pottery pot Fu	IIIB	
M215	650×60	265	Oval vertical shaft	180×130-70	Grass mat	1	F (1×)	Side flex	Pottery Spinning wheel, stone bead (36×), green bead (15×)	IIIB	With beam cover
M216	660×60	273	Oval vertical shaft	154×100-70	/	4	/	Side flex	Pottery single-handled pot Fu, black pottery sherds	I	Half stone circle and beam cover
M217	800×600-30	275	Oval vertical shaft	210×130-100	/	/	/	/	Pottery sherd	IIIB	One appending pit on western wall
M218	730×26	276	Oval vertical shaft	150×120-60	/	1	/	/	Pottery sherd with triangle pattern	IIIB	
M219	540×40	68	Round-square vertical shaft	266×150-80	/	3	/	/	/	IIIB	Two piles of gravel stones on the east of tomb opening
M220	580×40	270	Oval vertical shaft	200×180-106	Yellow sand under the body	2	/	/	Pottery Cup, pottery single-handled shallow Bowl, pottery painted pot Fu, s/g bone	IIIA	S/g bone inside the Fu; with beam cover above the tomb opening
M221	520×34	270	Oval vertical shaft	190×104-170	Grass mat	5	/	Side flex/Supine flex	Pottery single-handled shallow Bowl (2×), pottery shallow Bowl (3×), bronze Pin	IV	With beam cover
M222	700×596-34	310	Oval vertical shaft	163×130-120	/	2	M (1×), F (1×)	Side flex	Pottery Jug, bronze tube, s/g bone	IIIA	With beam cover
M223	690×60	270	Oval vertical shaft	190×140-60	/	6	/	/	Pottery Jar, pottery sherds, pottery shallow Bowl, s/g bone	IV	S/g bone inside the Bowl; with beam cover above the tomb opening
M224	700×60	245	Oval vertical shaft with chamber passage	190×170-110 Passage: 100×110-50	/	4	/	Side flex	Pottery sherds, pottery single-handled shallow Bowl, pottery shallow Bowl, pottery single-handled pot Fu, bone stick	IIIA	With beam cover
M225	684×40	270	Oval vertical shaft	180×140-100	/	/	/	/	Pottery Spinning wheel, s/g bones	IIIB	One stone circle on the tomb opening

Tomb No.	Dimension of surface mound L×W-H / Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D/Dm×H (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Sub-Phase	Remarks
M226	910×60	248	Oval vertical shaft	240×174-120	/	4	M (1×), F (1×)	Side flex	Pottery Jug, pottery Spinning wheel, pottery Cup, stone Spinning wheel, pottery sherds, pottery shallow Bowl	IIIB	With beam cover
M227	700×94	271	Oval vertical shaft	280×210-120	/	2	F (1×), Infant (1×)	Side flex	Green bead (6×), stone bead (10×), bronze ornament, pottery shallow Bowl	IIIB	With beam cover
M228	740×26	282	Oval vertical shaft	200×132-97	/	3	M (1×), F (1×)	Side flex	Pottery black Jug, stone cosmetic stick, gravel stone, pottery sherds	IIIB	With beam cover
M229	900×50	263	Oval vertical shaft	200×150-110	/	4	/	Side flex	Pottery single-handled Jar, pottery single-handled pot Fu, pottery shallow Bowl, gravel stone, ring	IIIB	With beam cover and grass mat; several stone pieces on the eastern tomb opening
M230	700×30	282	Oval vertical shaft	180×120-110	/	3	/	/	/	IIIB	With beam cover
M231	840×40	88	Oval vertical shaft	280×200-120	/	6	/	Side flex	Pottery Cup, pottery Basin, pottery shallow Bowl, bronze Tube, bronze Arrowhead, gravel stone, iron Knife, animal bones	IIIB	With beam cover and grass mat
M232	940×20	292	Oval vertical shaft	220×140-130	/	4	/	Side flex	Pottery sherds, bead ornament, stone cosmetic stick, bronze slage	IIIB	With beam cover; one appending pit on the south of the chamber
M233	400×37	255	Oval vertical shaft	190×143-57	/	1	M (1×)	Supine straight	/	IIIB	
M234	440×22	275	Oval vertical shaft	186×170-94	Grass mat	6	F (1×), Kid (5×)	Side flex	Pottery spout pot Fu, pottery single-handled shallow Bowl, bone Spinning wheel, green bead (44×), stone bead (142×), bronze ornament with iron rust	IIIB	With beam cover
M235	530×30	330	Oval vertical shaft	150×100-70	/	2 layers	/	/	Pottery single-handled shallow Bowl, pottery shallow Bowl, pottery single-handled pot Fu, pottery sherds, stone Spinning wheel, food, s/b bone	IV	One stone circles on the tomb opening, with beam cover in the center circle
M236	660×46	250	Oval vertical shaft	170×116-80	Grass mat	1	/	Side flex	Golden Earring, wooden Spinning wheel	IIIB	With beam cover
M237	860×60	270	Round-square vertical shaft	264×144-124	/	/	/	/	/	IIIB	With beam cover
M238	580×13	291	Oval vertical shaft	216×148-90	/	1	F (1×)	Side flex	Bone Pin, bead ornament, pottery sherds	IV	One large stone on the western wall; with beam cover
M239	780×34	40	Oval vertical shaft	164×106-124	Grass mat	2	M (1×), M (1×)	Prone flex/ Side flex	Pottery Cup, s/g bone	IV	With beam cover and grass mat
M240	445×54	260	Oval vertical shaft	106×98-48	/	3	Infant (3×)	/	/	IIIB	With stone cover
M241	480×36	295	Oval vertical shaft	160×150-90	/	2	M (1×), F (1×)	Side flex	Pottery double-handled pot Fu, pottery Cup, bronze Knife, bronze Pin, green bead (22×), stone bead	IV	One appending pit on western wall; with beam cover
M242	700×520-30	320	Oval vertical shaft	170×140-110	/	7	M (3×), F (1×), Infant (1×)	Supine flex/Side flex	Pottery double-handled pot Fu, pottery single-handled shallow Bowl (2×), pottery single-handled Jar, pottery single-handled pot Fu, bone Tube, bronze Earring (2×), bronze ornament, green bead (77×), stone bead (11×), gravel stone, cattle bone	IV	One stone circle and beam cover
M243	430×390-20	310	Oval vertical shaft	145×70-70	/	1	M (1×)	Supine straight	Pottery single-handled pot Fu	IV	
M244	700×60	320	Oval vertical shaft	180×124-100	/	1	M (1×)	Side flex	Pottery single-handled pot Fu, pottery single-handled shallow Bowl (2×), bronze Knife, bronze stick	IIB	
M245	680×66	300	Oval vertical shaft	197×130-94	/	1	F (1×)	Side flex	Stone Spinning wheel, pottery sherd	IIB	One appending pit on the western wall; with beam cover
M246	552×73	270	Oval vertical shaft	214×140-103	/	1	F (1×)	Side flex	Pottery spouted pot Fu, pottery single-handled shallow Bowl, bone Spinning wheel	IIB	With beam cover
M247	760×60	270	Oval vertical shaft	220×150-90	/	2	F (2×)	Side flex	Pottery single-handled spouted pot Fu, pottery single-handled pot Fu, pottery single-handled shallow Bowl, pottery Spinning wheel, stone cosmetic stick, bone ornament, bone Pin	IIB	
M248	220×30	280	Oval vertical shaft	180×140-80	/	3	F (1×), Infant (2×)	Side flex	Bone Tube (2×), bone ornament	IIB	With beam cover
M249	600×34	262	Oval vertical shaft	180×100-70	/	2	F (1×), Infant (2×)	Side flex	Bone Pin (2×), bronze Needle, bronze Tube	IIB	One pile of gravel stone on the tomb opening
M250	810×680-35	280	Oval vertical shaft with chamber passage	280×150-80	Grass mat	3	M (1×), F (1×)	Side flex	Pottery single-handled painted pot Fu, pottery single-handled spouted pot Fu, pottery single-handled shallow Bowl, stone Spinning wheel, bronze Knife, iron ornament, stone cosmetic stick, green bead (167×), amber bead (9×), s/g bone	IIB	With beam cover and grass mat
M251	760×660-60	255	Oval vertical shaft	130×140-125	/	3 layers	/	/	Pottery single-handled shallow Bowl, pottery shallow Bowl, pottery single-handled spouted pot Fu, bronze ornament, bronze Hook, agate bead, stone bead (2×)	IIB	With beam cover
M252	620×30	250	Oval vertical shaft	190×140-80	Grass mat	1	F (1×)	/	Pottery single-handled shallow Bowl, pottery shallow Bowl, stone cosmetic stick, bead string	IIIB	With beam cover
M253	400×60	180	Oval vertical shaft	180×150-60	/	2	/	Supine flex	Pottery shallow Bowl	IIIB	With beam cover
M254	800×700-34	282	Oval vertical shaft	183×140-135	/	2	M (1×), F (1×)	Side flex	Pottery single-handled shallow Bowl (2×), pottery single-handled spouted pot Fu, stone cosmetic stick, bone Spinning wheel	IIA	With beam cover
M255	660×44	285	Oval vertical shaft	140×92-64	/	4	/	Side flex	Pottery single-handled spouted pot Fu (2×), pottery single-handled shallow Bowl, stone cosmetic stick, bronze Needle	IIB	
M256	680×80	270	Oval vertical shaft	220×120-70	/	2	/	Supine flex	Stone bead (47×), agate bead (3×), bronze Circle (2×)	IIB	
M257	420×360-30	282	Oval vertical shaft with chamber passage	180×110 Passage: 110×100-40	/	1	F (1×)	Supine flex	Pottery single-handled spouted pot Fu, pottery single-handled shallow Bowl, stone Spinning wheel	IIB	
M258	660×496-55	295	Oval vertical shaft	190×110-79	/	1	F (1×)	Side flex	Pottery single-handled painted pit Fu, pottery single-handled shallow Bowl	IIB	One stone circle on the tomb opening
M259	540×20	270	Vertical shaft with chamber passage	243×130-70	/	3	M (1×), F (1×), Kid (1×)	Supine flex/Side flex	Pottery Basin, pottery single-handled pot Fu, pottery single-handled shallow Bowl, s/g bone	IV	S/g bone inside the Basin; with beam cover
M260	520×28	300	Oval vertical shaft	207×145-74	Grass mat	2	M (1×), F (1×)	Side flex	Pottery single-handled spouted pot Fu, pottery single-handled shallow Bowl (2×), stone bead (78×), green bead	IIA	With beam cover and grass mat
M261	600×50	272	Oval vertical shaft	210×140-80	/	2	Kid (1×)	Side flex	Pottery shallow Bowl, pottery single-handled Jar	IIIB	One appending pit on the western wall; with beam cover and stones on the tomb opening
M262	740×50	283	Oval vertical shaft	160×120-84	/	2	M (1×), F (1×)	Side flex	Pottery single-handled spouse pot Fu, pottery single-handled shallow Bowl	IIIB	One appending pit on the western wall; with beam cover
M263	890×800-50	275	Oval vertical shaft	210×175-98	/	2	M (1×), F (1×)	Side flex	Pottery single-handled spouted pot Fu, pottery single-handled shallow Bowl, stone Spinning wheel, bead string, bronze Button	IIIB	One stone circle in the eastern mound; with beam cover
M264	560×38	330	Oval vertical shaft	175×136-60	/	1	/	Side flex	Pottery sherds	IIIB	
M265	650×40	275	Oval vertical shaft	194×125-90	Wooden couch	4	/	Side flex/Supine straight	Pottery Jug, pottery single-handled shallow Bowl	IIIB	
M266	840×72	268	Oval vertical shaft	261×168-116	Grass mat	/	/	Secondary- burial	pottery sherds, pottery Pin (3×), jade ornament, oracle bone, eyebrow stick, bronze Needle, stone Spinning wheel, stone cosmetic stick	IIIB	One appending pit on the western wall; with beam cover

Tomb No.	Dimension of surface mound L×W-H / Dm×H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D/Dm×H (cm)	Tomb Furnishings	No.of buried people	Gender	Burial Form	Burial Objects	Sub-Phase	Remarks
M267	850×30	315	Oval vertical shaft with chamber passage	210×144-60 Passage: 100-80-40	/	1	M (1×)	Side flex	Pottery pot Fu, bone Pin, gravel stone, pottery shallow Bowl	IIIB	One appending pit on the western wall
M268	600×16	90	Oval vertical shaft	210×160-161	Grass mat	1	M (1×)	Supine straight	Pottery sherds	IV	One stone circle on the tomb opening
M269	420×32	290	Oval vertical shaft	120×100-56	/	2	Kid (2×)	Side flex	Gravel stone	/	With beam cover
M270	600×40	275	Oval vertical shaft with chamber passage	300×180-130 Passage: 100×100-20	Grass mat	5	/	Supine straight	Pottery single-handed shallow Bowl (2×), pottery spouted pot Fu, pottery shallow Bowl, bone Knife, stone bead, bead string, stone Spinning wheel, stone cosmetic stick, cattle bone	IIIB	One stone wall in the western chamber; with beam cover on the tomb opening
M271	800×40	90	Oval vertical shaft	320×200-90	/	3	/	/	Pottery spouted pot Fu, pottery sherds, pottery Jug, potter shallow Bowl	IIIB	One large stone in the chamber center; with beam cover on the tomb opening
M272	510×18	270	Oval vertical shaft	124×60-86	/	2	Kid (2×)	Side flex	Bronze Needle	IIIB	
M273	500×440-20	263	Oval vertical shaft	135×95-53	/	1	/	Side flex	Bronze ornament	IIIB	
M274	550×30	265	Oval vertical shaft	170×100-90	/	2	/	Side flex	Pottery Jug	IIIB	With beam cover
M275	1161×80	267	Rectangular oaf- underground pit with chamber passage	480×490-157	/	5	/	/	Pottery sherds, bronze Stamp, iron object, iron Plaque, iron Knife, bronze object with golden coating, stone bead (3×), purple bead, iron Awl, dyed soil piece (5×), mica pieces (5×)	Han	
M276	620×40	278	Oval vertical shaft	204×156-100	/	2	M (1×), F (1×)	Side flex	Pottery spouted pot Fu, pottery Cup, stone cosmetic stick (2×), bone Needle, s/g bone	IIB	One appending pit on the western wall; with beam cover on the tomb opening
M277	600×30	260	Oval vertical shaft with chamber passage	225×158-80	/	2	/	Prone flex	Stone cosmetic stick (2×), pottery single-handed shallow Bowl (2×), bead string	IIB	
M278	800×540-50	270	Oval shaft pit with two chambers	Front Chamber: 193×192-142 Back Chamber: 210×147-70	/	Front Chamber (3×), Back Chamber (2×)	/	Side flex/Supine straight	Pottery sherds, bronze Circle, pottery spouted pot Fu, pottery single-handed shallow Bowl, pottery single-handed shallow Bowl, animal bones	IIB	One stone circle and beam cover on the tomb opening
M279	600×26	270	Oval vertical shaft	320×186-100	/	3	/	Side flex	Pottery sherds	/	One appending pit on western wall; with beam cover on the tomb opening
M280	1380×1210-60	270	Oval vertical shaft with chamber passage	300×190-160 Passage: 190×160-110	/	/	/	/	Pottery sherds, s/g bones	IIB	One stone circle on the tomb opening
M281	785×525-25	270	Round vertical shaft	163×128	/	2	/	Side flex	Pottery single-handed shallow Bowl, bronze Knife, s/g bones	/	One stone circle, beam cover and grass mat on the tomb opening; the bronze Knife and s/g bones are inside the Fu
M282	/	/	/	/	/	/	/	/	Pottery single-handed spouted pot Fu	/	
M283	600×76	260	Oval vertical shaft	230×180-130	/	2 layers	/	/	Pottery single-handed pot Fu, bronze object	IIIA	
M301	250×40	/	Rectangular pit	110×100-90	/	/	/	/	/	/	
M302	320×280-50	/	/	/	/	/	/	/	/	/	Only surface mound remained
M303	360×320-50	/	/	/	/	/	/	/	/	/	Only surface mound remained
M304	350×450 200×210	/	/	/	/	/	/	/	/	Jin & Tang	Temple foundation
M305	590×600 340	/	/	/	/	/	/	/	Pottery Jar, bones	Jin & Tang	Temple foundation

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male; A=Adult; T=Teenager

Table 37 Qiemuerqieke remains

Tomb No.	Standing Stele	Dimension of surface mound DmxH (cm)	Dimension of enclosed stone LxW (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber LxW-D (cm)	No.of buried people	Gender & Age	Burial Form	Burial Objects	Remarks
M1	Possible		/	20	Stone coffin	210x210-130	15	/	Supine flex/ Secondary burial	Stone Arrowhead (5x), lithic tool	
M2	1		1800x2750	20	Stone coffin	290x200x178	19	/	Secondary burial	Stone arrowhead (3x), stone wares (4x), pottery ware	One main burial with a small chamber 4m north and an shallow pit with several human bones 3m west
M3	1		2800x3000	20	Stone coffin	170x180-110	1	/	/	Stone double-vessel, stone ware	Possibly robbed
M4	1		3500x3800	10	Stone coffin	330x235-190	/	/	Secondary burial	Pottery Jug, iron pieces, pottery sherds, lithic tool pieces	Possibly robbed
M5	1		2100x1900								
	m1	220x76		110	Vertical shaft	170x250-150	1	Kid	Supine straight	Bone ornament (6x), iron Knife, bone Button	One wooden frame couch
	m2			20		210x210-130	/	/	Side flex	Stone single-handled Cup, s/g knucklebones (64x)	
	m3					/	/	/	/		
M6	/		/		/	/			Supine		
M7	/		1050x440								
M7	m1			20	Stone coffin	218x274-136	5	Kid (1x)	Secondary burial	Pottery Jar, bronze Arrowhead, stone Arrowhead (4x), stone wares (6x), bronze object, jade object, coal object	
	m2			20	Stone coffin	184x180-115	/	/	Secondary burial	Stone Arrowhead (2x), stone wares (2x), bead string	
M8	1		/	20	Stone coffin	260x145-155	/	/	Secondary burial	Stone vessel (2x)	A small coffin (162x57-50cm) inside the coffin, with several human bones
M9	/		/	60	Stone coffin	282x108-125	/	/	/	/	
M10	/	1000	/	10	Stone coffin	375x250-185	/	/	/	/	Robbed
M11	/	900	/	270	Stone coffin	140x190-130	2 layers	/	/	Bronze Spear, bronze Awl, stone vessel (2x), pottery Jar	Robbed
M12	/		/	315	Stone coffin	75x75-40	/	/	/	/	
M13	/		1800x1050	15	/	200x150-105	/	/	Secondary burial	/	Robbed
M14	Damaged stone		2050x5070								
	m1	530x50		330	Vertical shaft	80x210-40	/			/	
	m2	500x50		/	Vertical shaft	/	/	Kid	Secondary burial	/	
M15	/		/	20	Stone coffin	295x146-140	/	/	Secondary burial	Pottery ware, stone vessel	A small coffin (190x40-40cm) inside the coffin, supine straight, no grave goods
M16	Possible (2x)		1110x1970							Pottery ware & stone vessel (7x)	
	m1			0	Stone coffin	90x106-150	/	Kid	Secondary burial	/	
	m2	600x50		340	Stone coffin	160x182-120	3	/	Supine flex	Stone ware (3x)	
	m3			0	Stone coffin	15x55-45	/	/	/	/	
	m4			315	Stone coffin	40x200-55	/	/	Secondary burial	/	
	m5			315	Stone coffin	40x170-30	/	/	Flex	/	
M17	Possible (3x)		2080x1210								
M17	m1			20	Stone coffin	140x162-107	/	/	Prone straight	Stone objects (7x)	A small rectangular stone coffin (180x60-20cm) inside the coffin
	m2			22	Stone coffin	230x104-128	20	/	Side flex/ Secondary burial	Bone Arrowhead (2x), bronze Arrowhead (2x), bronze Knife, stone ware (4x), pottery Jar	One shallow pit on the west, with several bones inside
M18	1	2000	/								
	m1			15	Stone coffin	180x190-145	13	/	Secondary burial	Stone Arrowhead	Robbed
M19	/	1600	/	345	Stone coffin	190x270-130	/	/	/	Pottery Jar	Robbed
M19	/		/	345	Stone coffin	360x200-150	2	/	Flex	Stone Cup, stone Plate, stone Arrowhead (2x), bronze object	
M20	/	1250	/	345	Stone coffin	440x300-180	1	/	Supine straight	Stone Arrowhead, stone vessel	One large slab in the chamber center, dividing into east and west section; another slab on the middle eastern center, dividing into north and south section; no grave goods or human bones
M21	/		/	100	Stone coffin	360x140-140	/	/	/	Stone Figurine	
M22	Damaged stone	900x90	/	70	Vertical shaft	290x190-140	2	/	Flex	Bronze Mirror, pottery wares (2x), iron Knife, bronze Nail, golden pieces, complete horse skeleton	One enclosed stone pit in the chamber center; the horse skeleton is on the secondary platform
M23	/	430x50	/	115	Vertical shaft	190x150-50	/	Kid	Secondary burial	Iron pieces, pottery ware	
M24	1		2300x2400	30	Stone coffin	180x160-130	7	/	Supine straight/ Secondary burial	Pottery cup Dog, stone Cup, stone Lamps, lithic tool	
M25	Stone slab (1x)	900x70	/	88	Vertical shaft	200x90-80	/	/	Secondary burial	Iron pieces, bronze object	
M26	/		/	345	Stone coffin	?x200-140	/	/	Secondary burial	/	
M27	/	500x50	/	67	Vertical shaft	230x106-80	/	/	Secondary burial	Iron adze, iron Knife, bronze Circle	
M28	/		/	20	Vertical shaft	/	/	/	Supine straight	Pottery ware, iron piece, bronze circle	
M29	/		/	20	Vertical shaft	285x210-60	/	/	Secondary burial	Bronze Nail (2x), iron Nail	A small stone coffin in the shaft pit
M30	/	230x150	/	42	Vertical shaft	300x160-180	/	/	Secondary burial	Bronze Arrowhead, bronze Circle	
M31	/	1000x150	/	20	Vertical shaft	210x100-80	/	/	Secondary burial	Iron Knife (2x), Hook, iron piece	
M32	/	600x30	/	20	Vertical shaft	210x70-90	/	Kid	Secondary burial	Iron Hook	

Table 38 Liushui tombs

Tomb Nr.	Pottery	Bronze	Lithic tools	Iron	Golden	Cowry
1		Button, Bead, Earring	Gravel stone			Ornament
2		Button	Gravel stone, Eyebrow stick			
3		Button			Bead	
5		Bead, Arrowhead				
6		Button	Eyebrow stick			
9	Jar (6×)	Button, Knife, Bead, Arrowhead	Gravel stone, Eyebrow stick, Jade ornament			
10		Button, Bead, Harness		Knife	Earring	
12		Harness				Ornament
13	Jar					
14	Jar					
15		Harness				
16		Button, Arrowhead, Harness	Gravel stone		Belt	
17		Button, Bead				Ornament
18	Jar, Shallow Bowl	Button, Bead, Mirror	Eyebrow stick			Ornament
19	Jar					
20	Jar	Button, Bead				
21		Earring	Gravel stone			Ornament
22		Button	Eyebrow stick			
24	Jar (2×)	Knife	Bead, Gravel stone	Knife		
26	Jar, Shallow Bowl		Gravel stone, Eyebrow stick			
27	Cup	Button, Bead				
28		Bead	Gravel stone	Knife		
29	Cup					
30	Cup, Shallow Bowl	Button, Bead	Gravel stone			Ornament
31						
32	Jar	Bracelet	Eyebrow stick			Ornament
34		Button		Knife		
35		Button, Knife	Gravel stone			
37		Arrowhead	Gravel stone			
40	Jar (2×), Cup	Button (19×), Bead	Bead (269×), Eyebrow stick			
41		Button	Eyebrow stick			
42	Jar	Button, Bead				
43	Cup					
44		Button	Eyebrow stick			
45		Button	Gravel stone			
46	Shallow Bowl (2×)	Knife (4×), Arrowhead	Gravel stone (2×)			
47		Bead	Gravel stone			
49		Bead, Bracelet				
50		Button	Eyebrow stick			
51	Jar					
52			Eyebrow stick			
54		A×e, Spear	Gravel stone			
55			Gravel stone			Ornament
56		Bead				

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male; A=Adult

Table 39 Xiangbaobao tombs

Tomb No.	Surface mound	Dimension of surface mound Dm×H / L×W-H (cm)	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D/Dm×D (cm)	Tomb Furnishings	No.of buried people	Gender & Age	Burial Form	Burial Objects	Remarks
M1	Rectangular circle	430×320-60	/	/	D: 80	Wooden frame couch	/	/	Cremation	/	
M2	Round mound	400×30	/	/	/	/	/	/	/	/	
M3	Round mound	250×60	/	/	/	/	/	/	/	/	
M4	Round mound	300×20	340	Oval shaft pit	155×125-90	/	1	F (1×)	Prone straight	Bronze Earring, iron Ring	
M5	Round circle	230×20	240	Oval shaft pit	125×104-50	/	1	/	Side flex	Pottery Jar (2×), bronze piece (3×), bronze Tube, bronze Bead, stone bead string (2×), bone bead (47×), agate bead	With beam cover
M6	Round mound	490×30	/	Round shaft pit	100×80	/	/	/	Cremation	/	S/g bones in the filling soil
M7	Round mound	250×15	/	Round shaft pit	90×50	/	1	Kid	Secondary burial	/	S/g bones in the filling soil
M8	Round mound	200×25	/	Round shaft pit	85×60	/	/	/	Cremation	Pottery sherds	
M9	Round mound	340×25	225	Oval shaft pit	260×150-(25-60)	/	2	M (1×), Sacrificial body (1x)	Side flex	Pottery pot Fu (3×), wooden Plate, wooden stick (3×), stone bead (3×)	With beam cover
M10	Square circle	900×850-110	/	Oval shaft pit	360×180-70	Wooden frame couch	7	A(6×), Kid (1×)	Secondary burial	Pottery pot Fu (2×), pottery Jar, pottery shallow Bowl, pottery Spinning wheel, bronze piece (4×), bronze ornament (5×), bronze Ball (2×), iron Knife, iron Tube, iron piece, agate bead, s/g bone	
M11	Round mound	160×15	95	Round shaft pit	90×45	/	1	Kid	Side flex	Bone bead (24×)	With beam cover
M12	Round mound	200×15	/	/	/	/	/	/	/	/	
M13	Round mound	240×10	0	Oval shaft pit	200×180-80	/	1	M (1×)	Side flex	Pottery pot Fu	With beam cover
M14	/	/	255	Oval shaft pit	210×135-80	/	1	M (1×)	/	Pottery pot Fu	With beam cover
M15	Round mound	360×30	230	Oval shaft pit	150×75-30	/	1	Kid	Supine straight	/	
M16	Round circle	340×30	/	Oval shaft pit	140×110-50	/	/	/	Cremation	/	
M17	Rectangular circle	580×420-25	158	Oval shaft pit	260×160-60	/	1	M (1×)	Side flex	Pottery pot Fu, s/g bones, bird bone	With beam cover
M18	Round circle	550×30	/	Oval shaft pit	240×190-30	/	/	/	Cremation	/	
M19	Round circle	490×15	270	Oval pit	(240-300)×(100-240)-70	/	3	Sacrificial body: A (2×), Infant (1×)	Cremation	Iron pieces	
M20			331	Oval pit	(200-300)×(110-220)-70	/	1	Sacrificial body: A (1×)	Cremation	Iron pieces	
M21	Round circle	230×10	68	Oval pit	(200-200)×(70-200)-95	/	1	M (1×)	Supine straight	Pottery pot Fu, bronze Tube (8×), golden ornament, golden Plaque, bird bone	With beam cover
M22	Round mound	540×30	/	Oval pit	(160-280)×(140-220)-70	Wooden frame couch	2	A (1×), Kid (1×)	Secondary burial	Pottery sherds, s/g bones	With beam cover
M23	Round circle	450×15	/	Oval pit	(110-150)×70-90	/	/	/	Cremation	/	
M24	Round mound	500×15	/	Round pit	(180-300)×60	/	/	/	Cremation	/	
M25			/	Round pit	(150-180)×40	/	/	/	Cremation	/	
M26	Round circle	780×70	/	Oval pit	(155-195)×(130-180)-40	/	/	/	Cremation	Bronze Earring, pottery sherds	
M27	Oval circle	800×670-70	/	Round pit	(180-220)×65	/	/	/	Cremation	Pottery sherds, burnt woolen felt fabrics	
M28	Round circle	420×25	234	Oval shaft pit	220×120-70	/	1	M (1×)	Side	Pottery pot Fu	
M29	Round mound	400×15	/	Oval shaft pit	130×90-25	Woven mat	1	D (1×)	Secondary burial	Bronze Arrowhead, wooden fire-making stick, s/g bones, bird bones	
M30	Round mound	340×20	/	Oval shaft pit	120×80-30	/	/	/	Cremation	/	
M31	Round circle	500×20	/	Oval pit	(80-150)×(60-100)-55	/	/	/	Cremation	/	
M32	Round circle	420×15	/	Oval pit	(130-180)×(70-130)-50	/	/	/	Cremation	/	
M33	Round circle	220×0	55	Oval shaft pit	130×90-60	/	1	F (1×)	Side flex	/	With beam cover
M34	Round mound	260×20	/	Round pit	(100×170)-110	/	/	/	Cremation	/	
M35	Round circle	700×60	/	Oval shaft pit	190×150-60	/	/	/	Cremation	S/g bones	
M36	Round circle	480×45	/	Round shaft pit	190×15	/	/	/	Cremation	/	
M37	Round circle	300×20	208	Oval shaft pit	290×200-75	Wooden frame couch	2	F (1×), Sacrificial body: Kid (1×)	Supine	Pottery pot Fu, pottery Jar, bronze Bracelet, bronze Plaque, bronze Ball (2×), bronze Earring, bronze Ring, iron Bracelet, iron piece, stone bead (17×), bone bead (5×), agate bead, s/g bone	With beam cover
M38	Round circle	300×15	/	Oval pit	(100-140)×(70-120)-50	/	/	/	Cremation	/	
M39	Round circle	800×50	/	Round pit	(150-180)×75	/	5	D (4×), Kid (1×)	Secondary burial	Pottery Bowl (4×), pottery shallow Bowl (5×), bronze Arrowhead (2×), bronze Circle (2×), bronze Earring (2×), bronze Button, s/g bones, bird bones	
M40	Round mound	340×40	300	Oval pit	(100-130)×(70-100)-50	/	1	F (1×)	Side flex	Stone bead (26×), bone bead	With beam cover

L=length; W=width; D=depth; Dm=Diameter; H=Height; s/g =sheep/goat; F=Female; M=Male; A=Adult; T=Teenager

Table 40 Xiabandi remains

Cemetery Nr.	Tomb No.	Surface mound/circle	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	No.of buried people	Gender	Burial Form	Burial Objects	Time Phase	
AI	AIM1	Stone mound	/	/	/	/	/	/	/	/	
	AIM2	Stone mound	/	/	/	/	/	/	/	/	
	AIM3	Stone mound	/	/	/	/	/	/	/	/	
	AIM4	Stone mound	/	/	/	/	/	/	/	/	
	AIM4	Stone mound	/	/	/	/	/	/	/	/	
	AIM5	Stone mound	/	/	/	/	/	/	/	/	
	AIM6	Stone mound	/	/	/	/	/	/	/	/	
	AIM7	Stone mound	/	/	/	/	/	/	/	/	
	AIM8	Stone mound	290		Round-rectangular shaft pit	165×53-58	1	F (1×)	Secondary burial	Wooden Plate, Wooden shallow Bow, woolen fabric	Han & Tang
	AIM9	Stone mound	90-270		Oval shaft pit	220×190-80	/	/	/	/	Han & Tang
	AIM10	Stone circle	270		Round-rectangular shaft pit	211×77-59	1	F (1×)	Supine straight	Pottery Jar, woolen fabric	Han & Tang
	AIM11	Stone mound	/	/	/	/	/	/	/	/	/
	AIM12	Stone circle	90-270		Irregular rectangular shaft pit	105×88-26	/	/	Cremation	/	Han & Tang
	AIM13	Stone mound	10-190		Round-rectangular stone coffin pit	80×58-14	/	/	Cremation	/	Han & Tang
	AIM14	Stone circle	270		Round-rectangular shaft pit	190×(60-76)-56	2	M (1×), F (1×)	Supine straight	/	Han & Tang
	AIM15	Stone circle	263		Rectangular shaft pit	236×80-67	1	F (1×)	Secondary burial	Pottery Jar, cotton pillow	Han & Tang
	AIM16	/	90-270		Oval shaft pit	97×83-(20-28)	/	/	Cremation	/	Han & Tang
AIM17	/	108-288		Irregular rectangular shaft pit	124×71-(54-58)	/	/	/	/	Han & Tang	
AID	AIDM1	/	/	/	/	/	/	/	Pottery Jar bottom, leather Boot	Bronze Age	
	AiIM1	Stone mound	306	Round-rectangular shaft pit	110×70-(18-40)	1	/	Secondary burial	Pottery Jar	Bronze Age	
	AiIM2	Round stone mound	/	/	/	/	/	/	/	/	
	AiIM3	Round stone mound	/	/	/	/	/	/	/	/	
	AiIM4	Stone mound	86	Round-rectangular shaft pit	130×(45-90)-(14-33)	1	F (1×)	Side flex	Pottery Jar, bronze Earring (2×), bronze Bracelet (2×)	Bronze Age	
	AiIM5A	Stone mound	112	Oval shaft pit	(53-92)-10	1	Infant (1×)	Side flex	Bronze Earring	Bronze Age	
	AiIM5B		85	Round-square shaft pit	50×45-(20-32)	1	Infant (1×)	Cremation	Woolen fabrics (2×)		
	AiIM5C		280	Round-rectangular shaft pit	50×35-(42-50)	1	Infant (1×)	Cremation	Pottery Cup		
	AiIM5D		358	Oval shaft pit	(30-40)-5	1	Infant (1×)	Cremation	Pottery Jar		
	AiIM6	Stone mound & circle	277	Round-rectangular shaft pit	150×130-54	1	M (1×)	Prone flex	Pottery Jar	Bronze Age	
	AiIM7	/	160-340	Round-rectangular shaft pit	116×73-(36-44)	1	/	Cremation	/	Bronze Age	
	AiIM8	Stone mound & circle	272	Round-rectangular shaft pit	120×90-110	1	M (1×)	Prone flex	/	Bronze Age	
	AiIM9	Stone mound	123-303	Round-rectangular shaft pit	128×120-64	/	/	Cremation	/	Bronze Age	
	AiIM10	Stone mound	/	/	/	/	/	/	Pottery Jar bottom	Bronze Age	
	AiIM11	Stone mound	163-343	Round-rectangular shaft pit	44×32-11	/	/	/	Animal bones	Bronze Age	
	AiIM12	Soil mound	104-284	Round-rectangular shaft pit	96×61-(30-36)	1	/	Secondary burial	Pottery Jar	Bronze Age	
	AiIM13	Stone mound	115	Rectangular shaft pit with side chamber	220×74-120 200×76-120	1	M (1×)	Supine straight	Iron Knife (2×), iron Arrowhead (2×), wooden shallow Bowl, wooden Jar, wooden Sheath, wooden Bow, bow ornament, saddle, walnut, iron objects, horse skeleton, s/g bones	Han & Tang	
	AiIM14	Stone mound	174-354	Oval shaft pit	96×88-10	/	/	Cremation	/	Bronze Age	
	AiIM15	Stone mound & circle	278	Round-rectangular shaft pit	84×54-52	1	Infant (1×)	Side flex	Pottery Jar bottom	Bronze Age	
	AiIM16	Stone mound	255	Round-rectangular shaft pit	75×42-32	1	Infant (1×)	Side flex	Pottery Jar bottom	Bronze Age	
	AiIM17	Stone circle	105-285	Oval shaft pit	63×44-(20-40)	/	/	Cremation	/	Bronze Age	
	AiIM18	Stone mound & circle	110	Round-rectangular shaft pit	170×100-100	3	M (1×), F (2×)	Secondary burial/side flex	Pottery shallow Bowl, pottery pot Fu (4×), pottery double-handed Jar, wooden Spoon with handle, bronze Ring, pottery sherd	Bronze Age	
	AiIM19	Stone circle	276	Round-rectangular shaft pit	87×60-70	1	Infant (1×)	Side flex	Pottery Cup, bronze Ball	Bronze Age	
	AiIM20	Stone circle	276	Round-rectangular shaft pit	116×76-80	1	F/T (1×)	Side flex	Pottery Bowl, wooden pieces (2×)	Bronze Age	
	AiIM21	Stone circle	290	Round-rectangular shaft pit	74×44-56	1	Infant (1×)	Side flex	Pottery Jar bottom	Bronze Age	
	AiIM22	Stone circle	255	Round-rectangular shaft pit	76×56-60	1	Infant (1×)	Side flex	Pottery Jar bottom	Bronze Age	
	AiIM23	/	120-300	Round-rectangular stone coffin pit	82×74-32	/	/	Cremation	Pottery sherd	Bronze Age	
	AiIM24	Stone circle	247	Round-rectangular shaft pit	136×85-134	1	M (1×)	Side flex	Pottery Jar	Bronze Age	
	AiIM25	Stone circle	338	Round-rectangular shaft pit	94×74-55	1	/	Secondary burial	/	Bronze Age	
	AiIM26	/	320	Round-rectangular shaft pit	121×84-68	1	F (1×)	Prone flex	Pottery Jar bottom	Bronze Age	
	AiIM27	/	67-247	Oval shaft stone coffin pit	64×74-36	/	/	Cremation	Pottery Jar bottom, bronze Bracelet	Bronze Age	
	AiIM28	Stone circle	105	Round-rectangular shaft pit	76×46-40	1	Infant (1×)	Side flex	Pottery Jar	Bronze Age	
	AiIM29	/	232	Round-rectangular shaft pit	144×120-70	2	M (1×)	Cremation/side flex	Pottery Jar	Bronze Age	
	AiIM30	/	281	Round-rectangular shaft pit	134×96-106	1	M (1×)	Prone flex	Pottery Jar	Bronze Age	
	AiIM31	Stone circle	259	Round-rectangular shaft pit	134×110-94	2	M (1×), F (1×)	Prone flex	Pottery Jar, pottery Bowl, s/g head	Bronze Age	
	AiIM32	Stone circle	280	Round-rectangular shaft pit	135×110-88	1	F (1×)	Prone flex	Silver Earring (2×), bronze Bracelet (3×), wooden shallow Bowl, wooden Spade	Bronze Age	
	AiIM33	/	72-252	Round-rectangular stone coffin pit	81×76-30	/	/	Cremation	/	Bronze Age	
	AiIM34	/	28-208	Round-rectangular stone coffin pit	41×34-30	/	/	Cremation	Goat skeleton	Bronze Age	
	AiIM35	Stone mound	259	Round-rectangular shaft pit	96×66-56	1	Infant (1×)	Side flex	Pottery Bowl	Bronze Age	
	AiIM36	Stone mound & circle	270	Round-rectangular shaft pit	140×160-100	2	F (1×), Infant (1×)	Prone flex	Pottery Jar (2×), s/g bones	Bronze Age	
	AiIM37	Stone mound	80-260	Oval shaft pit	86×68-48	/	/	Cremation	Pottery Jar	Bronze Age	
	AiIM38	Stone mound	85-265	Round-rectangular shaft pit	70×32-40	/	/	/	/	Bronze Age	
	AiIM39	/	270	Round-rectangular shaft pit	143×78-96	1	F (1×)	Side flex	Bronze Ring, bronze Earring, wooden Spade, wooden piece	Bronze Age	
	AiIM40	Stone mound	232	Round-rectangular shaft pit	46×34-47	1	Infant (1×)	Prone flex	Pottery Jar bottom	Bronze Age	
	AiIM41	Stone mound & circle	112-292	Round-rectangular shaft pit	160×136-84	1	/	Secondary burial	Pottery Jar (2×)	Bronze Age	
	AiIM42	Stone circle	292	Round-rectangular shaft pit	115×88-100	1	F (1×)	Side flex	Pottery Jar, bronze Bracelet (2×), bronze Earring (3×)	Bronze Age	
	AiIM43	/	320	Round shaft pit	81-70	1	Infant (1×)	Prone flex	Pottery Jar bottom	Bronze Age	
	AiIM44	Stone circle	68-248	Round-rectangular shaft pit	65×40-50	/	/	/	/	Bronze Age	
	AiIM45	Stone circle	254	Round-rectangular shaft pit	112×70-65	1	M (1×)	Side flex	Pottery Cup	Bronze Age	
AiIM46	Stone circle	110	Round-rectangular shaft pit	106×72-74	1	F (1×)	Prone flex	Pottery Jar	Bronze Age		
AiIM47	Stone circle	276	Round-rectangular shaft pit	144×85-93	1	F (1×)	Prone flex	Pottery Jar, s/g head	Bronze Age		
AiIM48	Stone circle	300	Round-rectangular shaft pit	124×98-80	1	M (1×)	Prone flex	Pottery Jar, s/g head	Bronze Age		
AiIM49	Stone circle	160-340	Round-rectangular shaft pit	70×50-42	/	/	/	/	Bronze Age		

Cemetery Nr.	Tomb No.	Surface mound/circle	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	No.of buried people	Gender	Burial Form	Burial Objects	Time Phase	
AII	AIIIM50	/	98-278	Round-rectangular stone coffin pit	80×35-36	/	/	Cremation	/	Bronze Age	
	AIIIM51	/	290	Rectangular shaft pit	104×68-62	1	F/T (1×)	Prone flex	Pottery Jar	Bronze Age	
	AIIIM52A	Stone mound	19	Round-rectangular shaft pit	125×100-70	2	M (1×), F (1×)	Prone flex	Pottery Jar (2×), bronze Ball, wooden Basin, wooden object	Bronze Age	
	AIIIM52B		287	Round shaft pit	92-72	1	Infant (1×)	Prone flex	Pottery Jar bottom	Bronze Age	
	AIIIM53	Stone mound	105-285	Round-rectangular shaft pit	152×92-70	/	/	/	/	Bronze Age	
	AIIIM54	Stone mound	125	Round-rectangular shaft pit	124×100-120	1	F (1×)	Prone flex	Wooden single-handled Cup, s/g bone	Bronze Age	
	AIIIM55	Stone circle	297	Round-rectangular shaft pit	104×90-96	1	Infant (1×)	Side flex	Pottery Bowl	Bronze Age	
	AIIIM56	Stone mound	294	Irregular rectangular shaft pit	100×85-80	1	Infant (1×)	Side flex	Pottery Jar bottom	Bronze Age	
	AIIIM57	Stone mound	75-255	Round-rectangular shaft pit	114×78-108	/	/	Cremation	/	Bronze Age	
	AIIIM58	Stone mound	143-323	Round-rectangular shaft pit	100×62-66	/	/	/	Pottery Jar	Bronze Age	
	AIIIM59	Stone mound	19-199	Round-rectangular shaft pit	190×150-50	/	/	/	Pottery Bowl	Bronze Age	
	AIIIM60	/	/	/	/	/	/	/	/	Bronze Age	
	AIIIM61	Stone mound	270	Round-rectangular shaft pit	152×78-82	1	M (1×)	Side flex	Pottery Jar, Goat head	Bronze Age	
	AIIIM62	Stone mound	280	Rectangular shaft pit	307×115-120	/	/	Cremation	Pottery Cup (10×), pottery Jar (3×), wooden shallow Bowl, wooden Plate (8×), bronze bead, woolen fabric, s/g bone	Bronze Age	
	AIIIM63	Stone mound	80-260	Round shaft pit	58-24	/	/	Cremation	Pottery Jar	Bronze Age	
	AIIIM68	Stone mound	102	Rectangular shaft pit	235×155-180	/	/	/	Animal bones	Han & Tang	
	AIIIM69	Stone mound	/	/	/	/	/	/	/	/	
	AIIIM70A	Stone mound	101-281	Round-rectangular shaft pit	170×60-50	/	/	/	/	Pottery sherds	Han & Tang
	AIIIM70B		90-270	Oval shaft pit	110×90-72	/	/	/	/		
	AIIIM70C		90-270	Irregular rectangular shaft pit	160×50-32	/	/	/	/		
	AIIIM70D		90-270	Irregular rectangular shaft pit	105×50-35	/	/	/	/		
	AIIIM71	Stone mound	/	/	/	/	/	/	/	/	
	AIIIM72A	Stone mound	80-260	Rectangular shaft pit	200×38-32	/	/	/	Animal bones	Han & Tang	
	AIIIM72B		80-260	Rectangular shaft pit	182×45-30	/	/	/	Pottery sherds, animal bones	Han & Tang	
	AIIIM73	Stone mound	0-180	Rectangular shaft pit	290×148-37	/	/	//	/	Han & Tang	
	AIIIM74	Stone mound	0-180	Oval shaft pit	73×55-90	/	/	/	Horse tooth	/	
	AIIIM75	/	/	Rectangular shaft pit	/	/	/	/	/	/	
	AIIIM76	/	/	Oval shaft pit	/	/	/	/	/	Han & Tang	
	AIIIM77	/	195	Round-rectangular shaft pit	240×73-65	1	F (1×)	Secondary burial/ supine straight	Wooden shallow Bowl	Han & Tang	
	AIIIM78	/	10-190	Round-rectangular shaft pit	232×80-64	1	F (1×)	Secondary burial	/	Han & Tang	
	AIIIM79	/	100-280	Round-rectangular shaft pit	265×102-60	/	/	/	/	Han & Tang	
	AIIIM80	/	105	Round-rectangular shaft pit	250×63-64	1	M (1×)	Secondary burial	/	Han & Tang	
	AIIIM81	/	/	Round shaft pit	110-110	/	/	/	/	Han & Tang	
	AIIIM82	/	/	Round shaft pit	110-105	/	/	/	/	Han & Tang	
	AIIIM83	/	/	Round shaft pit	106-80	/	/	/	/	Han & Tang	
	AIIIM84	Stone circle	310	Round-rectangular shaft pit	75×58-55	1	Kid (1×)	Side flex	Pottery Jar bottom	Bronze Age	
	AIIIM85	Stone circle	50	Round-rectangular shaft pit	65×38-60	1	Infant (1×)	Side flex	Pottery Jar bottom	Bronze Age	
	AIIIM86	Stone mound & circle	25-205	Oval shaft pit	142×98-72	1	/	Cremation	Pottery Jar	Bronze Age	
	AIIIM87	Stone circle	278	Oval shaft pit	49×40-38	1	Infant (1×)	Side flex	Pottery Bowl	Bronze Age	
	AIIIM88	Stone circle	68-248	Round-rectangular shaft pit	82×52-52	1	/	Secondary burial	/	Bronze Age	
	AIIIM89	Stone circle	87	Round-rectangular shaft pit	67×49-56	1	Kid (1×)	Side flex	Pottery Cup, leather Boot	Bronze Age	
	AIIIM90	Stone circle	80	Round-rectangular shaft pit	126×102-84	1	M (1×)	Side flex	Pottery Jar	Bronze Age	
	AIIIM91	Stone circle	125	Round-rectangular shaft pit	104×68-95	1	F (1×)	Side flex	Pottery Cup	Bronze Age	
	AIIIM92	Stone mound & circle	318	Round-rectangular shaft pit	97×68-72	1	Kid (1×)	Side flex	Pottery Jar	Bronze Age	
	AIIIM93	Stone circle	106	Round-rectangular shaft pit	102×55-73	1	Kid (1×)	Side flex	Pottery Jar	Bronze Age	
	AIIIM94	Stone circle	285	Round-rectangular shaft pit	47×36-52	1	Infant (1×)	Side flex	Wooden single-handled Cup	Bronze Age	
	AIIIM95	Stone circle	160	Irregular rectangular shaft pit	56×42-63	1	Infant (1×)	Side flex	Pottery Cup	Bronze Age	
AIIIM96	/	220	Irregular rectangular shaft pit	45×38-53	1	Infant (1×)	Side flex	/	Bronze Age		
AIIIM97	/	273	Round-square shaft pit	140×77-70	1	M (1×)	Side flex	Pottery Bowl	Bronze Age		
AIIIM98	/	270	Round shaft pit	71-65	1	F (1×)	Side flex	Pottery Bowl	Bronze Age		
AIIIM99	/	280	Round-rectangular shaft pit	107×75-60	1	M (1×)	Side flex	Pottery Jar	Bronze Age		
AIIIM100	/	273	Oval shaft pit	110×90-65	1	M (1×)	Side flex	Pottery Bowl	Bronze Age		
AIIIM101	/	272	Oval shaft pit	116×92-(42-53)	1	F (1×)	Side flex	Pottery Jar	Bronze Age		
AIIIM102	Stone circle	298	Round-rectangular shaft pit	150×94-90	2	M (1×), bone ash (1×)	Side flex	Pottery Jar	Bronze Age		
AIIIM103	Stone circle	280	Round-rectangular shaft pit with side chamber	130×86-82 84×46-70	1	F (1×)	Side flex	Pottery Jar	Bronze Age		
AIIIM104	Stone circle	263	Round-rectangular shaft pit	131×86-102	1	M (1×)	Prone flex	Wooden Plate, s/g bone	Bronze Age		
AIIIM105	Stone circle	270	Round-rectangular shaft pit	125×80-102	1	M (1×)	Side flex	Pottery Jar	Bronze Age		
AIIIM106	/	80-260	Oval shaft pit	66×41-20	/	/	Cremation	Pottery sherds (3×)	Bronze Age		
AIIIM107	/	180	Irregular rectangular shaft pit	114×85-35	1	F (1×)	Side flex	Pottery shallow Bowl	Bronze Age		
AIIIM108	/	115-295	Oval shaft pit	65×47-34	1	/	Cremation	/	Bronze Age		
AIIIM109	/	135-315	Round-rectangular shaft pit	150×60-44	1	/	Secondary burial	Wooden single-handled Cup	Bronze Age		
AIIIM110	Stone circle	118-298	Rectangular shaft pit	450×100-84	2	/	Cremation	Pottery Jar, wooden Plate (5×)	Bronze Age		
AIIIM111	/	125-305	Oval shaft stone coffin pit	92×44-(10-25)	1	/	Cremation	Pottery sherd	Bronze Age		
AIIIM112	Stone mound & circle	95-275	Round-rectangular shaft pit	137×116-79	1	/	Secondary burial	Pottery Jar, bronze bead	Bronze Age		
AIIIM113	Stone mound & circle	85	Round-rectangular shaft pit	64×52-60	1	Infant (1×)	Side flex	Pottery Bowl	Bronze Age		
AIIIM114	Stone mound & circle	120	Round-rectangular shaft pit	100×62-79	1	Infant (1×)	Side flex	Pottery Jar	Bronze Age		
AIIIM115	/	90-270	Irregular rectangular shaft pit	216×122-40	1	F (1×)	Secondary burial	Glazed bead, pottery pot Fu	Han & Tang		
AIIIM116	/	115-295	Rectangular shaft pit	100×55-52	/	/	/	/	Bronze Age		
AIIIM117	Stone mound	88	Round-rectangular shaft pit	185×75-76	1	M (1×)	Supine flex	/	Han & Tang		
AIIIM118	Stone mound	/	/	/	/	/	/	/	/		
AIII	AIIIM1	Stone mound	/	/	/	/	/	/	/	/	
	AIIIM2	Stone mound	120-300	/	163×97-50	/	/	Secondary burial	/	Ming & Qing	
AV	AVM1	Stone mound	/	/	/	2	A (1×), T (1×)	Cremation	/	Han & Tang	
	AVM2	Stone mound	/	/	/	/	/	/	/	/	
	AVM3	Stone mound	/	/	/	/	/	/	/	/	
	AVM4	Stone mound & circle	/	/	/	/	/	Cremation	Stone Awl, pottery sherd, animal bone	Han & Tang	
	AVM5	Stone mound	/	/	/	/	/	/	/	/	
	AVM6	Stone mound	/	/	/	/	/	/	Pottery sherds	Han & Tang	
	AVM7	Stone mound	/	/	/	/	/	/	/	/	
BIM1	/	302	Round-rectangular shaft pit	188×87-88	1	F (1×)	Supine straight	/	Ming & Qing		
BIM2	/	303	Round-rectangular shaft pit	190×72-80	1	M (1×)	Supine straight	/	Ming & Qing		

Cemetery Nr.	Tomb No.	Surface mound/circle	Tomb Orientation (°)	Tomb Structure	Dimension of Tomb Chamber L×W-D (cm)	No.of buried people	Gender	Burial Form	Burial Objects	Time Phase	
BI	BIM3	/	310	Round-rectangular shaft pit	191×89-76	1	F (1×)	Supine straight	/	Ming & Qing	
	BIM4	/	305	Round-rectangular shaft pit	260×74-82	1	M (1×)	Supine straight	/	Ming & Qing	
	BIM5	/	312	Round-rectangular shaft pit	76×36-11	1	Infant (1×)	Supine straight	/	Ming & Qing	
	BIM6	/	320	Round-rectangular shaft pit	187×73-79	1	M (1×)	Supine straight	/	Ming & Qing	
	BIM7	/	315	Round-rectangular shaft pit	104×76-60	1	M (1×)	Supine straight	S/g bones	Ming & Qing	
	BIM8	/	310	Round-rectangular shaft pit	200×100-60	1	M (1×)	Supine straight	/	Ming & Qing	
	BIM9	/	315	Round-rectangular shaft pit	190×70-38	1	F (1×)	Supine straight	/	Ming & Qing	
	BIM10	/	300	Round-rectangular shaft pit	112×42-23	1	Infant (1×)	Supine straight	/	Ming & Qing	
	BIM11	/	355	Round-rectangular shaft pit	224×84-45	1	F (1×)	Supine straight	/	Ming & Qing	
	BIV	BIVM1	/	355	Round-rectangular shaft pit	214×58-68	1	A (1×)	Supine straight	/	Ming & Qing
		BIVM2	/	337	Round-rectangular shaft pit	185×80-76	1	M (1×)	Secondary burial	/	/
BIVM3		/	/	/	/	/	/	Supine straight	/	Ming & Qing	
BIVM4		Stone mound & circle	337	Round-rectangular shaft pit	195×85-94	1	F (1×)	Supine straight	/	Ming & Qing	
BV	BVM1	/	20	Round-rectangular stone chamber	248×94-100	1	M (1×)	Supine straight	/	Ming & Qing	
	BVM2	/	10	Round-rectangular shaft pit	160×60-40	1	T (1×)	Secondary burial	/	Ming & Qing	
	BVM3	/	20	Round-rectangular shaft pit	130×55-40	1	Infant (1×)	Supine straight	/	Ming & Qing	
	BVM4	/	35	Round-rectangular stone chamber	201×70-88	1	F (1×)	Supine straight	/	Ming & Qing	
	BVM5	/	0	Round-rectangular shaft pit	150×70-85	1	A (1×)	Secondary burial	/	Ming & Qing	
	BVM6	/	358	Round-rectangular shaft pit	100×34-30	1	T (1×)	Supine straight	/	Ming & Qing	
	BVM7	/	15	Round-rectangular shaft pit	238×86-76	1	M (1×)	Supine straight	/	Ming & Qing	
BVI	BVIM1	/	320	Round-rectangular mudbrick chamber	180×80-34	1	F (1×)	Supine straight	/	Ming & Qing	
	BVIM2	/	320	Round-rectangular mudbrick chamber	200×65-50	1	M (1×)	Supine straight	/	Ming & Qing	
	BVIM3	/	325	Round-rectangular mudbrick chamber	245×78-40	1	M (1×)	Supine straight	/	Ming & Qing	
	BVIM4	/	320	Round-rectangular mudbrick chamber	230×68-36	1	M (1×)	Supine straight	/	Ming & Qing	
	BVIM5	/	330	Round-rectangular mudbrick chamber	112×68-32	1	Infant (1×)	Supine straight	/	Ming & Qing	
	BVIM6	/	330	Round-rectangular stone chamber	24×70-40	1	M (1×)	Supine straight	/	Ming & Qing	
BVII	BVIIIM1	Stone circle	330	Round-rectangular shaft pit	180×74-52	1	F (1×)	Supine straight	/	Ming & Qing	
	BVIIIM2	Stone circle	330	Round-rectangular shaft pit	200×88-70	1	M (1×)	Supine straight	/	Ming & Qing	
	BVIIIM3	Stone circle	325	Round-rectangular shaft pit	195×60-60	/	/	/	/	Ming & Qing	

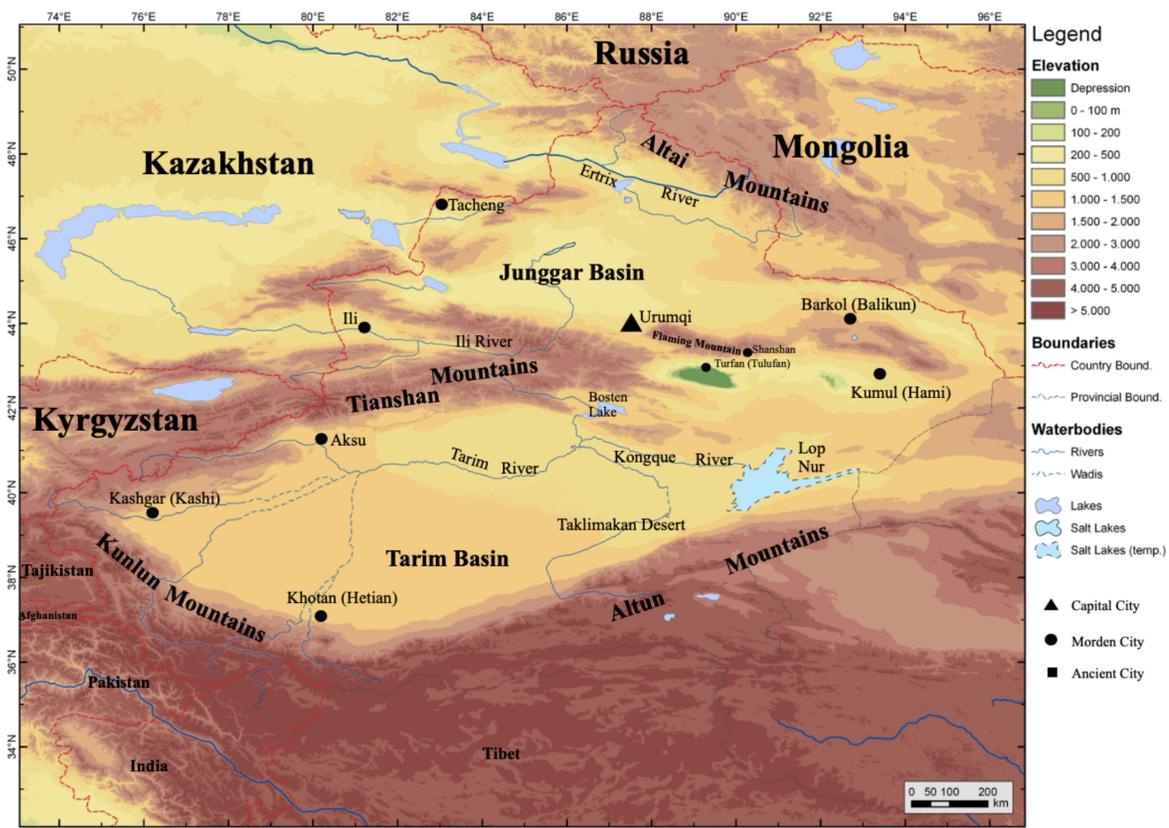


Fig. 1.1

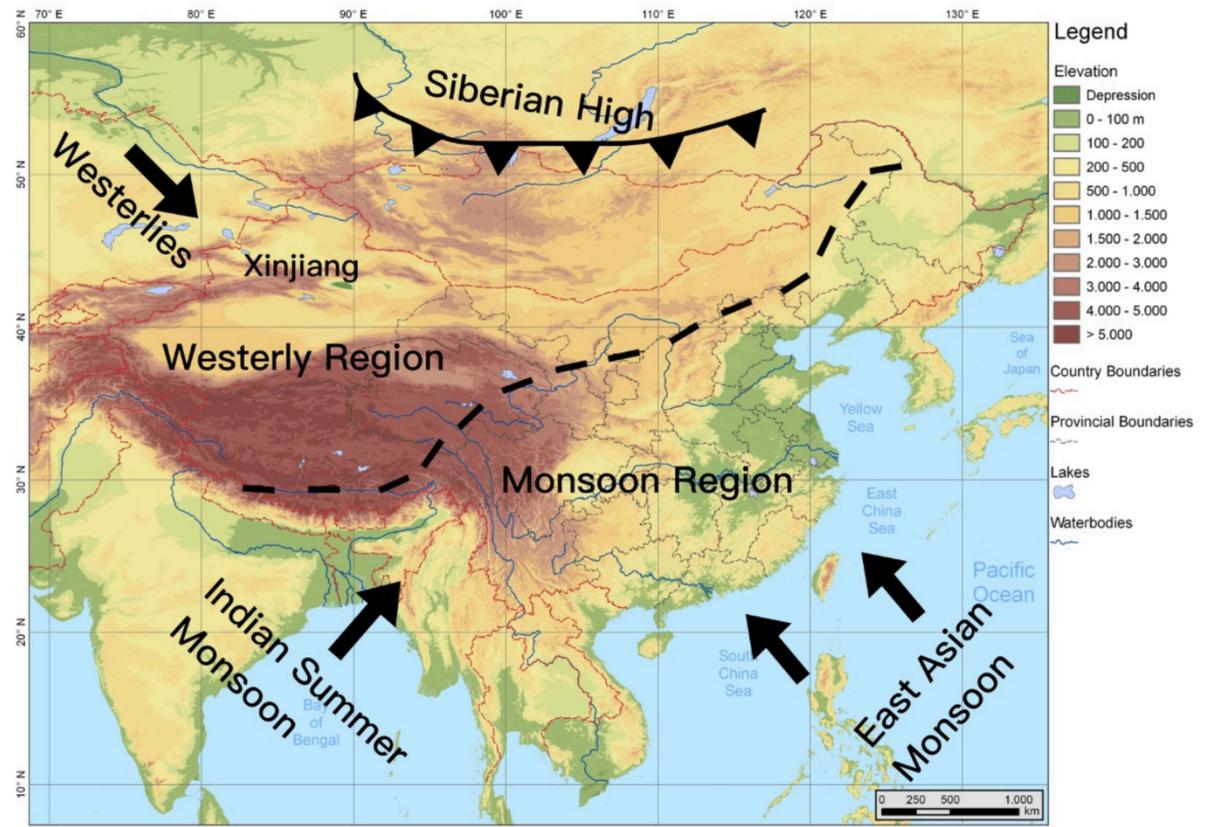


Fig. 1.2

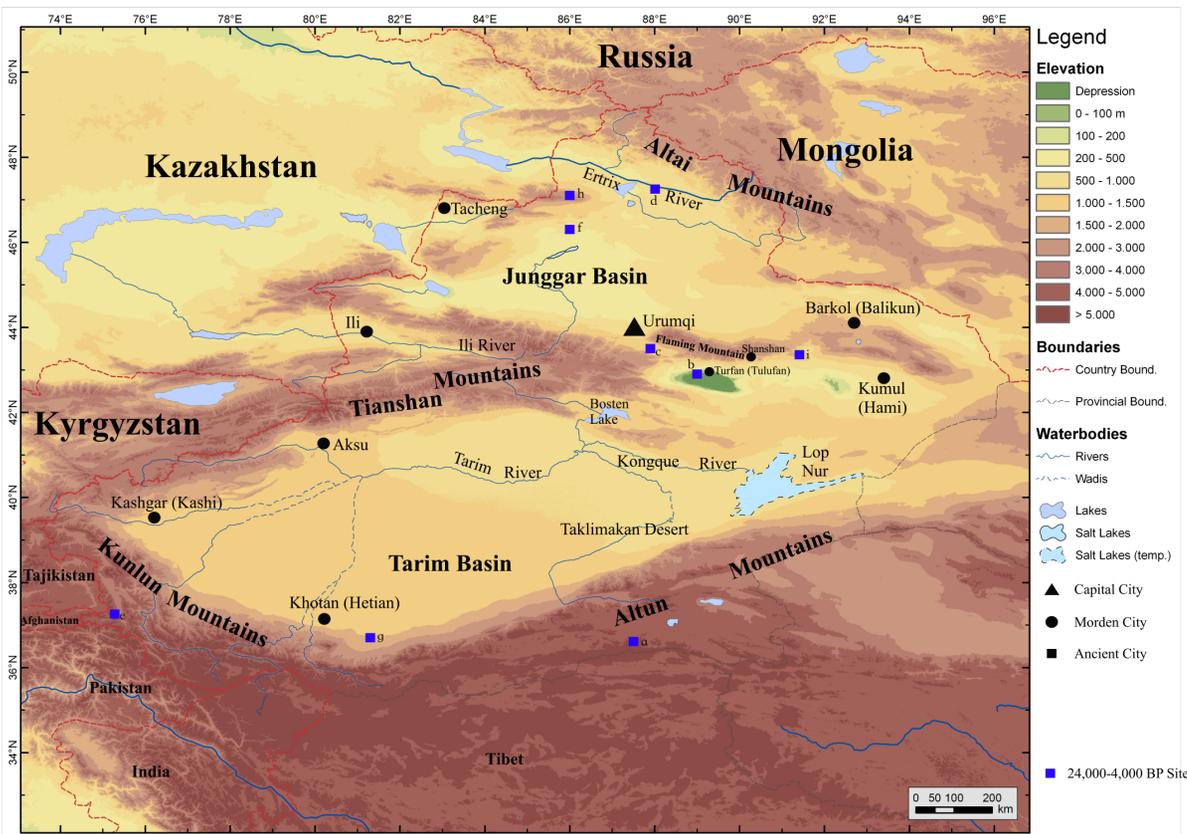


Fig. 4.1

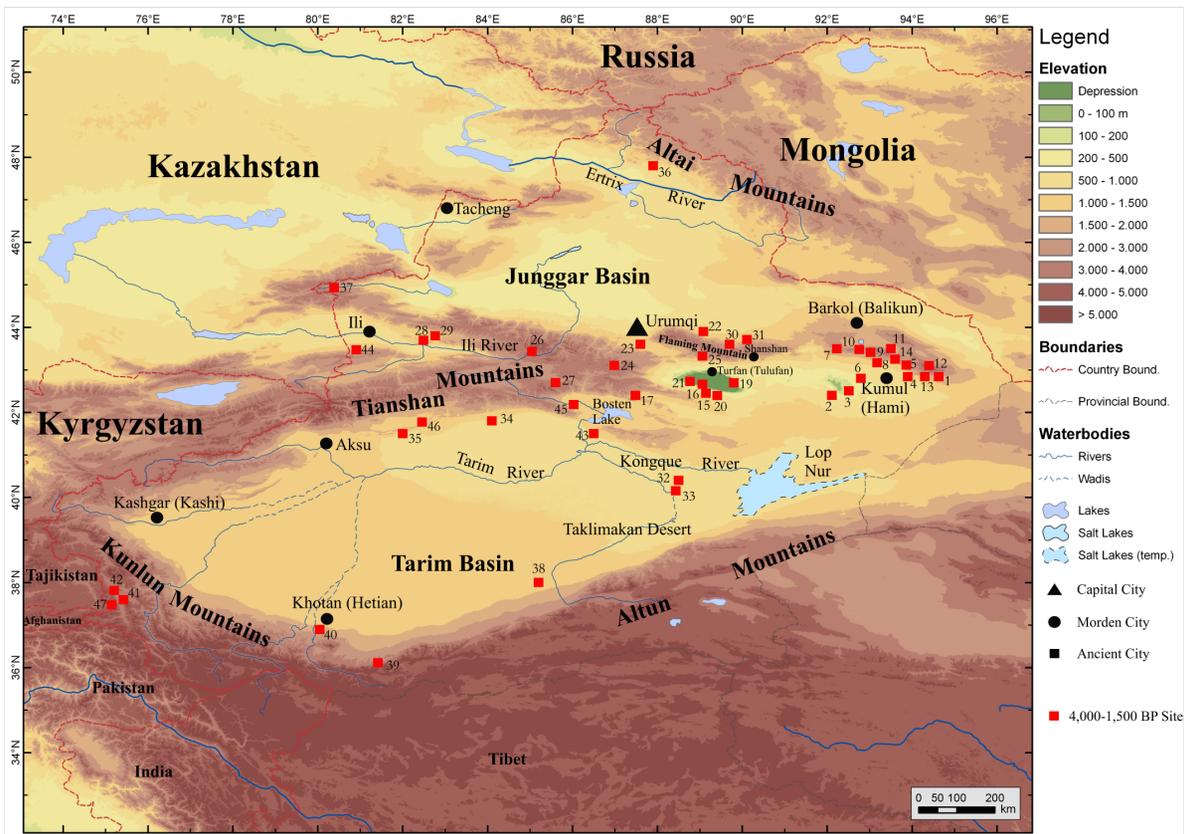


Fig. 5

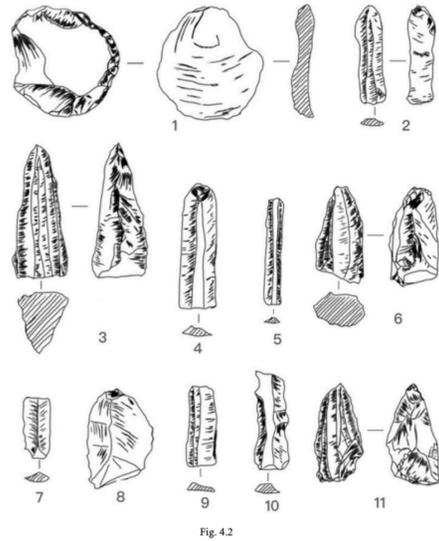


Fig. 4.2

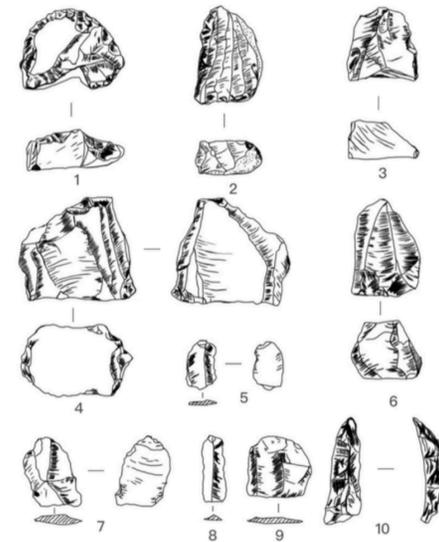


Fig. 4.3

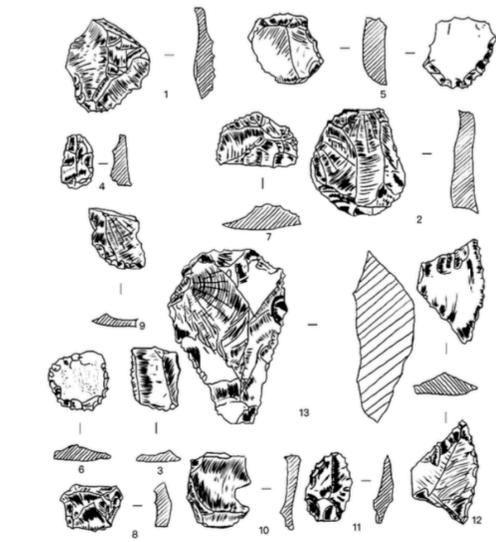


Fig. 4.7

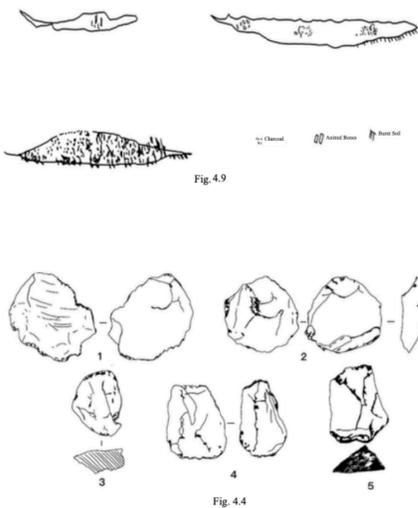


Fig. 4.4

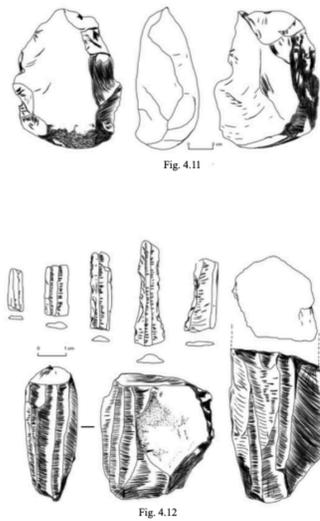


Fig. 4.11

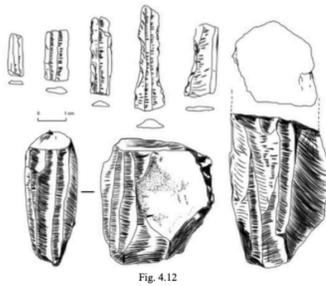


Fig. 4.12

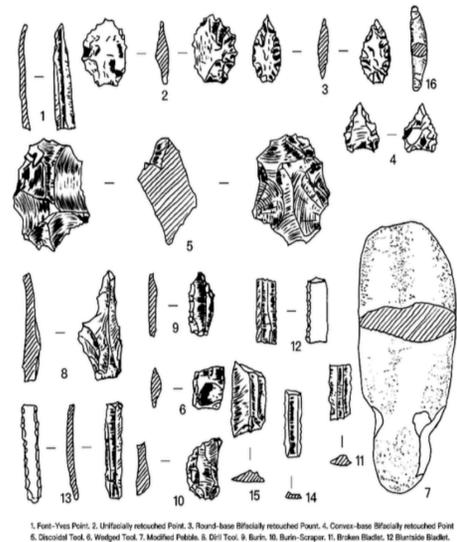


Fig. 4.8



Fig. 4.5



Fig. 4.6



Fig. 4.10



Fig. 4.14



Fig. 4.13

1. Notched Scraper, 2. End Scraper, 3. Side Scraper, 4. End and Side Scraper, 5. Double-ended and side Scraper, 6. Double-ended Scraper, 7. Half-shouldered Scraper, 8. Straight Scraper, 9. Corner Scraper, 10. Notch, 11. Fluted-base End Point, 12. Convex-base End Point, 13. End Point

1. Point-Yess Point, 2. Unifacially retouched Point, 3. Round-base bifacially retouched Point, 4. Convex-base bifacially retouched Point, 5. Bifacial Point, 6. Wedged Tool, 7. Modified Pickaxe, 8. Drill Tool, 9. Burin, 10. Burin-Scraper, 11. Broken Blade, 12. Blunt-base Blade, 13. Double-blunt-base Blade, 14. Broken Blunt-base Blade, 15. Transverse Microtool, 16. Burin

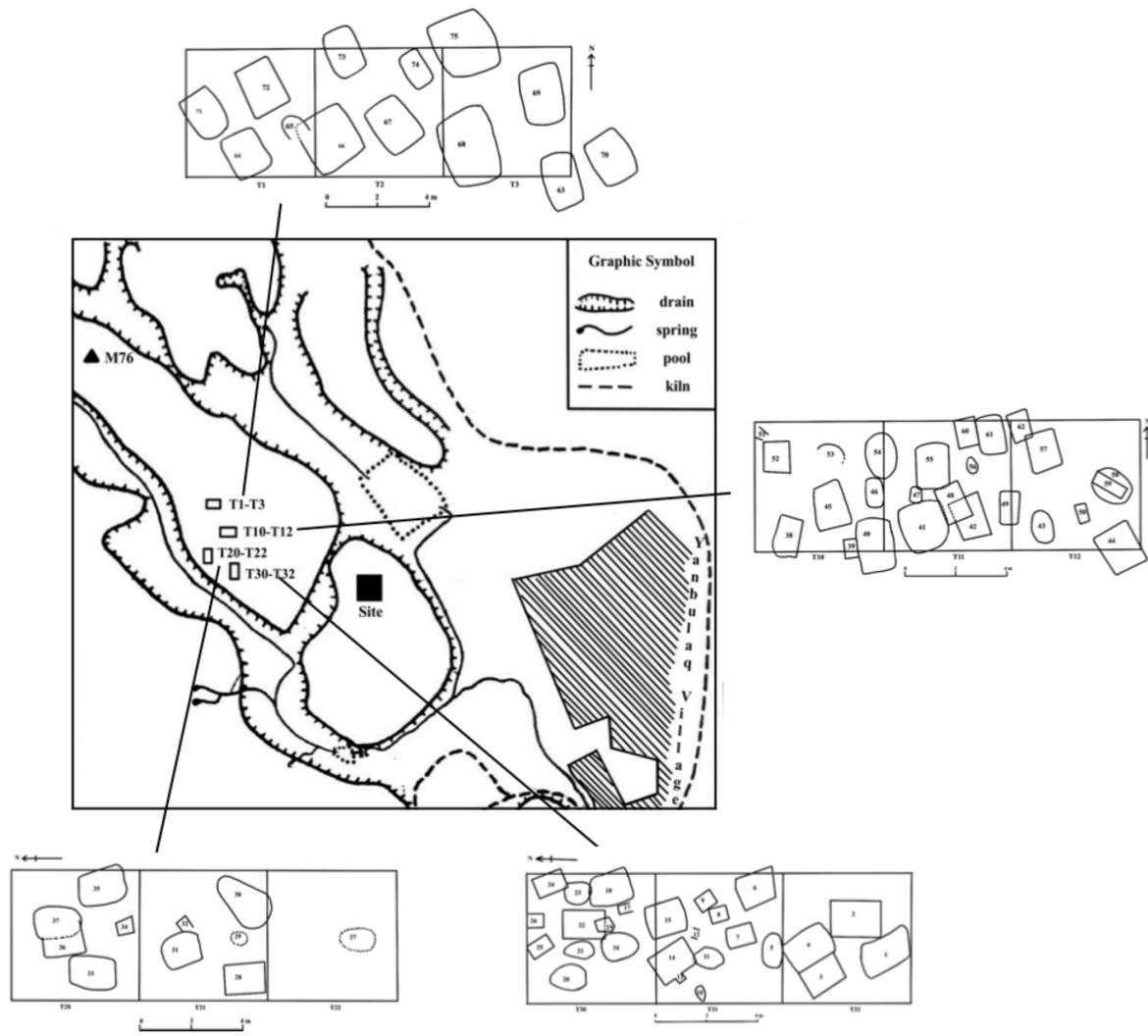


Fig. 1.1.1-1 Yanbulaq Excavation Area

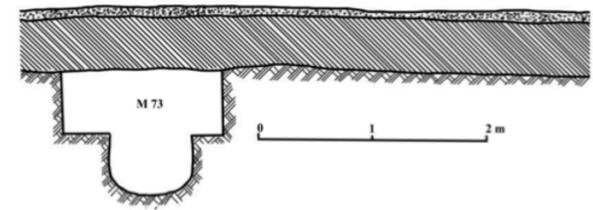


Fig. 5.1.1.1-2 T2 Strigraphy

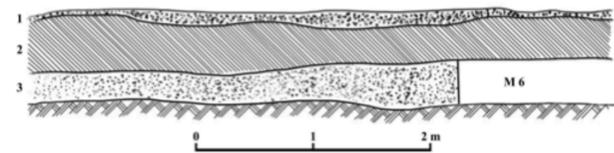


Fig. 5.1.1.1-3 T31 Strigraphy

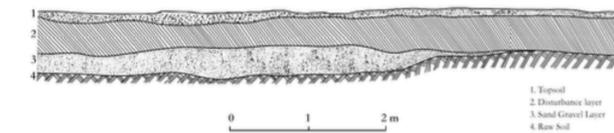


Fig. 5.1.1.1-4 Cemetery Stratigraphy

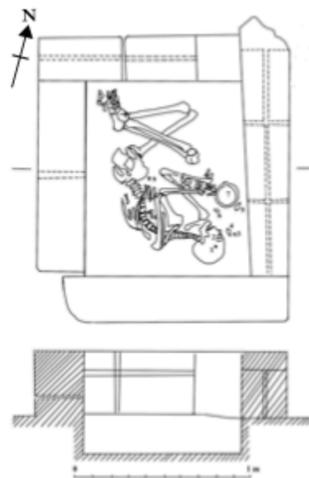


Fig. 5.1.1.1-5

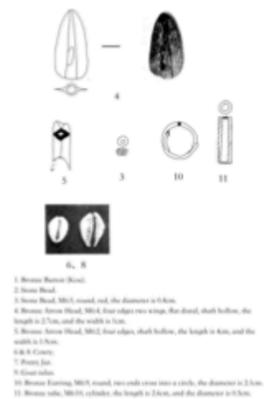


Fig. 5.1.1.1-9



- 1.1.1.1.1-9 Primary vessel
- 2. Single handled jar, M30/2, flat lip, straight neck, flat body, round base, the length is 9.5cm, and the height is 14.5cm.
- 4. Wooden pin
- 6. Clay vessels



Fig. 5.1.1.1-11

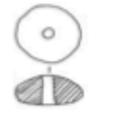
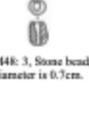
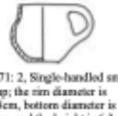
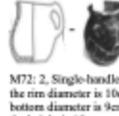
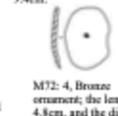
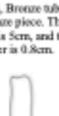
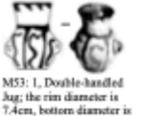
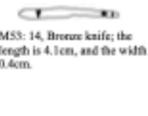
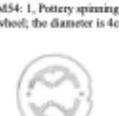
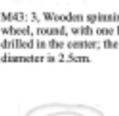
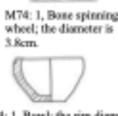
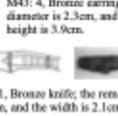
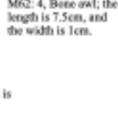
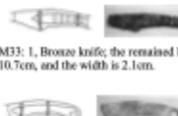
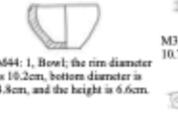
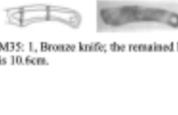
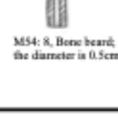
<p>M2</p>	 <p>M2-2: Single-handled Jar; pointed lip, carinated belly, round base; handle is higher than the lip. The diameter is 9.2cm, and the height is 9.4cm.</p>  <p>M2-3: Double-handled Jar; flared lip, high neck, carinated belly, flat base. The rim diameter is 7.6cm, bottom diameter is 7.4cm, and the height is 18.3cm.</p>	<p>M64</p>	 <p>M64-3: Bronze mirror; the diameter is 6.7cm, and the thickness is 0.2cm.</p>  <p>M64-6: Grinding stone; the length is 8.4cm, and the width is 3.4cm.</p>  <p>M64-8: Bowl; the rim diameter is 14cm, and the height is 6.4cm.</p>
<p>M4</p>	 <p>M4-1: Cup; flared lip, deep carinated belly, flat base, in bucket shape. The caliber is 8.2cm, bottom diameter is 5.4cm, and the height is 12.6cm.</p>  <p>M4-2: Double-handled Cup; pointed lip, deep belly, flat base, in bucket shape. The rim diameter is 11.6cm, bottom diameter is 10cm, and the height is 14.2cm.</p>	<p>M66</p>	 <p>M66-2: Pottery spinning wheel; the diameter is 3.7cm.</p>  <p>M66-4: Bone ornament; the length is 4.7cm, and the width is 1.6cm.</p>
<p>M40</p>	 <p>M40-3: Single-handled Cup; the rim diameter is 11.6cm, bottom diameter is 7.6cm, and the height is 10.6cm.</p>  <p>M40-4: Single-handled Jar. The diameter is 12cm, and the height is 10.2cm.</p>	<p>M69</p>	 <p>M69-3: Bronze spinning wheel; round, with one hole drilled in the center.</p>  <p>M69-4: Disc; the rim diameter is 17cm, bottom diameter is 11.2cm, and the height is 12.8cm.</p>
<p>M45</p>	 <p>M45-2: Wooden plate; oval, flat lip, shallow plate, flat base. The rim diameter is 21.8cm, bottom diameter is 10.2cm, and the height is 5.2cm.</p>  <p>M45-3: Bronze mirror; round, no pattern, one knob on the backside; the diameter is 4.5cm, and the thickness is 0.1cm.</p>	<p>M70</p>	 <p>M70-3: Bronze Button (Kou); the diameter is 1.8cm.</p>  <p>M70-5: Single-handled Cup; the rim diameter is 10.8cm, bottom diameter is 5.6cm, and the height is 16.2cm.</p>
<p>M47</p>	 <p>M47-6: Bronze engraving knife; the edge length is 2.5cm, width is 0.8cm, and the height is 7.1cm.</p>  <p>M47-11: Wooden bucket; the rim diameter is 10.4cm, bottom diameter is 10.4cm, and the height is 9.9cm.</p>  <p>M47-7: Bronze engraving knife; the length is 8.1cm, edge length is 1.7cm, and the width is 0.6cm.</p>	<p>Others</p>	 <p>M7-1: Wooden plate. The length is 35cm, width is 11cm, and the height is 3cm.</p>  <p>M14-4: Single-handled Cup; pointed lip, carinated belly, round base. The rim diameter is 6.9cm, and the height is 6.7cm.</p>  <p>M23-1: Double-handled Jar. The rim diameter is 5.8cm, and the height is 9.4cm.</p>  <p>M27-1: Single-handled Cup. The rim diameter is 13cm, bottom diameter is 6.4cm, and the height is 13.4cm.</p>  <p>M18-3: Bronze tube; made by bronze piece. The length is 5cm, and the diameter is 0.8cm.</p>
<p>M48</p>	 <p>M48-2: Bronze ring; the diameter is 2.6cm.</p>  <p>M48-3: Stone bead; the diameter is 0.7cm.</p>  <p>M48-4: Bone ornament; the length is 2.4cm, and the width is 1.2cm.</p>	<p>Others</p>	 <p>M71-2: Single-handled small Cup; the rim diameter is 5.8cm, bottom diameter is 3cm, and the height is 6.3cm.</p>  <p>M72-2: Single-handled Jar; the rim diameter is 10cm, bottom diameter is 9cm, and the height is 15cm.</p>  <p>M72-4: Bronze ornament; the length is 4.8cm, and the diameter is 0.2cm.</p>  <p>M63-1: Bowl; the rim diameter is 6.6cm, bottom diameter is 7.2cm, and the height is 5.2cm.</p>  <p>M18-3: Bronze tube; made by bronze piece. The length is 5cm, and the diameter is 0.8cm.</p>
<p>M53</p>	 <p>M53-1: Double-handled Jar; the rim diameter is 7.4cm, bottom diameter is 5.4cm, and the height is 10.6cm.</p>  <p>M53-6: Wooden spoon; the length is 4.5cm, height is 1.2cm, and the depth is 0.6cm.</p>  <p>M53-12: Bronze owl; the length is 4.2cm, and the diameter is 0.1cm.</p>  <p>M53-14: Bronze knife; the length is 4.1cm, and the width is 0.4cm.</p>	<p>Others</p>	 <p>M54-1: Pottery spinning wheel; the diameter is 4cm.</p>  <p>M43-3: Wooden spinning wheel; round, with one hole drilled in the center; the diameter is 2.5cm.</p>  <p>M74-1: Bone spinning wheel; the diameter is 3.8cm.</p>  <p>M43-4: Bronze earring; the diameter is 2.3cm, and the height is 3.9cm.</p>  <p>M62-4: Bone owl; the length is 7.5cm, and the width is 1cm.</p>  <p>M33-1: Bronze knife; the remained length is 10.7cm, and the width is 2.1cm.</p>  <p>M44-1: Bowl; the rim diameter is 10.2cm, bottom diameter is 4.8cm, and the height is 6.6cm.</p>  <p>M35-1: Bronze knife; the remained length is 10.6cm.</p>  <p>M46-1: Bronze plate; the diameter is 8.5cm, and the thickness is 0.2cm.</p>  <p>M72-1: Stone mortar; the length is 8.4cm, width is 6cm, and the height is 4.4cm.</p>  <p>M54-8: Bone bead; the diameter is 0.5cm.</p>

Fig. 5.1.1.1-16

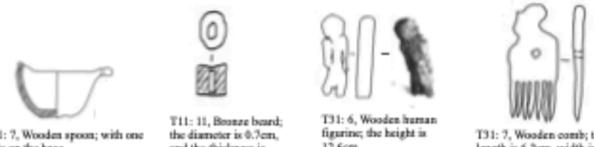
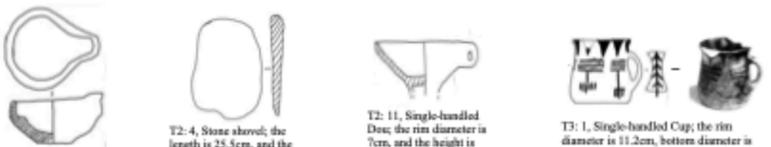
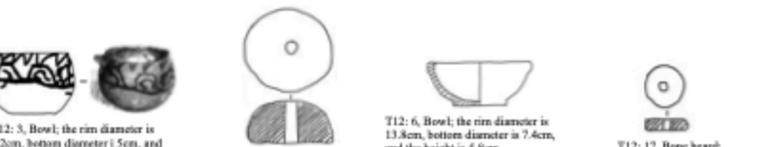
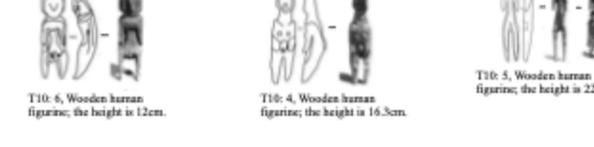
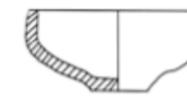
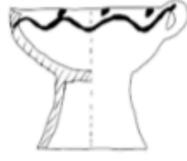
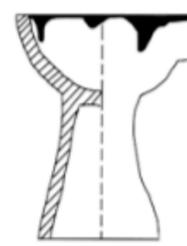
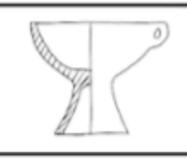
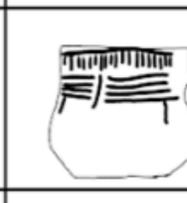
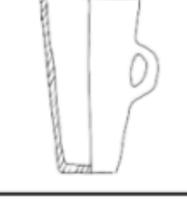
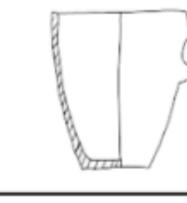
<p>T1</p>	 <p>T1: 9, Single-handled small Cup; the rim diameter is 5.6cm, and the height is 6.6cm.</p> <p>T1: 10, Single-handled small Cup; the rim diameter is 6cm, and the height is 6cm.</p> <p>T1: 14, Single-handled Bowl; food is one shallow pit out of the groove pit, with one mud-brick above it; the rim diameter is 12cm, and the height is 5.5cm.</p>	<p>T11</p>	 <p>T11: 7, Wooden spoon; with one hole on the base.</p> <p>T11: 11, Bronze beard; the diameter is 0.7cm, and the thickness is 0.5cm.</p> <p>T11: 6, Wooden human figurine; the height is 12.6cm.</p> <p>T11: 7, Wooden comb; the length is 6.2cm, width is 2.3cm, and the thickness is 0.4cm.</p>
<p>T2</p>	 <p>T2: 1, Wooden spoon; the rim diameter is 18cm, bottom diameter is 7.8cm, and the height is 9.5cm.</p> <p>T2: 4, Stone shovel; the length is 25.5cm, and the width is 18.4cm.</p> <p>T2: 11, Single-handled Disc; the rim diameter is 7cm, and the height is 6.2cm.</p> <p>T2: 1, Single-handled Cup; the rim diameter is 11.2cm, bottom diameter is 10cm, and the height is 12.6cm.</p>	<p>T10</p>	 <p>T10: 1, Wooden human figurine; the height is 15.6cm.</p> <p>T10: 2, Wooden human figurine; the height is 16.7cm.</p> <p>T10: 3, Wooden human figurine; the height is 15cm.</p> <p>T10: 4, Wooden human figurine; the height is 16.3cm.</p> <p>T10: 5, Wooden human figurine; the height is 22.4cm.</p>
<p>T12</p>	 <p>T12: 3, Bowl; the rim diameter is 9.2cm, bottom diameter is 5cm, and the height is 9cm.</p> <p>T12: 11, Wooden Spinning wheel; the diameter is 4.5cm.</p> <p>T12: 6, Bowl; the rim diameter is 13.8cm, bottom diameter is 7.4cm, and the height is 5.8cm.</p> <p>T12: 17, Bronze beard; round, with one hole drilled in the corner; the diameter is 0.9cm.</p>	<p>T10</p>	 <p>T10: 1, Wooden human figurine; the height is 12cm.</p> <p>T10: 4, Wooden human figurine; the height is 16.3cm.</p> <p>T10: 5, Wooden human figurine; the height is 22.4cm.</p>
<p>Others</p>	 <p>T20: 1, Wooden Bowl; the rim diameter is 8.4cm, and the height is 4.6cm.</p> <p>T30:1, Woolen fabric; cross grain; yellow, single warp and single weft, each yarn is 0.02-0.03cm, and there are 13 yarns each cm².</p> <p>T32: 2, Zinc; the rim diameter is 22.2cm, bottom diameter is 11.8cm, and the height is 31.3cm.</p>	<p>T10</p>	 <p>T30: 1, Woolen fabrics; red, plain weave, each yarn is 0.02-0.05cm, and there are 10 warps and 12 wefts on each cm².</p>

Fig. 5.1.1.1-17

		1	2	3
Alms Bowl (Bo)	I			
	II			
Dou	I			
	II			
Double-handled Jug	I			
	II			
	III			
Single-handled Cup	I			
	II			
Single-handled small Cup	I			
	II			

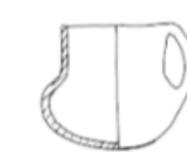
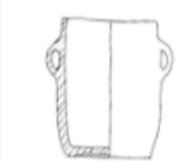
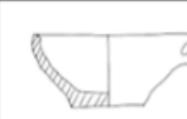
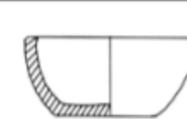
		1	2	3
Single-handled Jar	I			
	II			
	III			
	IV			
Double-handled Jar	I			
	II			
	III			
Bowl	I			
	II			

Fig. 5.1.1.1-18

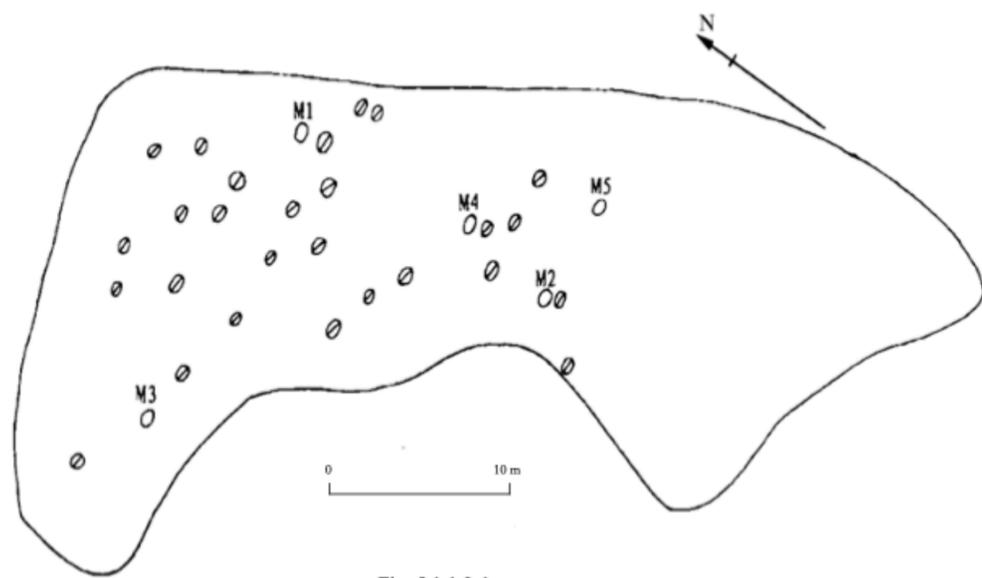


Fig. 5.1.1.2-1

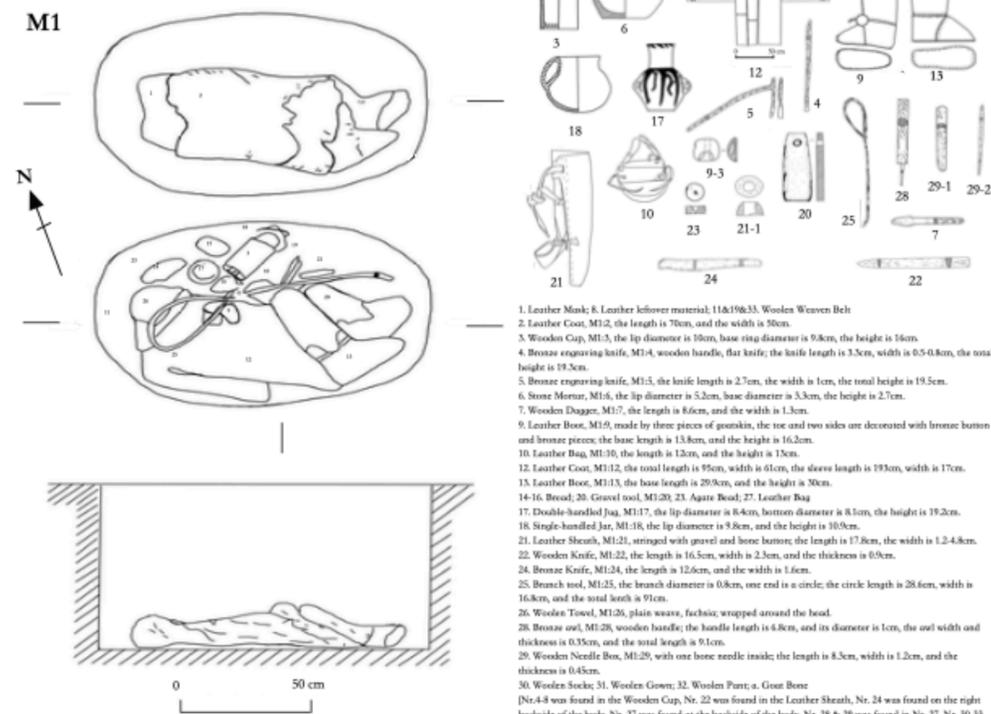


Fig. 5.1.2-3

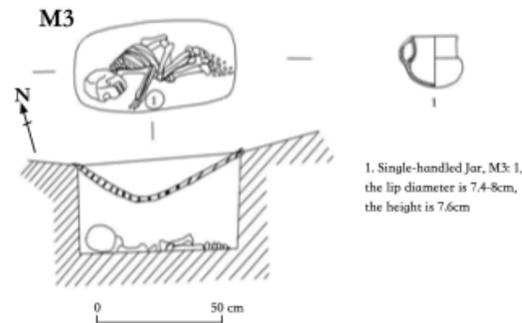


Fig. 5.1.1.2-5

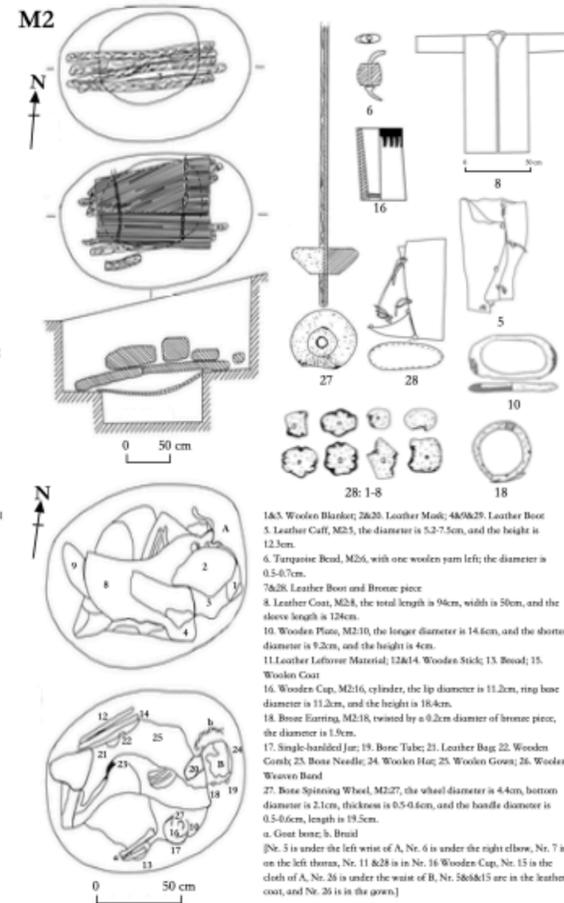


Fig. 5.1.1.2-4

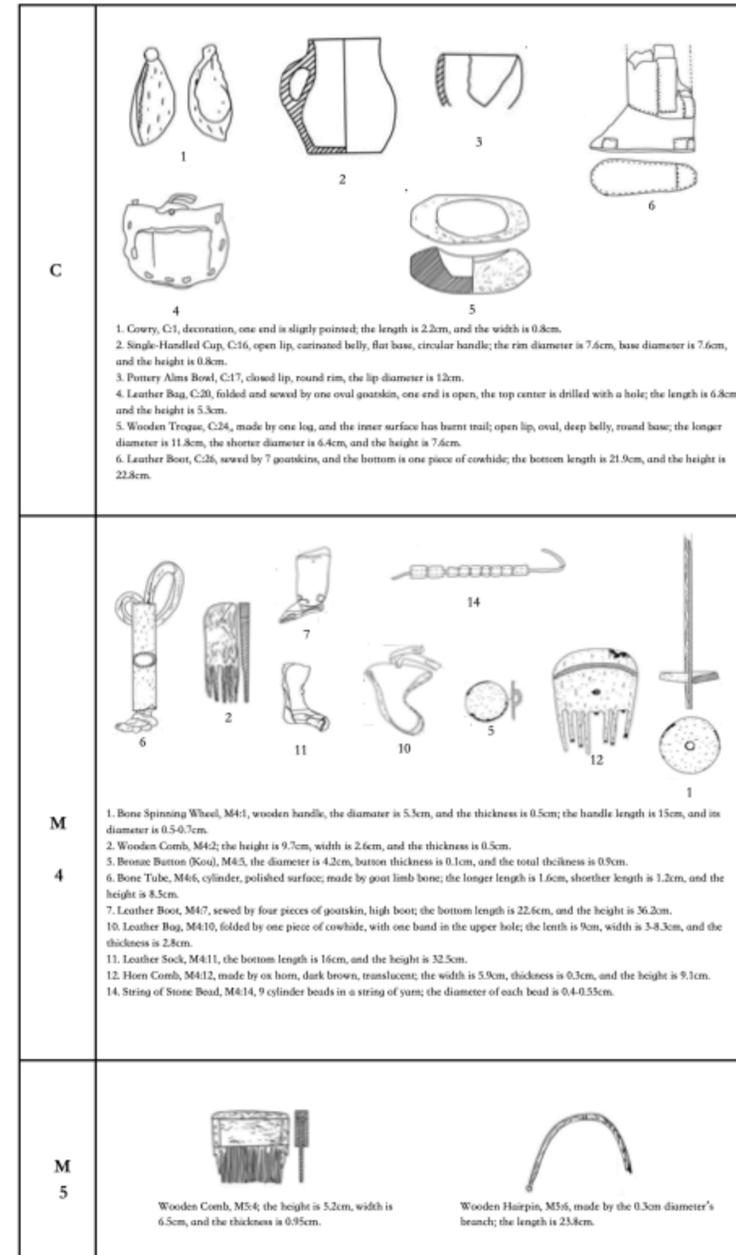


Fig. 5.1.1.2-2

1. Single-handled Jar, M3: 1, the lip diameter is 7.4-8cm, the height is 7.6cm

1. Leather Mink & Leather leftover material; 11&19&33. Woolen Weaven Belt
 2. Leather Coat, M1:2, the length is 78cm, and the width is 58cm.
 3. Wooden Cup, M1:3, the lip diameter is 18cm, base diameter is 9.8cm, the height is 14cm.
 4. Bronze engraving knife, M1:4, wooden handle, flat knife; the knife length is 3.3cm, width is 0.5-0.8cm, the total height is 19.3cm.
 5. Bronze engraving knife, M1:5, the knife length is 2.7cm, the width is 1cm, the total height is 19.5cm.
 6. Stone Mortar, M1:6, the lip diameter is 5.2cm, base diameter is 3.3cm, the height is 2.7cm.
 7. Wooden Dagger, M1:7, the length is 8.6cm, and the width is 1.3cm.
 8. Leather Boot, M1:9, made by three pieces of goatskin, the toe and two sides are decorated with bronze button and bronze piece; the base length is 13.8cm, and the height is 16.2cm.
 9. Leather Coat, M1:10, the length is 12cm, and the height is 13cm.
 10. Leather Bag, M1:12, the total length is 19cm, width is 11cm, the sleeve length is 19.3cm, width is 17cm.
 11. Leather Boot, M1:13, the base length is 29.9cm, and the height is 30cm.
 12. Braid; 20. Gosvel tool, M1:20; 21. Agate Bead; 27. Leather Bag
 13. Double-handled Jar, M1:17, the lip diameter is 8.4cm, bottom diameter is 8.5cm, the height is 19.2cm.
 14. Single-handled Jar, M1:18, the lip diameter is 9.8cm, and the height is 10.9cm.
 15. Leather Sheath, M1:21, stringed with gravel and bone button; the length is 17.8cm, the width is 1.2-4.8cm.
 16. Wooden Knife, M1:22, the length is 16.5cm, width is 2.3cm, and the thickness is 0.9cm.
 17. Bronze Knife, M1:24, the length is 12.6cm, and the width is 1.6cm.
 18. Branch tool, M1:25, the branch diameter is 0.8cm, one end is a circle; the circle length is 28.6cm, width is 16.8cm, and the total length is 91cm.
 19. Woolen Towel, M1:26, plain weave, fabric wrapped around the head.
 20. Bronze nail, M1:28; wooden handle; the handle length is 4.8cm, and its diameter is 1cm, the nail width and thickness is 0.35cm, and the total length is 9.1cm.
 21. Wooden Needle Box, M1:29, with one bone needle inside; the length is 8.5cm, width is 1.2cm, and the thickness is 0.45cm.
 22. Woolen Socks; 31. Woolen Gown; 32. Woolen Pant; a. Goat Bone
 [Nr.4-8 was found in the Wooden Cup, Nr. 22 was found in the Leather Sheath, Nr. 24 was found on the right backside of the body, Nr. 27 was found at the backside of the body, Nr. 28 & 29 was found in Nr. 27, Nr. 30-33 were clothes found on the body.]

1&3 Woolen Blanket; 2&20. Leather Mink; 4&9&29. Leather Boot
 5. Leather Cuff, M2:5, the diameter is 5.2-7.5cm, and the height is 12.3cm.
 6. Turquoise Bead, M2:6, with one woolen yarn left; the diameter is 0.5-0.7cm.
 7&28. Leather Boot and Bronze piece
 8. Leather Coat, M2:8, the total length is 94cm, width is 50cm, and the sleeve length is 124cm.
 9. Wooden Flute, M2:10, the longer diameter is 14.6cm, and the shorter diameter is 9.2cm, and the height is 4cm.
 10. Leather Luffuse Material; 12&14. Wooden Stick; 15. Braid; 15. Woolen Coat
 16. Wooden Cup, M2:16, cylinder, the lip diameter is 11.2cm, ring base diameter is 11.2cm, and the height is 18.4cm.
 17. Bronze Earring, M2:18, twisted by a 0.2cm diameter of bronze piece, the diameter is 1.9cm.
 18. Single-handled Jar; 19. Bone Tube; 21. Leather Bag; 22. Wooden Comb; 25. Bone Needle; 24. Woolen Hat; 25. Woolen Gown; 26. Woolen Weaven Band
 27. Bone Spinning Wheel, M2:27, the wheel diameter is 4.4cm, bottom diameter is 2.1cm, thickness is 0.5-0.6cm, and the handle diameter is 0.5-0.6cm, length is 19.5cm.
 a. Goat bone; b. Braid
 [Nr. 5 is under the left wrist of A, Nr. 6 is under the right elbow, Nr. 7 is on the left thorax, Nr. 11 & 28 is in Nr. 16 Wooden Cup, Nr. 15 is the cloth of A, Nr. 28 is under the waist of B, Nr. 28&15 are in the leather coat, and Nr. 26 is in the gown.]

1. Bone Spinning Wheel, M4:1, wooden handle, the diameter is 5.3cm, and the thickness is 0.5cm; the handle length is 15cm, and its diameter is 0.5-0.7cm.
 2. Wooden Comb, M4:2; the height is 9.7cm, width is 2.6cm, and the thickness is 0.5cm.
 3. Bronze Button (Kou), M4:5, the diameter is 4.2cm, button thickness is 0.1cm, and the total thickness is 0.5cm.
 4. Bone Tube, M4:6, cylinder, polished surface; made by goat limb bone; the longer length is 1.6cm, shorter length is 1.2cm, and the height is 8.5cm.
 5. Leather Boot, M4:7, sewed by four pieces of goatskin, high boot; the bottom length is 22.6cm, and the height is 36.2cm.
 6. Leather Bag, M4:10, folded by one piece of cowhide, with one band in the upper hole; the length is 9cm, width is 3-8.3cm, and the thickness is 2.8cm.
 7. Leather Sock, M4:11, the bottom length is 16cm, and the height is 32.5cm.
 8. Horn Comb, M4:12, made by ox horn, dark brown, translucent; the width is 5.9cm, thickness is 0.3cm, and the height is 9.1cm.
 9. String of Stone Bead, M4:14, 9 cylinder beads in a string of yarn; the diameter of each bead is 0.4-0.55cm.

Wooden Comb, M5:4; the height is 5.2cm, width is 6.5cm, and the thickness is 0.95cm.
 Wooden Hairpin, M5:6, made by the 0.3cm diameter's branch; the length is 23.8cm.



Fig. 5.1.1.3-1

M30: 1, Bone Plaques



Fig. 5.1.1.3-2

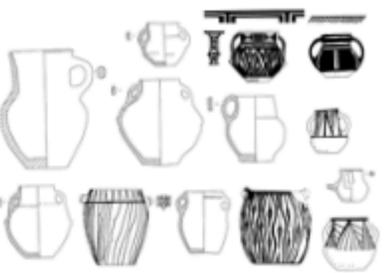
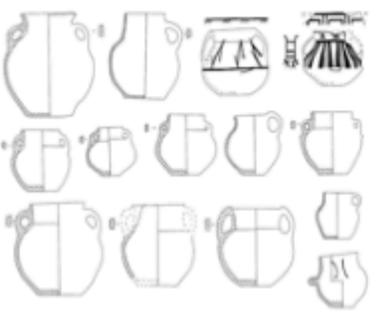
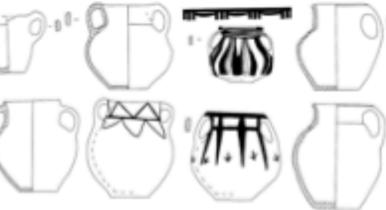
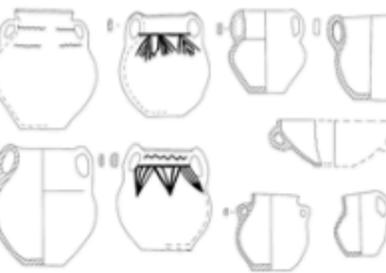
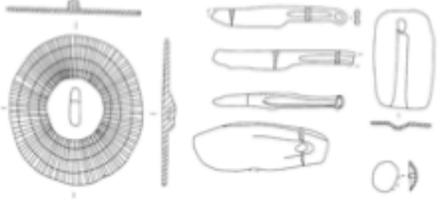
Sub-phase	Pottery	Bronze
Phase I		
Phase II		
Phase III		
Phase IV		

Fig. 5.1.1.3-3 Sub-phases of Tianshanbeilu grave goods (adopted by Lv, et al., 2001)

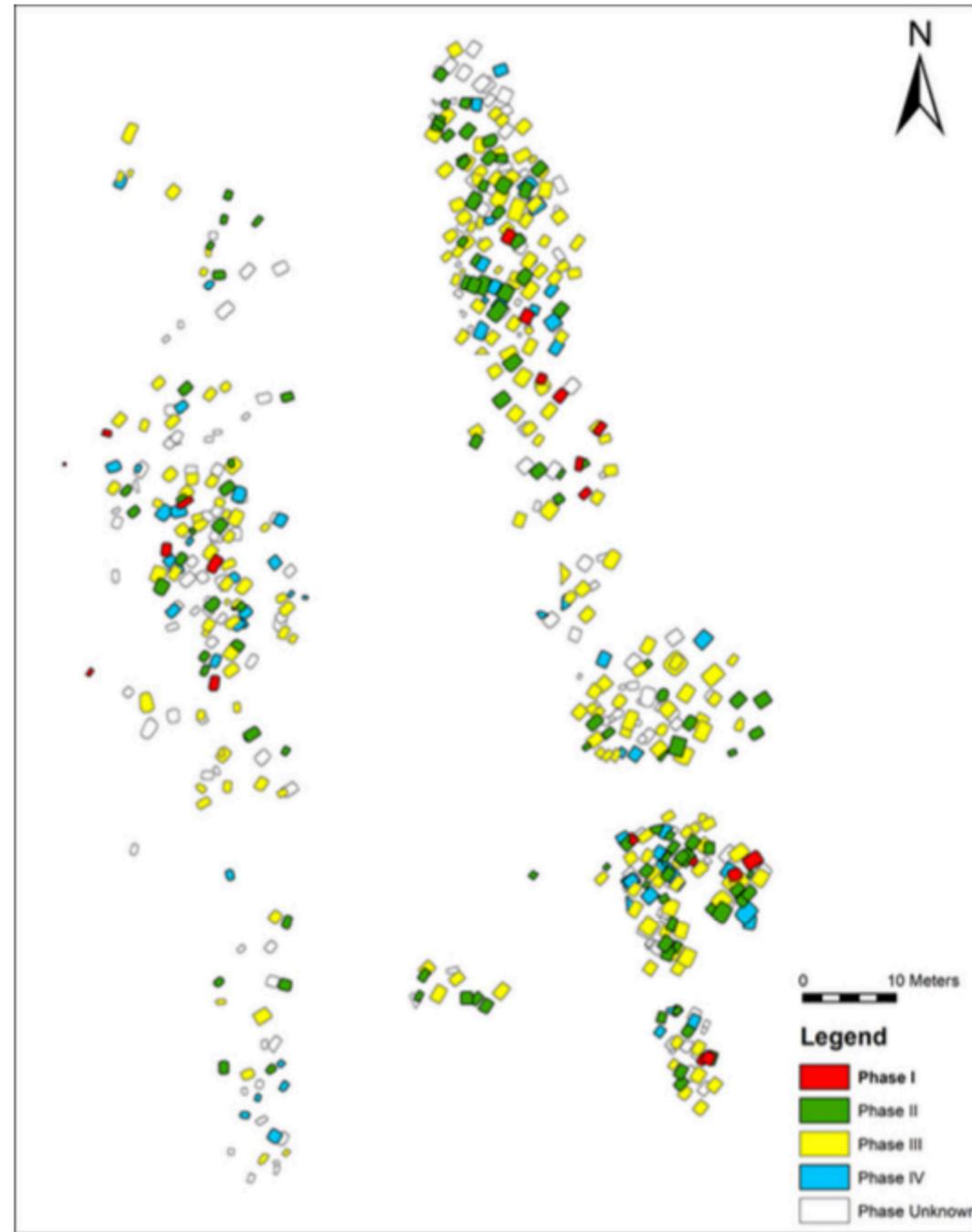
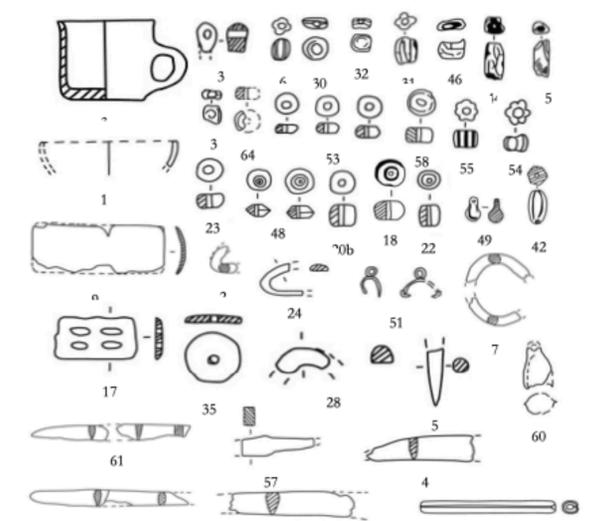
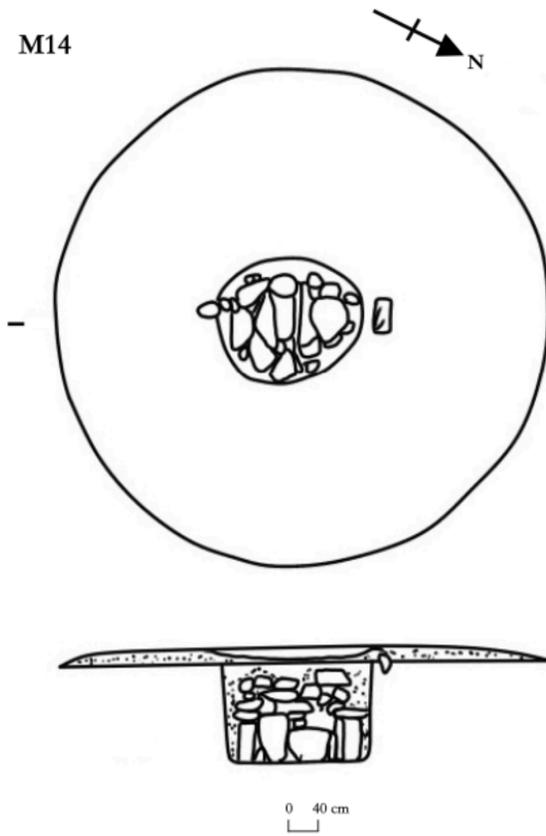


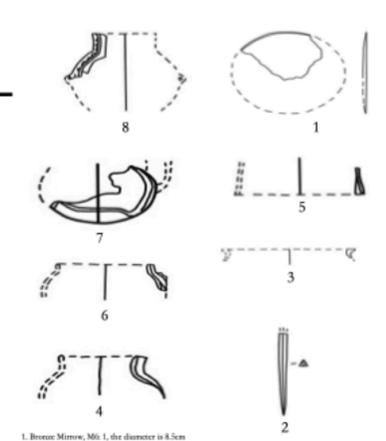
Fig. 5.1.1.3-4 Distribution of different phases in Tianshanbeilu (Tong, et al., 2020)

M14



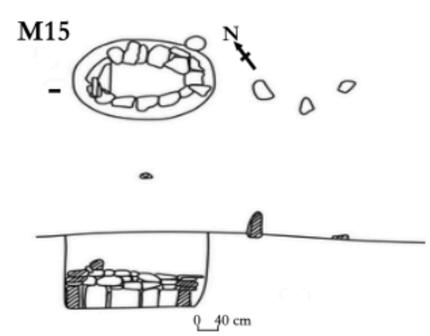
1. Pottery Shallow Bowl Shard, M14: 1, the lip diameter is 16.8cm, height is 3.7cm
2. Stone Bead, M14: 2, the length is 1.1cm, diameter is 0.5cm
3. Golden Ornament, M14: 3, the diameter is 0.5cm, thickness is 0.2cm
- 4 & 61. Iron Knife, M14: 4 & 61, might be the same one, the width is 1.4cm
5. Iron Arrowhead, M14: 5, the length is 2.4cm
6. Golden Ornament, M14: 6, the length is 0.75cm, width is 0.55cm
7. Iron Circle, M14: 7, the thickness is 0.8cm
8. Iron Knife, M14: 8, the length is 13.4cm, width is 1.5cm
9. Iron Plaque, M14: 9, the length is 8.1cm, width is 3.4cm, thickness is 0.3cm
13. Iron Knife, M14: 13, the length is 8.1cm, width is 1.8cm
17. Bronze Plaque, M14: 17, the length is 3.1cm, width is 1.8cm
- 18 & 23 & 43 & 49. Agate Bead, the diameter is 0.5-1.2cm, thickness is 0.3-0.9cm
- 20b. Stone Bead, M14: 20b, the diameter is 0.8cm, height is 0.7cm
22. Bronze Bead, the length is 0.7cm, diameter is 0.6cm
24. Iron Circle, M14: 24, the thickness is 0.6cm
28. Iron Circle, M14: 28, the thickness is 0.35cm, width is 1cm
30. Golden Circle, M14: 30, the diameter is 0.65cm, thickness is 0.3cm
31. Golden Ornament, M14: 31, the length is 1cm, width is 0.65cm
32. Golden Circle, M14: 32, the diameter is 0.7cm, thickness is 0.4cm
35. Pottery Spinning Wheel, M14: 35, the diameter is 5.2cm, thickness is 0.6cm
38. Pottery Single-handled Cup, M14: 38, the lip diameter is 7.2cm, base diameter is 5.6-5.8cm, height is 6.8cm
42. Stone Bead, M14: 42, the length is 1.6cm, diameter is 0.7cm
43. Golden Ornament, M14: 43, the diameter is 0.3cm, height is 0.8cm
44. Golden Ornament, M14: 44, the length is 1.4cm, width is 0.6cm
45. Golden Ornament, M14: 45, the length is 1.3cm, width is 0.5cm
46. Golden Ornament, M14: 46, the length is 0.5cm, width is 0.8cm, thickness is 0.3cm
51. Silver Earring, M14: 51, the length is 1.2-1.4cm
53. Stone Bead, M14: 53, the diameter is 0.6-0.8cm, thickness is 0.3-0.4cm
54. Stone Bead, M14: 54, the length is 0.5cm, diameter is 0.6cm
55. Glass Bead, M14: 55, the diameter is 0.75cm, height is 0.65cm
56. Iron Tube, M14: 56, the length is 9cm, diameter is 1cm
57. Iron Arrowhead, the length is 5.2cm
58. Bone Bead, M14: 58, the diameter is 0.9cm, thickness is 0.6cm
60. Bronze Bell, M14: 60, the height is 2cm
64. Glass Bead, M14: 64, the diameter is 1cm

M6

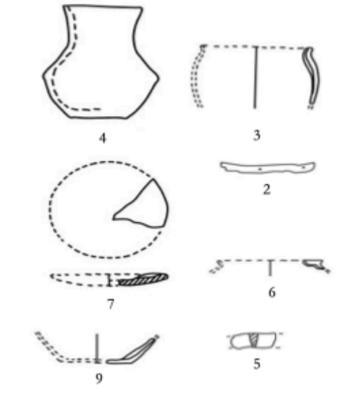
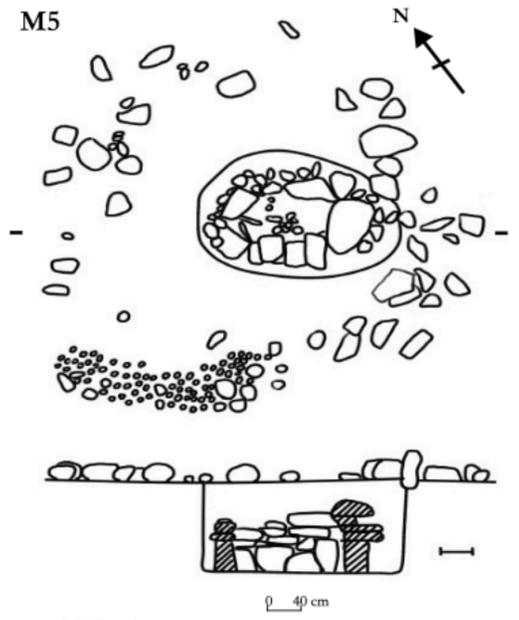


1. Bronze Mirror, M6: 1, the diameter is 8.5cm
2. Iron Awl, M6: 2, the length is 4.6cm
3. Pottery Jar, M6: 3, the lip diameter is 24.2cm, height is 2.2cm
4. Pottery Jar, M6: 4, the lip diameter is 6.6cm, height is 3.5cm
5. Pottery Dou, M6: 5, the stand diameter is 14.8cm, height is 4.5cm
6. Pottery Jar, M6: 6, the lip diameter is 9.4cm, height is 3.4cm
7. Pottery Single-handled Jar, M6: 7, the height is 7.6cm
8. Pottery Jar, M6: 8, the lip diameter is 11.5cm, base diameter is 8.4cm, height is 19.8cm

M15



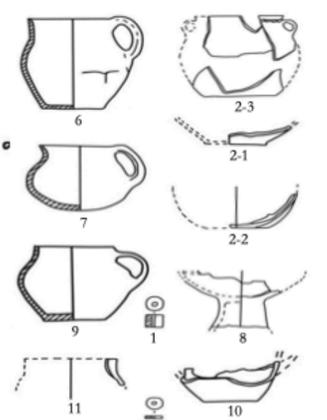
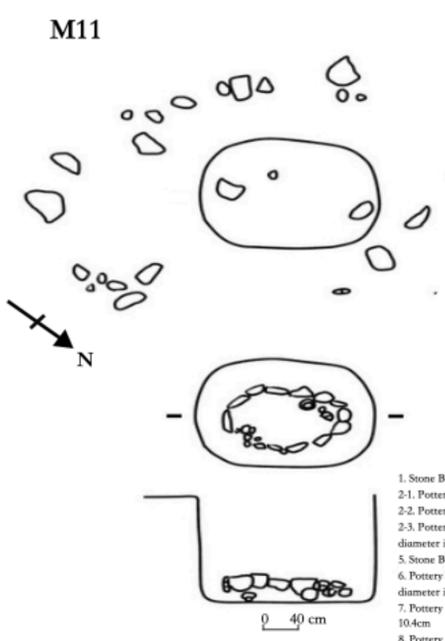
M5



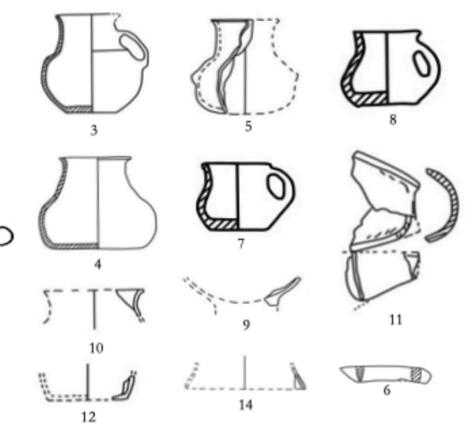
2. Golden Piece, M5: 2, the length is 4cm, width is 0.3cm
3. Pottery Double-handled Jug, M5: 3, the lip diameter is 24cm, height is 13.9cm
4. Pottery Jug, M5: 4, the lip diameter is 6.7cm, base diameter is 4.8cm, height is 11.6cm
5. Iron Knife, M5: 5, the length is 2.7cm, width is 1.1cm
6. Pottery Double-handled Jug, M5: 6, the lip diameter is 29.2cm, height is 3.1cm
7. Pottery Shallow Bowl, M5: 7, the lip diameter is 10.7cm, height is 1.3cm
8. Pottery Jar, M5: 8, the lip diameter is 11.5cm, base diameter is 8.4cm, height is 19.8cm
9. Pottery Jug, M5: 9, the lip diameter is 8.4cm, height is 12.8cm

Fig. 5.1.1.4-1

M11



1. Stone Bead, M11: 1, the length is 0.6cm
- 2-1. Pottery Ware Base, M11: 2-1, the base diameter is 13cm, height is 5.3cm
- 2-2. Pottery Ware Base, M11: 2-2, the base diameter is 8cm, height is 5.9cm
- 2-3. Pottery Double-handled Jar, M11: 2-3, the lip diameter is 12.8cm, base diameter is 9.8-10.2cm, height is 16cm
5. Stone Bead, M11: 5, the diameter is 0.6cm, thickness is 0.15cm
6. Pottery Single-handled Jar, M11: 6, the lip diameter is 11.7-13.5cm, base diameter is 9.4-9.6cm, height is 17.8cm
7. Pottery Single-handled Jar, M11: 7, the lip diameter is 7.6-8.3cm, height is 10.4cm
8. Pottery Dou, M11: 8, the plate diameter is 18.4cm, height is 11.7cm, stand diameter is 7.9-8.1cm
9. Pottery Single-handled Jar, M11: 9, the lip diameter is 9.4cm, base diameter is 7.4cm, height is 12.2cm
10. Pottery Single-handled Cup, M11: 10, the base diameter is 5.5cm, height is 5.6cm
11. Pottery Jar, the lip diameter is 10.2cm, height is 4cm



3. Pottery Single-handled Jar, M8: 3, the lip diameter is 11.5cm, base diameter is 8.4cm, height is 19.8cm
4. Pottery Jug, M8: 4, the lip diameter is 11.6cm, base diameter is 13-14cm, height is 17cm
5. Pottery Jug, M8: 5, the lip diameter is 8.4cm, height is 12.8cm
6. Iron Knife, the length is 6.5cm
7. Pottery Single-handled Jar, M8: 7, the lip diameter is 5.2-5.7cm, base diameter is 4.5cm, height is 6.4cm
8. Pottery Single-handled Jar, M8: 8, the lip diameter is 5.5cm, base diameter is 4.5cm, height is 6.2cm
9. Pottery Dou, M8: 9, the height is 4.7cm
10. Pottery Single-handled Jar, the lip diameter is 12cm, height is 3.6cm
11. Pottery Jar shard, M8: 11, the length is 7.3cm, width is 11cm, height is 5.4cm
12. Pottery Pot, M8: 12, the base diameter is 16.2cm, height is 5.6cm
14. Pottery Dou, M8: 14, the stand diameter is 25cm, height is 4.9cm

Fig. 5.1.1.4-2

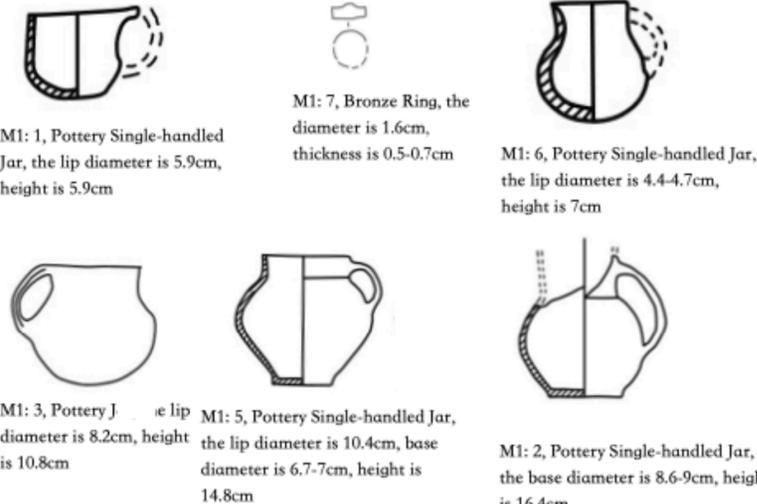
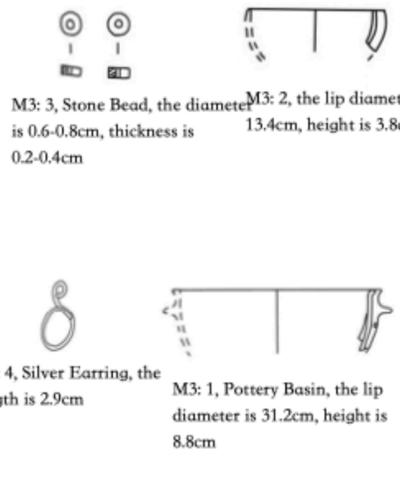
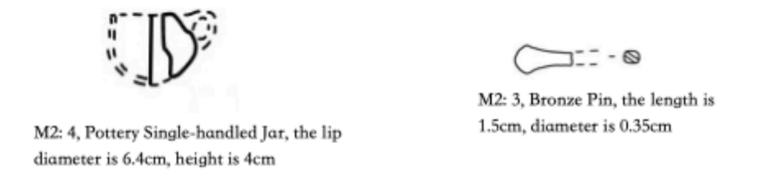
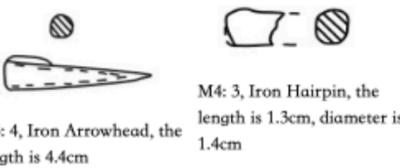
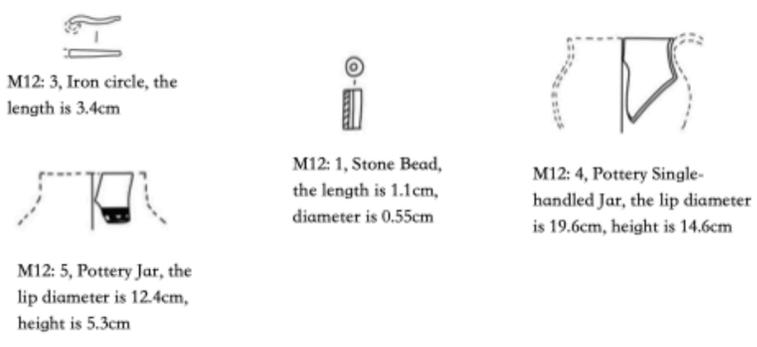
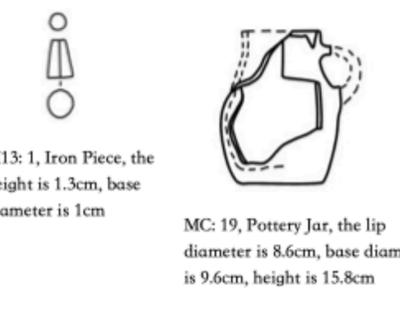
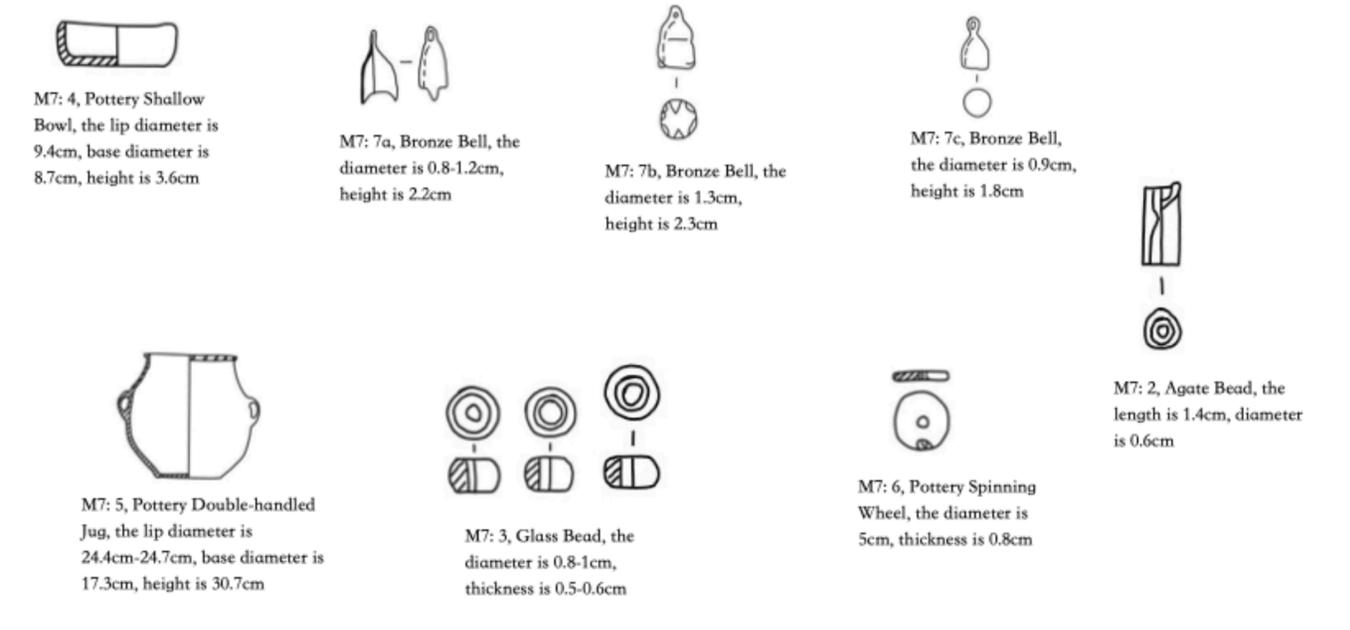
<p>M1</p>	 <p>M1: 1, Pottery Single-handled Jar, the lip diameter is 5.9cm, height is 5.9cm</p> <p>M1: 7, Bronze Ring, the diameter is 1.6cm, thickness is 0.5-0.7cm</p> <p>M1: 6, Pottery Single-handled Jar, the lip diameter is 4.4-4.7cm, height is 7cm</p> <p>M1: 3, Pottery Jar, the lip diameter is 8.2cm, height is 10.8cm</p> <p>M1: 5, Pottery Single-handled Jar, the lip diameter is 10.4cm, base diameter is 6.7-7cm, height is 14.8cm</p> <p>M1: 2, Pottery Single-handled Jar, the base diameter is 8.6-9cm, height is 16.4cm</p>	<p>M3</p>	 <p>M3: 3, Stone Bead, the diameter is 0.6-0.8cm, thickness is 0.2-0.4cm</p> <p>M3: 2, the lip diameter is 13.4cm, height is 3.8cm</p> <p>M3: 4, Silver Earring, the length is 2.9cm</p> <p>M3: 1, Pottery Basin, the lip diameter is 31.2cm, height is 8.8cm</p>
<p>M2</p>	 <p>M2: 4, Pottery Single-handled Jar, the lip diameter is 6.4cm, height is 4cm</p> <p>M2: 3, Bronze Pin, the length is 1.5cm, diameter is 0.35cm</p>	<p>M4</p>	 <p>M4: 4, Iron Arrowhead, the length is 4.4cm</p> <p>M4: 3, Iron Hairpin, the length is 1.3cm, diameter is 1.4cm</p>
<p>M12</p>	 <p>M12: 3, Iron circle, the length is 3.4cm</p> <p>M12: 1, Stone Bead, the length is 1.1cm, diameter is 0.55cm</p> <p>M12: 4, Pottery Single-handled Jar, the lip diameter is 19.6cm, height is 14.6cm</p> <p>M12: 5, Pottery Jar, the lip diameter is 12.4cm, height is 5.3cm</p>	<p>M13 Collection</p>	 <p>M13: 1, Iron Piece, the height is 1.3cm, base diameter is 1cm</p> <p>MC: 19, Pottery Jar, the lip diameter is 8.6cm, base diameter is 9.6cm, height is 15.8cm</p>
<p>M7</p>	 <p>M7: 4, Pottery Shallow Bowl, the lip diameter is 9.4cm, base diameter is 8.7cm, height is 3.6cm</p> <p>M7: 7a, Bronze Bell, the diameter is 0.8-1.2cm, height is 2.2cm</p> <p>M7: 7b, Bronze Bell, the diameter is 1.3cm, height is 2.3cm</p> <p>M7: 7c, Bronze Bell, the diameter is 0.9cm, height is 1.8cm</p> <p>M7: 5, Pottery Double-handled Jug, the lip diameter is 24.4cm-24.7cm, base diameter is 17.3cm, height is 30.7cm</p> <p>M7: 3, Glass Bead, the diameter is 0.8-1cm, thickness is 0.5-0.6cm</p> <p>M7: 6, Pottery Spinning Wheel, the diameter is 5cm, thickness is 0.8cm</p> <p>M7: 2, Agate Bead, the length is 1.4cm, diameter is 0.6cm</p>		

Fig. 5.1.1.4-3

Nr. I Cemetery

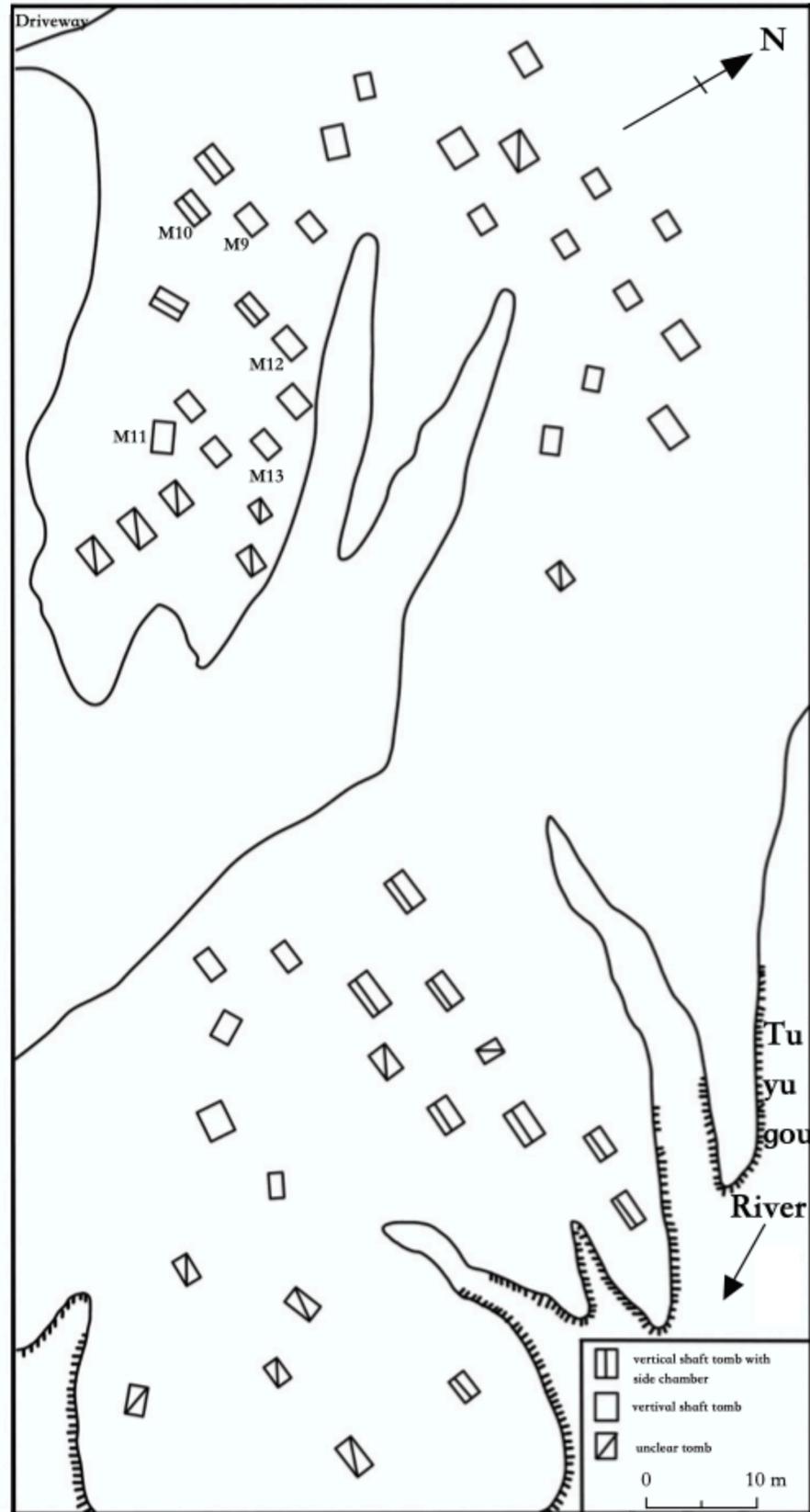


Fig. 5.1.3.2-1

Nr. III Cemetery

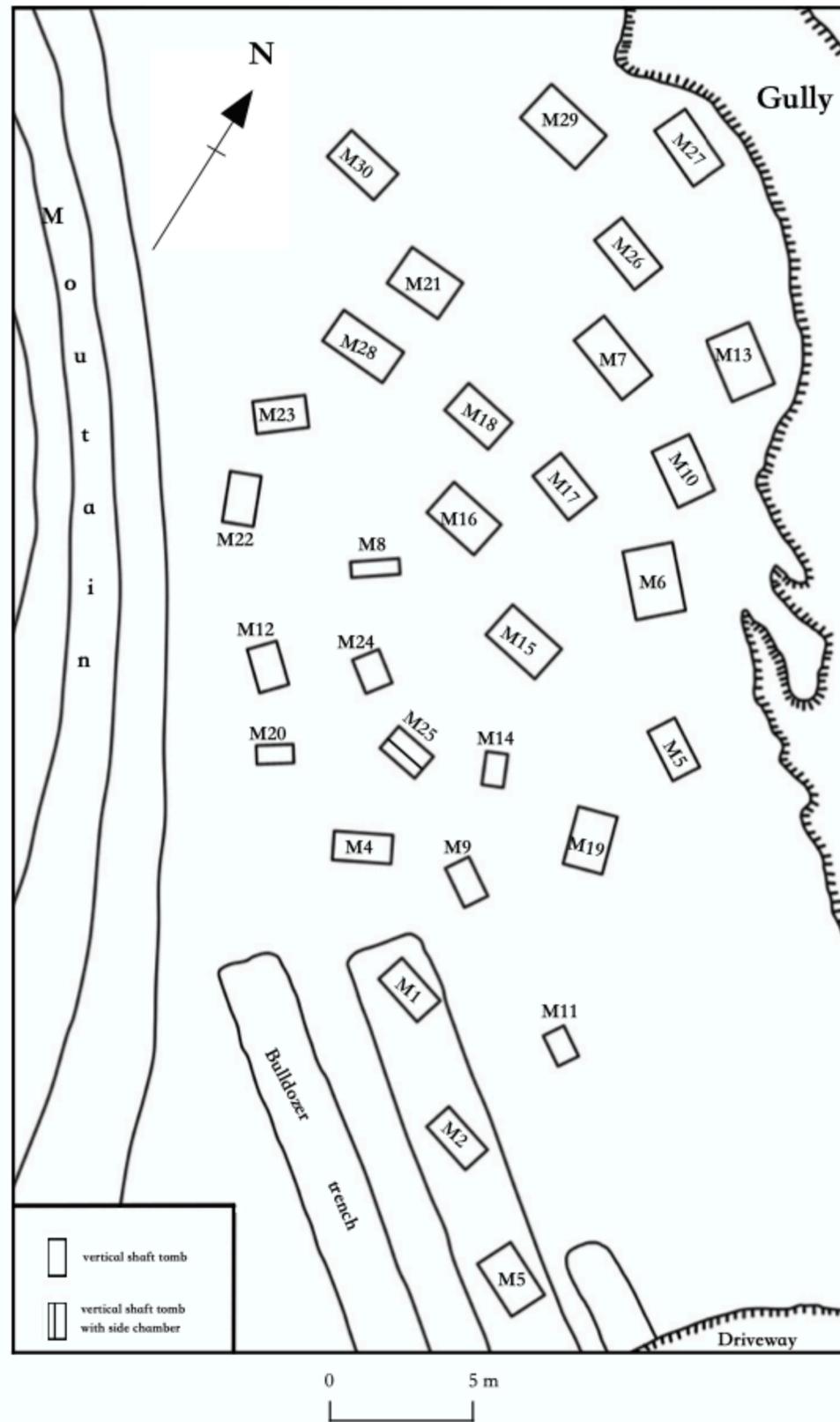
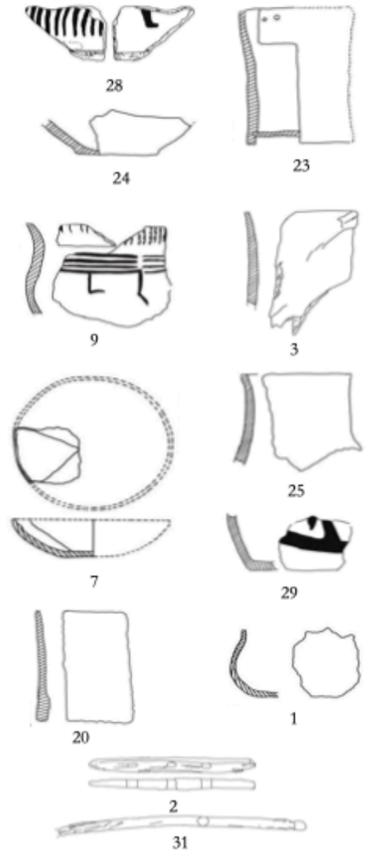
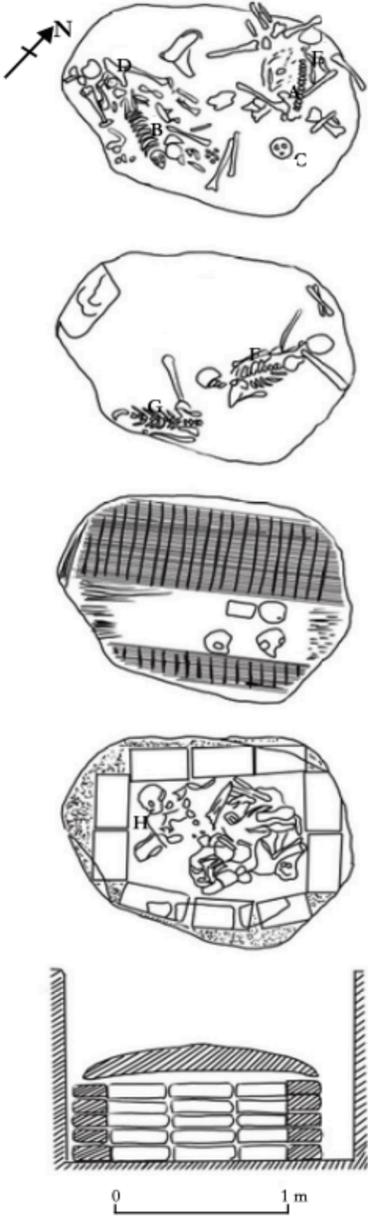


Fig. 5.1.3.2-2

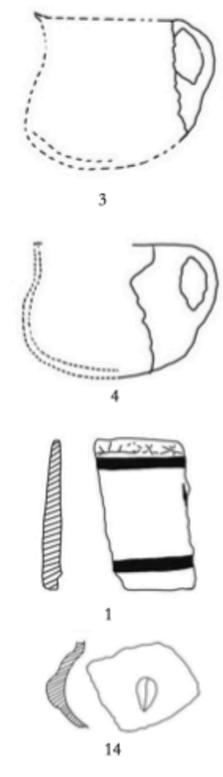
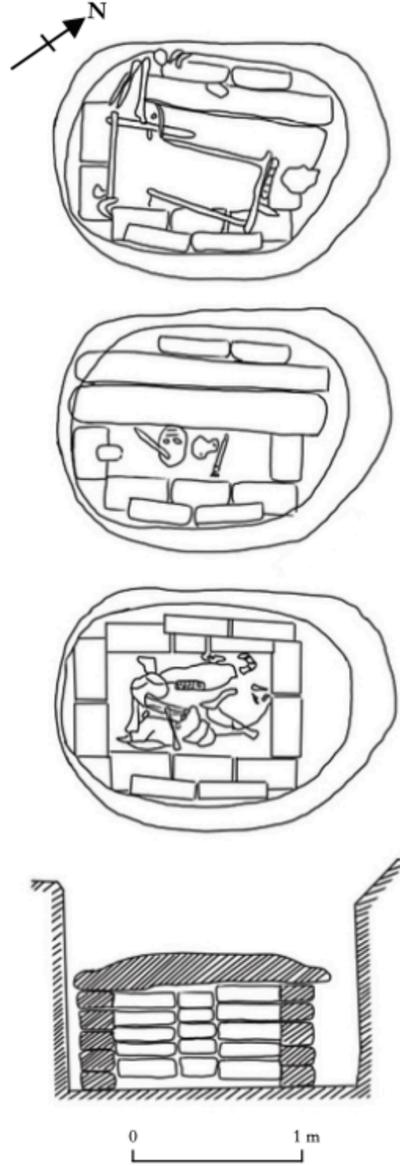
91HWM151



- 1. Pottery Jar, M151: 1
- 2. Wooden Check piece, M151: 2, the length is 16.7cm, width is 1.7cm
- 3. Wooden Bucket, M151: 3, the height is 10cm
- 7. Pottery Painted Shallow Bowl, M151: 7
- 9. Pottery Painted Jar, M151: 9
- 20. Wooden Bucket, M151: 20, the height is 22.2cm
- 23. Wooden Bucket, M151: 23, the lip diameter is 11.5cm, height is 16.2cm
- 24. Pottery Shallow Bowl, M151: 24
- 25. Pottery Jug, M151: 25
- 28. Pottery Jug, M151: 28
- 29. Pottery Painted Cup, M151: 29
- 31. Wooden Stick, M151: 31, the length is 24cm

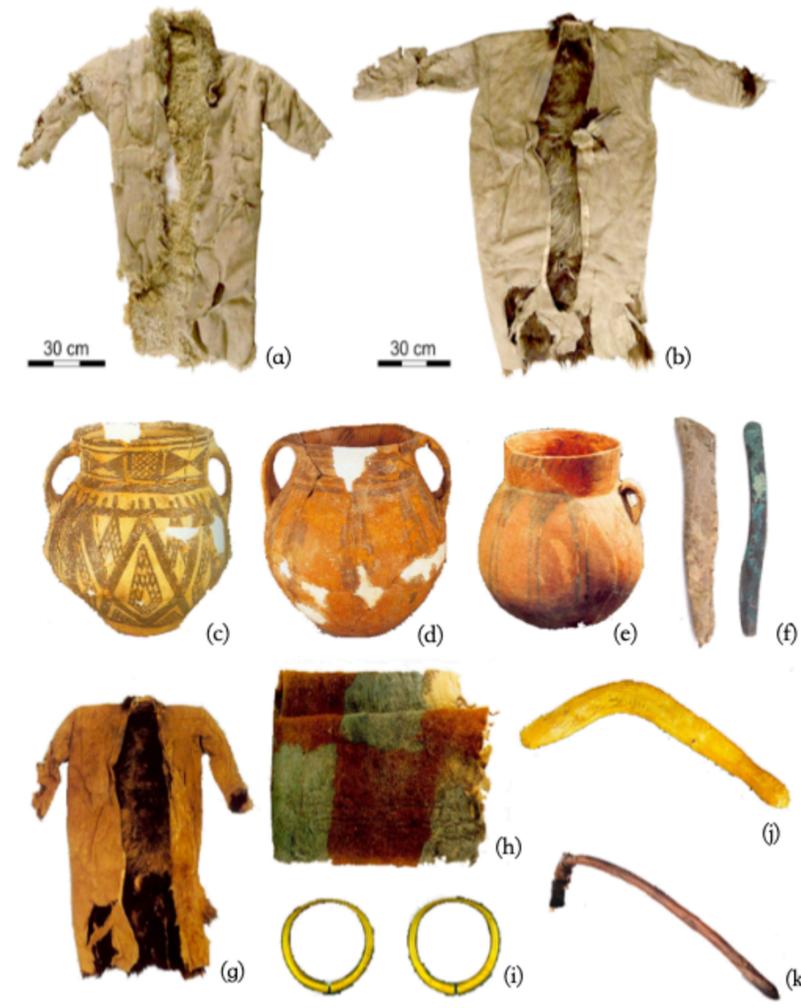
Fig. 5.1.1.6-1

91HWM152



- 3. Pottery Jar, M152: 3, the lip diameter is 10cm, height is 10.7cm
- 4. Pottery Jar, M152: 4, the lip diameter is 10.5cm, height is 10cm
- 11. Wooden Bucket, M152: 11, the height is 11cm
- 14. Pottery Jar, M152: 4

Fig. 5.1.1.6-2



(a) Leather Coat: 86HWM1-00751, (b) Leather Coat: 86HWM: 2-00752 (Schröder, et al., 2016)
 (c-e) Painted Pottery, (f) Bronze ware and leather sheath, (g) Leather fur coat, (h) woolen textile, (i) Golden earring, (j) Bonnerange, (k) Bronze Adez with wooden handle (Wang, et al., 2021)

Fig. 5.1.1.6-3

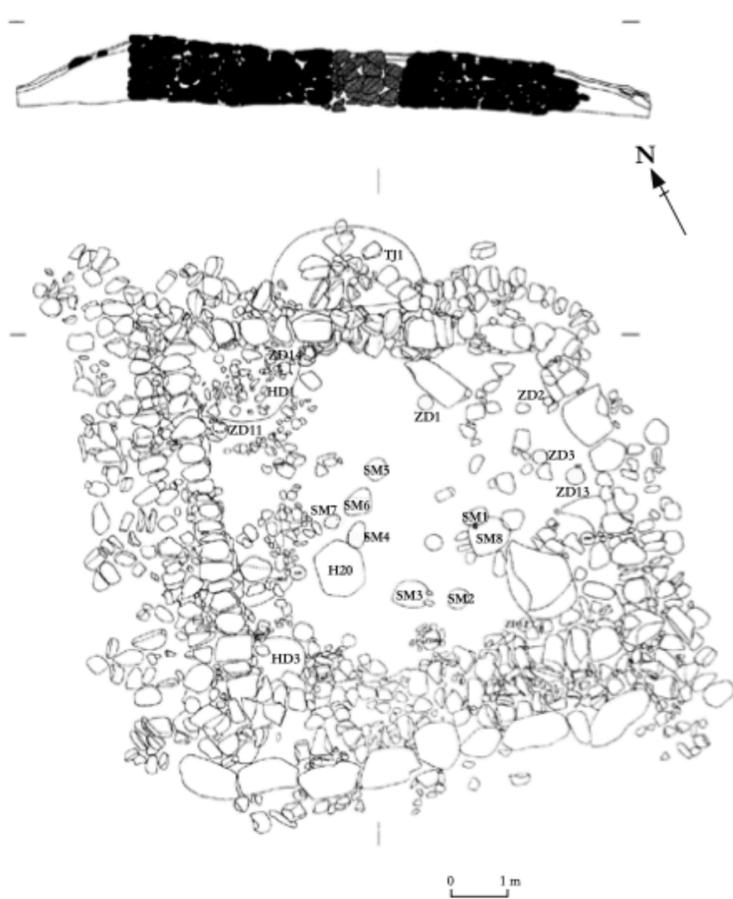
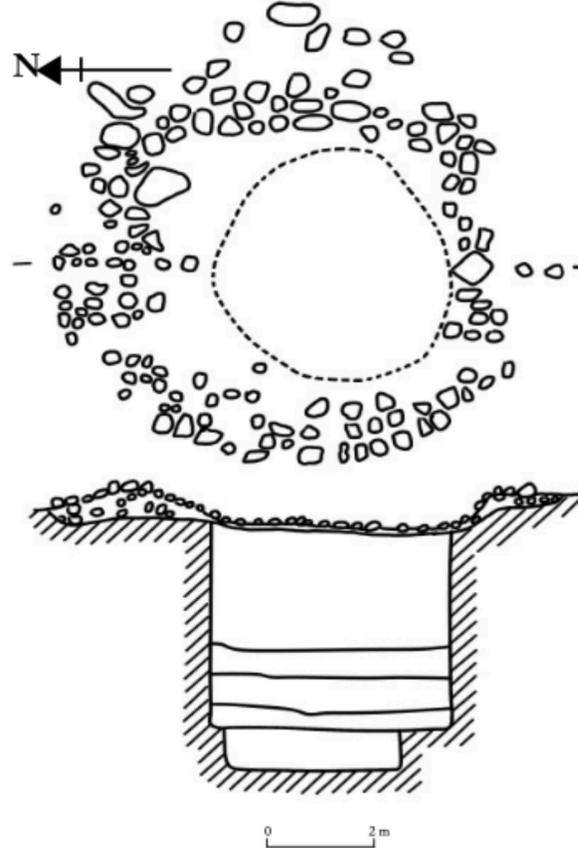
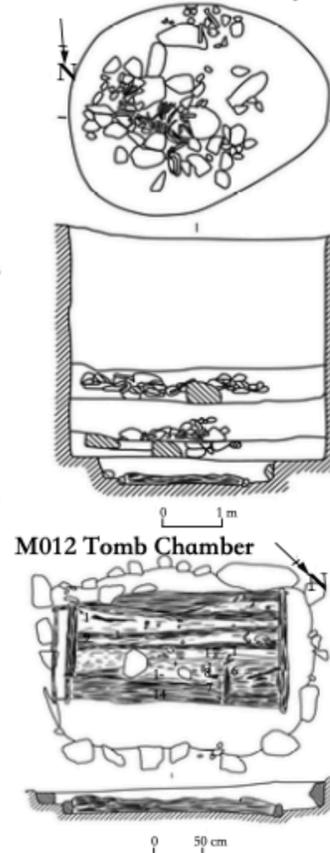


Fig. 5.1.2.1-17

M012 Plan & Profile



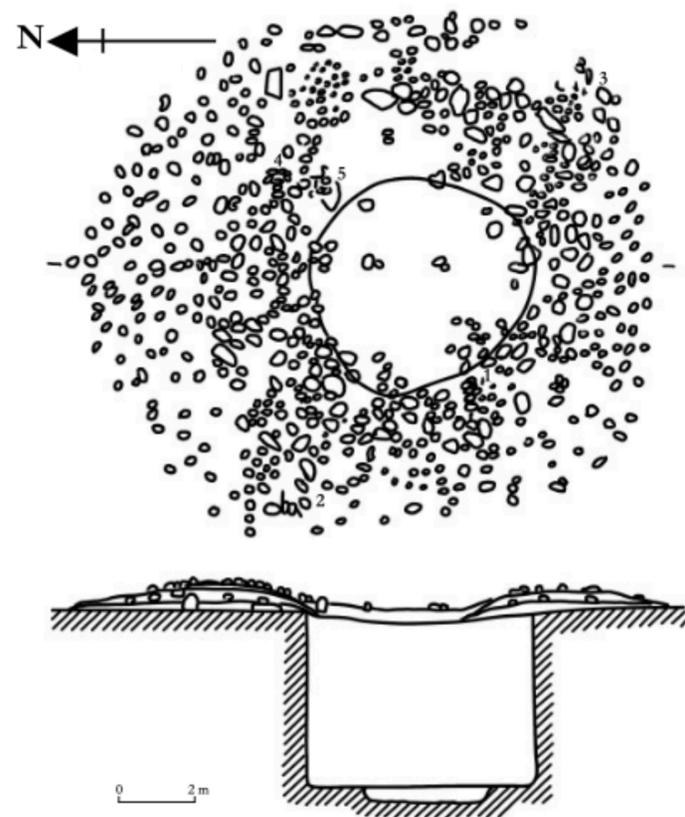
M012 Plan & Profile under layer ②



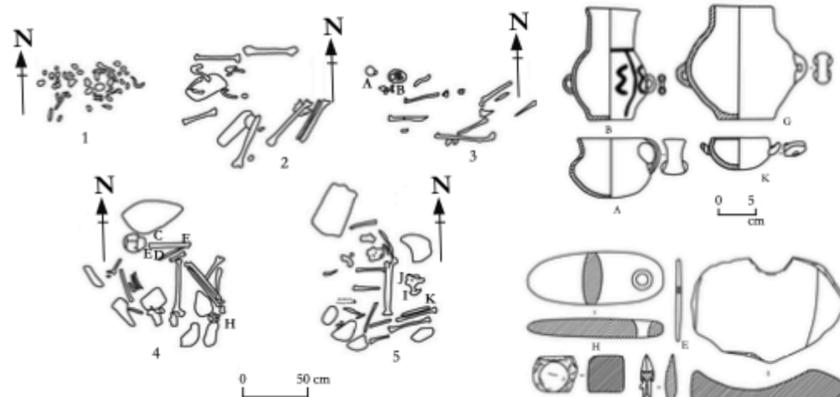
- 1-3 & 6 & 11. Rectangular Golden Plaque, M012: 6 & 7 & 45 & 5 & 44
- 4 & 5 & 10. Rectangular Silver plaque, M012: 30 & 42 & 34
- 7. Golden Flower Ornament, M012: 1-5
- 8. Golden Ball, M012: 3
- 9. Round Golden Piece, M012: 14
- 12. Golden Piece, M012: 56
- 13. Round Silver Button, M012: 8
- 14. Round Silver Button, M012: 35
- 15. Bone Awl, M012: 49
- 16. Pottery Jug, M012: 46
- 17. Pottery Bowl, M012: 15
- 18-19. Iron Objects

Fig. 5.1.2.1-15

M015 Plan & Profile



M015 Human Sacrifice



M015 Tomb Chamber

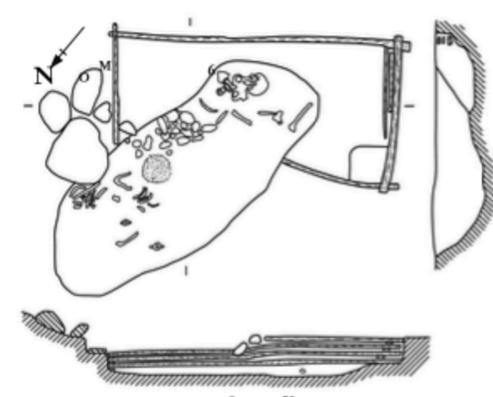
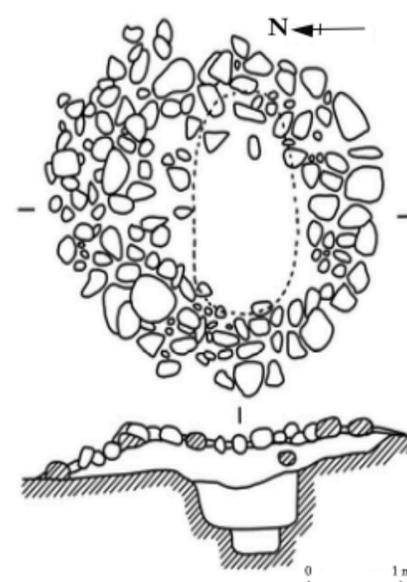


Fig. 5.1.2.1-16

- 1-6. M015RS1-6
- A. Pottery Single-handled Jar, M015RS3: 3
- B. Pottery Jug, M015RS3: 2
- C. Bronze Mirror, M015RS4: 2
- D. Bronze Ornament, M015RS4: 3
- E. Bronze Awl, M015RS4: 4
- F. Bronze Knife, M015RS4: 5
- G. Pottery Jug, M015RS4: 1
- H. Gravel Stone, M015RS4: 6
- I. Bone Object, M015RS5: 2
- J. Bone Ornament, M015RS5: 1
- K. Pottery Shallow Bowl, M015RS5: 3
- L. Millstone, M015RS1: 1-2
- M. Bone Arrowhead, M015RS6: 1
- N. Millstone, M015RS1: 1-1
- O. Bone String Ornament, M015RS6: 2

M010 Plan & Profile



M010 Tomb Chamber

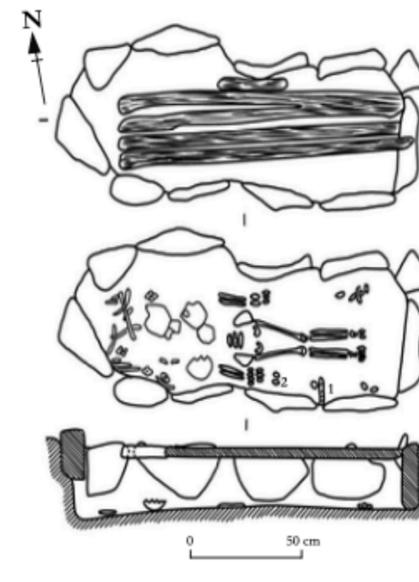


Fig. 5.1.2.1-14

- 1. Iron Knife 2. Clay Bead Bracelet

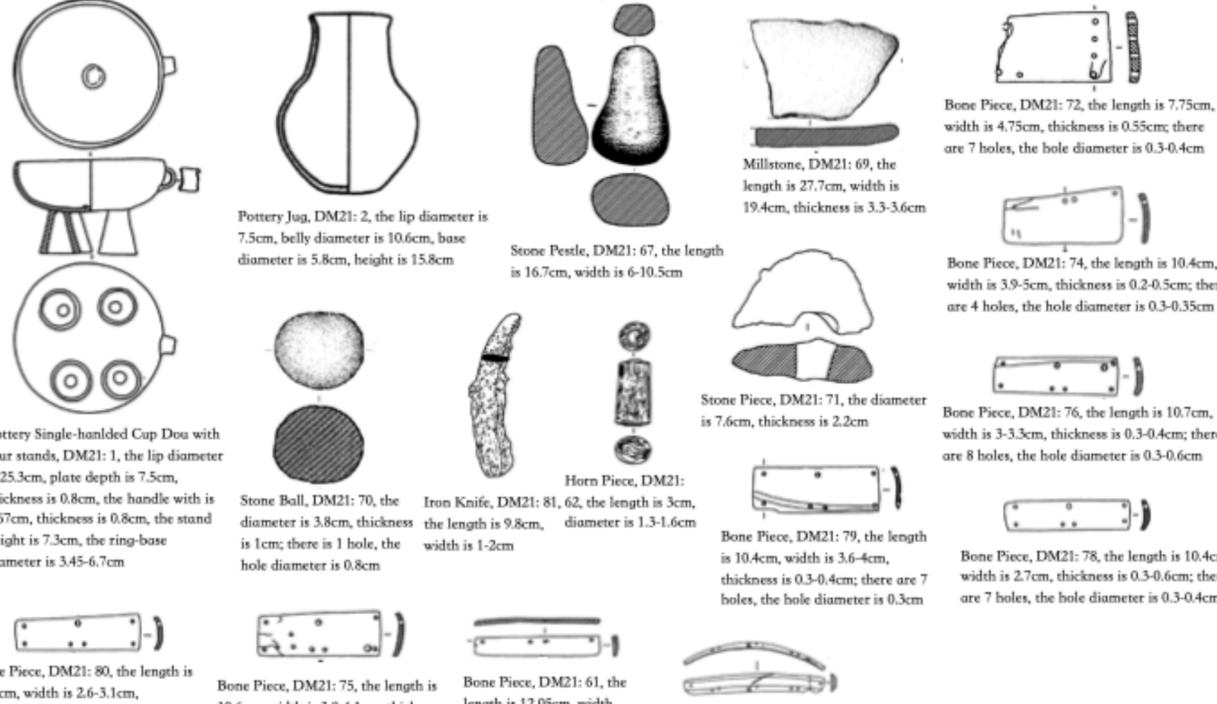
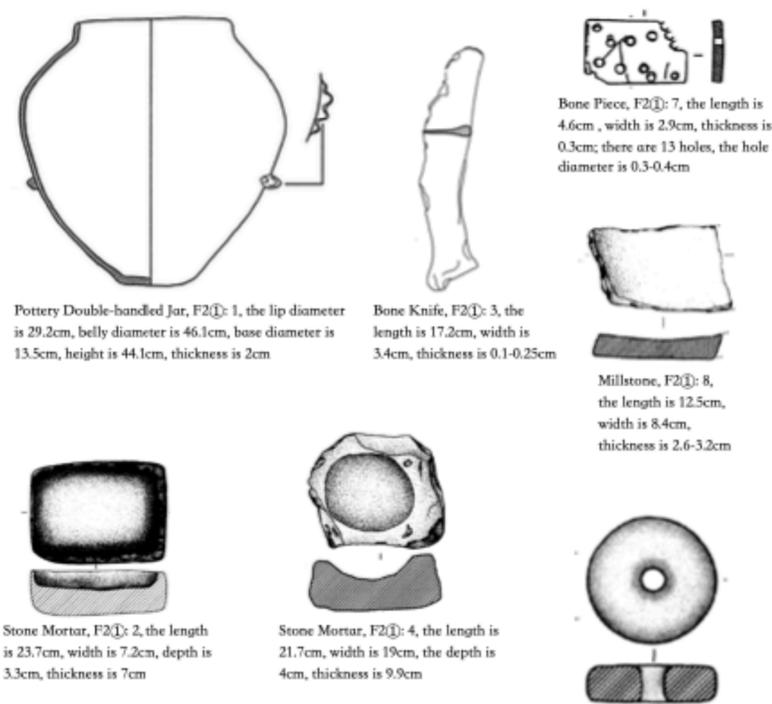
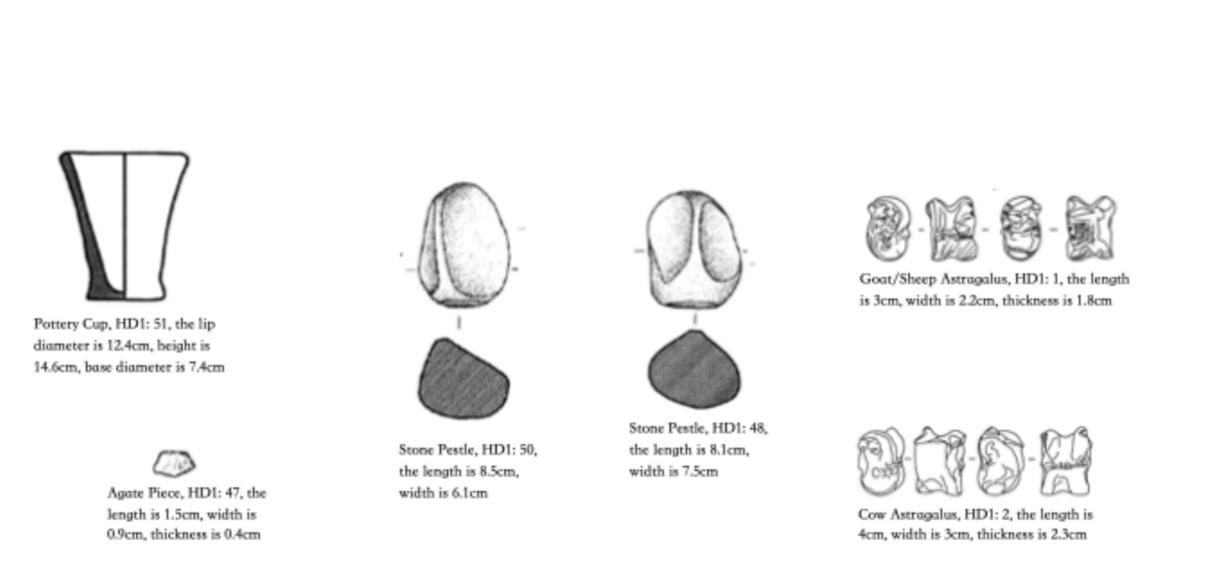
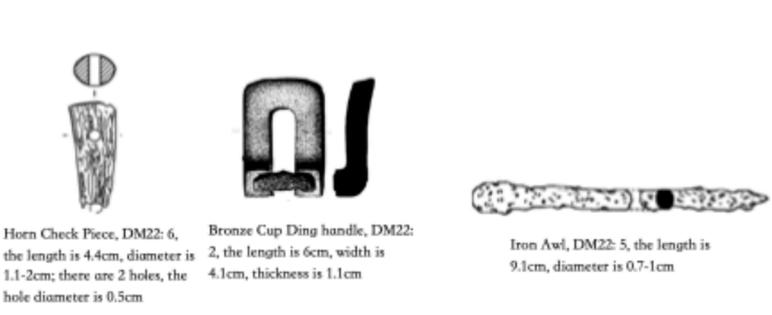
<p>DM21</p>	 <p>Pottery Jug, DM21: 2, the lip diameter is 7.5cm, belly diameter is 10.6cm, base diameter is 5.8cm, height is 15.8cm</p> <p>Pottery Single-handled Cup Dou with four stands, DM21: 1, the lip diameter is 25.3cm, plate depth is 7.5cm, thickness is 0.8cm, the handle with is 2.67cm, thickness is 0.8cm, the stand height is 7.3cm, the ring-base diameter is 3.45-6.7cm</p> <p>Stone Pestle, DM21: 67, the length is 16.7cm, width is 6-10.5cm</p> <p>Millstone, DM21: 69, the length is 27.7cm, width is 19.4cm, thickness is 3.3-3.6cm</p> <p>Bone Piece, DM21: 72, the length is 7.75cm, width is 4.75cm, thickness is 0.55cm; there are 7 holes, the hole diameter is 0.3-0.4cm</p> <p>Bone Piece, DM21: 74, the length is 10.4cm, width is 3.9-5cm, thickness is 0.2-0.5cm; there are 4 holes, the hole diameter is 0.3-0.35cm</p> <p>Stone Piece, DM21: 71, the diameter is 7.6cm, thickness is 2.2cm</p> <p>Bone Piece, DM21: 76, the length is 10.7cm, width is 3-3.3cm, thickness is 0.3-0.4cm; there are 8 holes, the hole diameter is 0.3-0.6cm</p> <p>Bone Piece, DM21: 79, the length is 10.4cm, width is 3.6-4cm, thickness is 0.3-0.4cm; there are 7 holes, the hole diameter is 0.3cm</p> <p>Bone Piece, DM21: 78, the length is 10.4cm, width is 2.7cm, thickness is 0.3-0.6cm; there are 7 holes, the hole diameter is 0.3-0.4cm</p> <p>Stone Ball, DM21: 70, the diameter is 3.8cm, thickness is 1cm; there is 1 hole, the hole diameter is 0.8cm</p> <p>Iron Knife, DM21: 81, 62, the length is 3cm, the length is 9.8cm, width is 1-2cm</p> <p>Horn Piece, DM21: 82, the length is 3cm, diameter is 1.3-1.6cm</p> <p>Bone Piece, DM21: 80, the length is 10.8cm, width is 2.6-3.1cm, thickness is 0.3cm; there are 7 holes, the hole diameter is 0.3-0.5cm</p> <p>Bone Piece, DM21: 75, the length is 10.6cm, width is 3.8-4.1cm, thickness is 0.4-0.5cm; there are 11 holes, the hole diameter is 0.3-0.57cm</p> <p>Bone Piece, DM21: 61, the length is 12.05cm, width is 2.05cm, thickness is 0.6cm; there are 4 holes, the hole diameter is 0.3cm</p> <p>Bone Piece, DM21: 28, the length is 18cm, width is 2.3cm, thickness is 0.7cm; there are 8 holes</p>	<p>F2①</p>  <p>Pottery Double-handled Jar, F2①: 1, the lip diameter is 29.2cm, belly diameter is 46.1cm, base diameter is 13.5cm, height is 44.1cm, thickness is 2cm</p> <p>Bone Knife, F2①: 3, the length is 17.2cm, width is 3.4cm, thickness is 0.1-0.25cm</p> <p>Millstone, F2①: 8, the length is 12.5cm, width is 8.4cm, thickness is 2.6-3.2cm</p> <p>Stone Mortar, F2①: 2, the length is 23.7cm, width is 7.2cm, depth is 3.3cm, thickness is 7cm</p> <p>Stone Mortar, F2①: 4, the length is 21.7cm, width is 19cm, the depth is 4cm, thickness is 9.9cm</p> <p>Bone Piece, F2①: 7, the length is 4.6cm, width is 2.9cm, thickness is 0.3cm; there are 13 holes, the hole diameter is 0.3-0.4cm</p> <p>Stone Spinning Wheel, F2①: 6, the diameter is 3.8cm, thickness is 1cm, the hole diameter is 0.8cm</p>
<p>HD1</p>	 <p>Pottery Cup, HD1: 51, the lip diameter is 12.4cm, height is 14.6cm, base diameter is 7.4cm</p> <p>Agate Piece, HD1: 47, the length is 1.5cm, width is 0.9cm, thickness is 0.4cm</p> <p>Stone Pestle, HD1: 50, the length is 8.5cm, width is 6.1cm</p> <p>Stone Pestle, HD1: 48, the length is 8.1cm, width is 7.5cm</p> <p>Goat/Sheep Astragalus, HD1: 1, the length is 3cm, width is 2.2cm, thickness is 1.8cm</p> <p>Cow Astragalus, HD1: 2, the length is 4cm, width is 3cm, thickness is 2.3cm</p>	<p>DM22</p>  <p>Horn Check Piece, DM22: 6, the length is 4.4cm, diameter is 1.1-2cm; there are 2 holes, the hole diameter is 0.5cm</p> <p>Bronze Cup Ding handle, DM22: 2, the length is 6cm, width is 4.1cm, thickness is 1.1cm</p> <p>Iron Awl, DM22: 5, the length is 9.1cm, diameter is 0.7-1cm</p> <p>HD3</p>  <p>Goat/Sheep Astragalus, HD3: 40, the length is 3cm, width is 1.6cm, thickness is 1.9cm</p> <p>Goat/Sheep Astragalus, HD3: 38, the length is 3cm, width is 1.9cm, thickness is 1.9cm</p>

Fig. 5.1.2.1-20

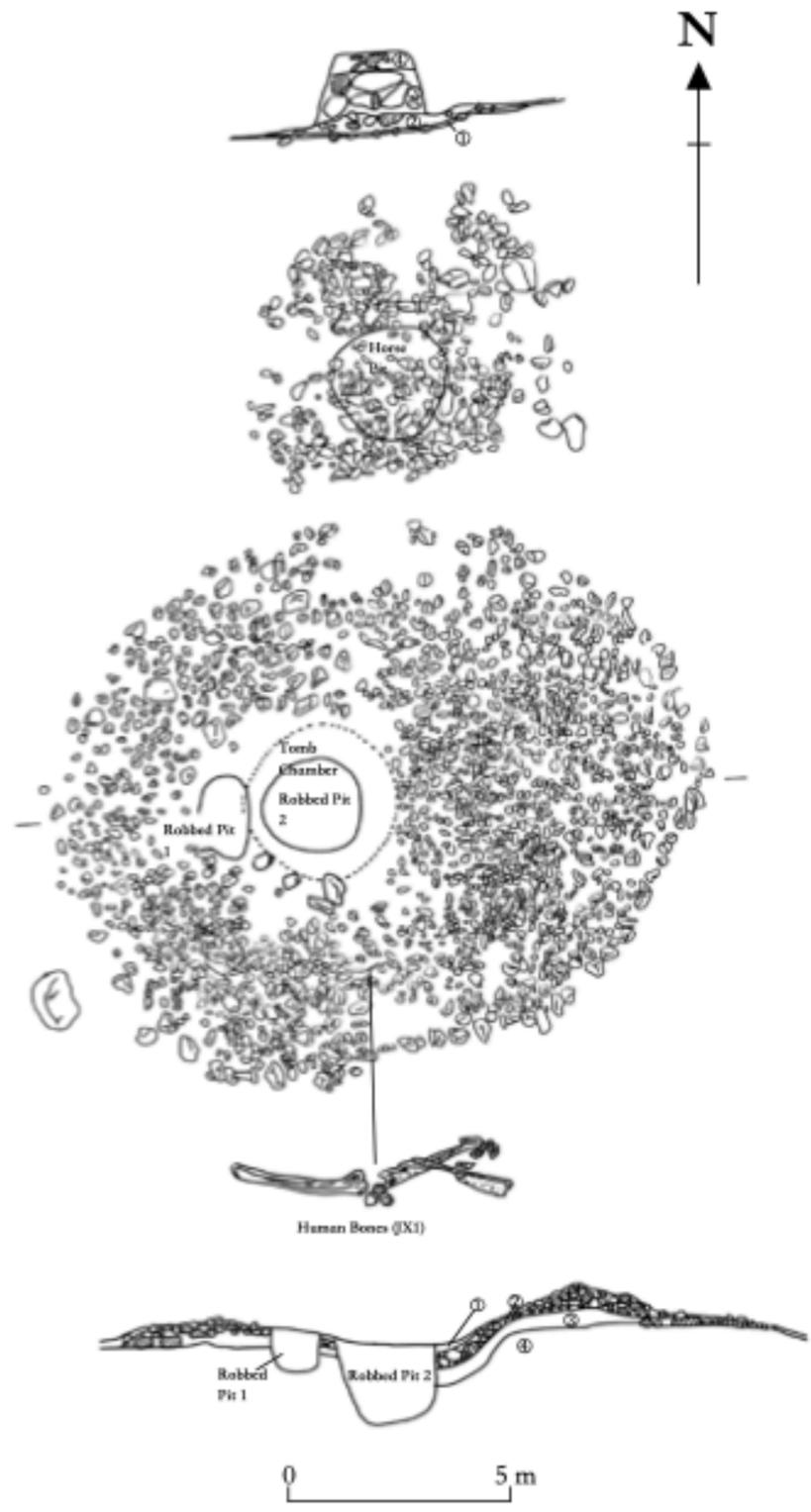


Fig. 5.1.2.2-1

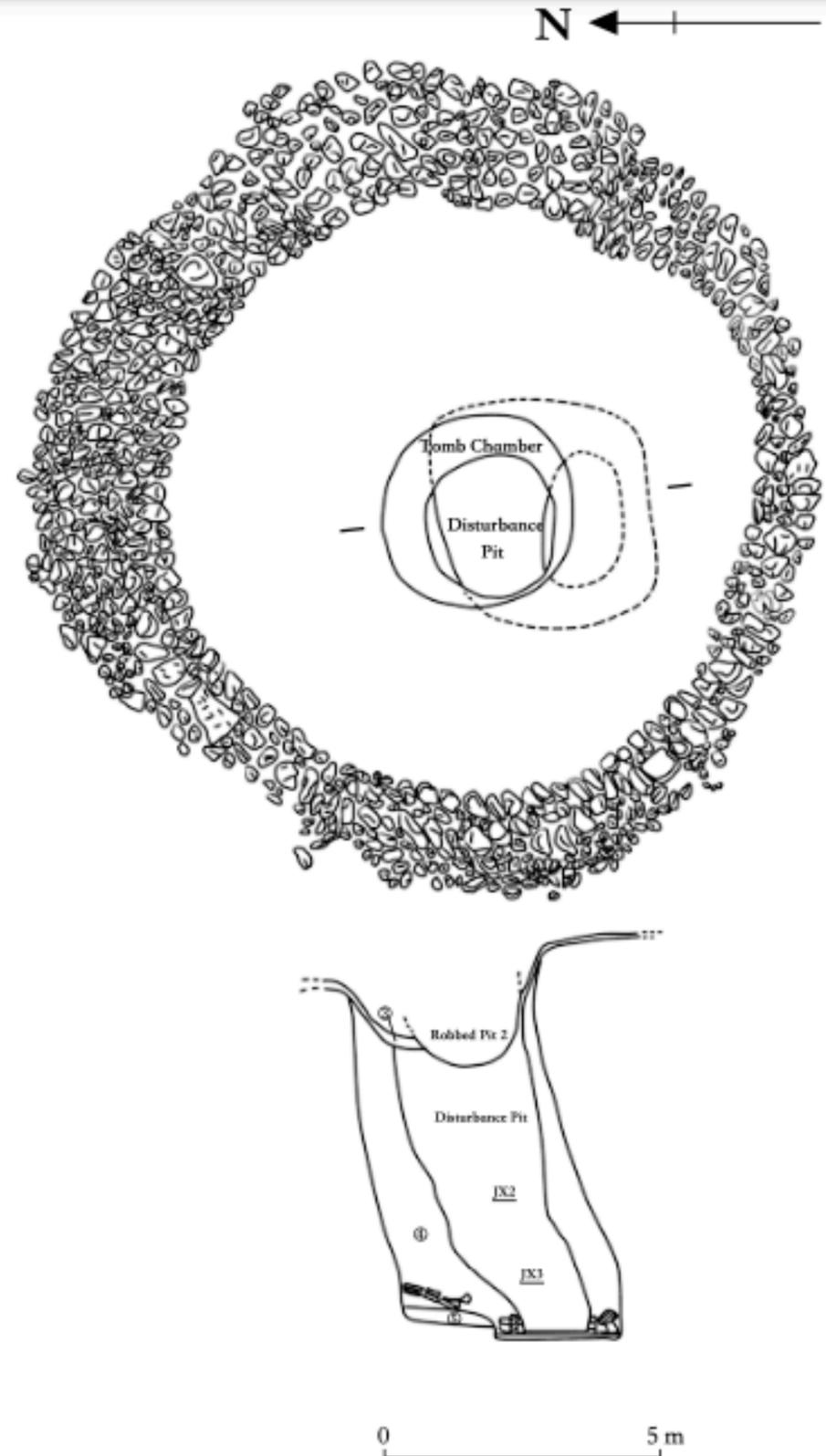


Fig. 5.1.2.2-2

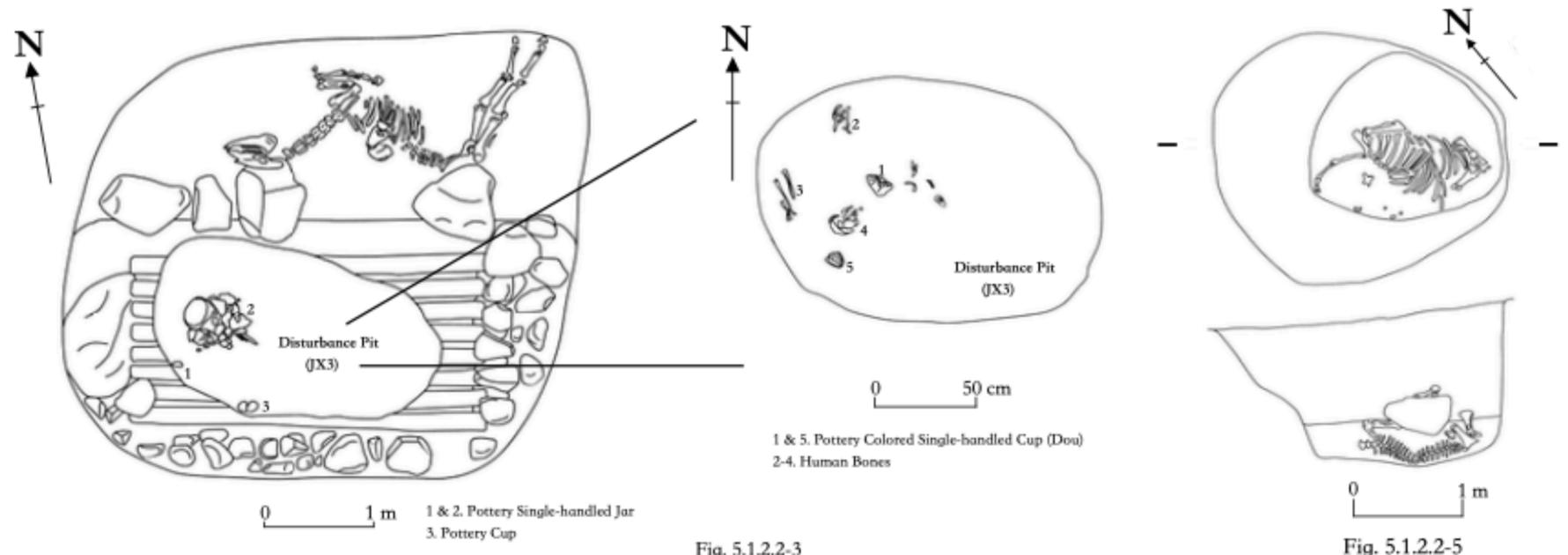


Fig. 5.1.2.2-3

Fig. 5.1.2.2-5

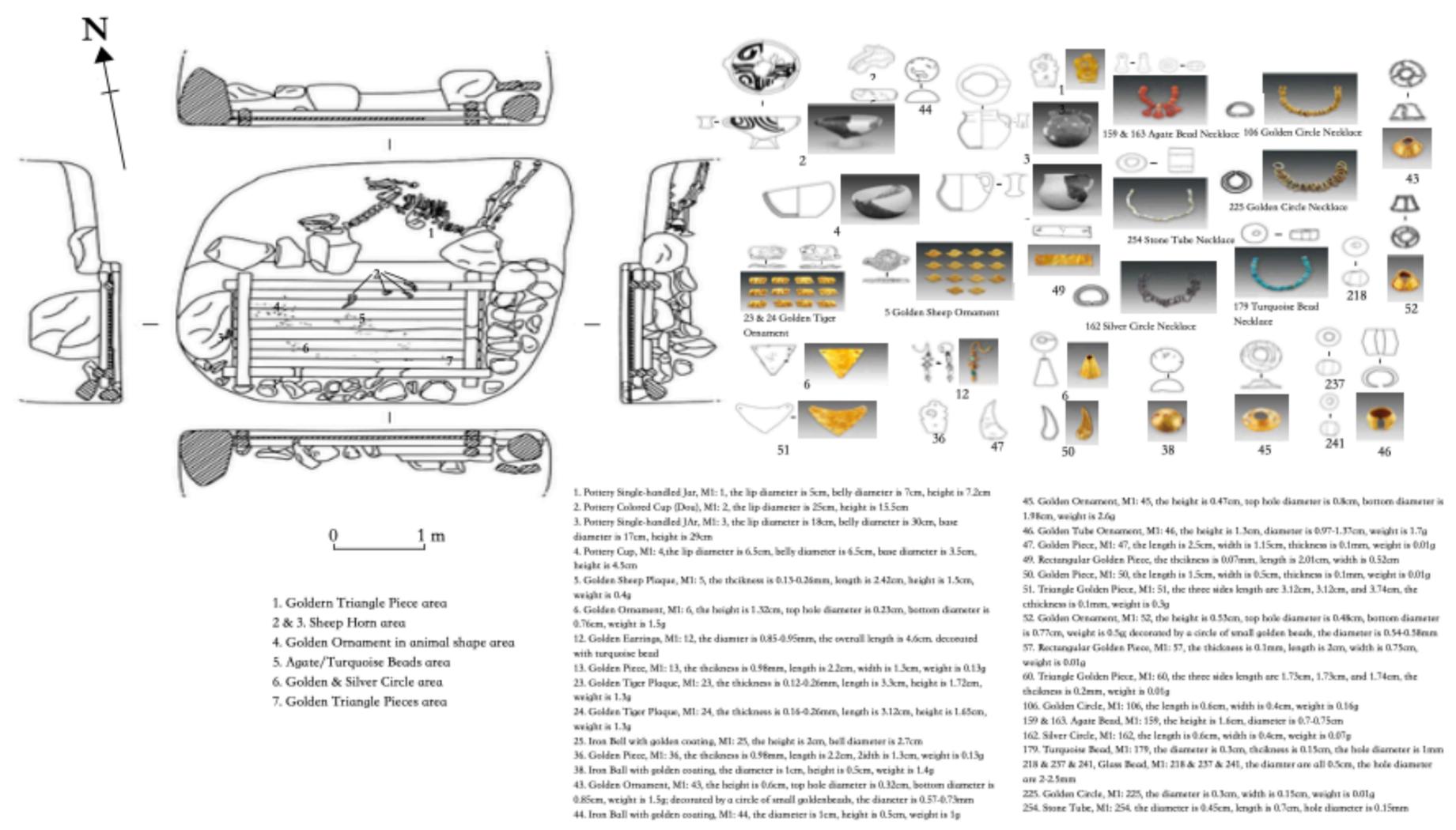


Fig. 5.1.2.2-4

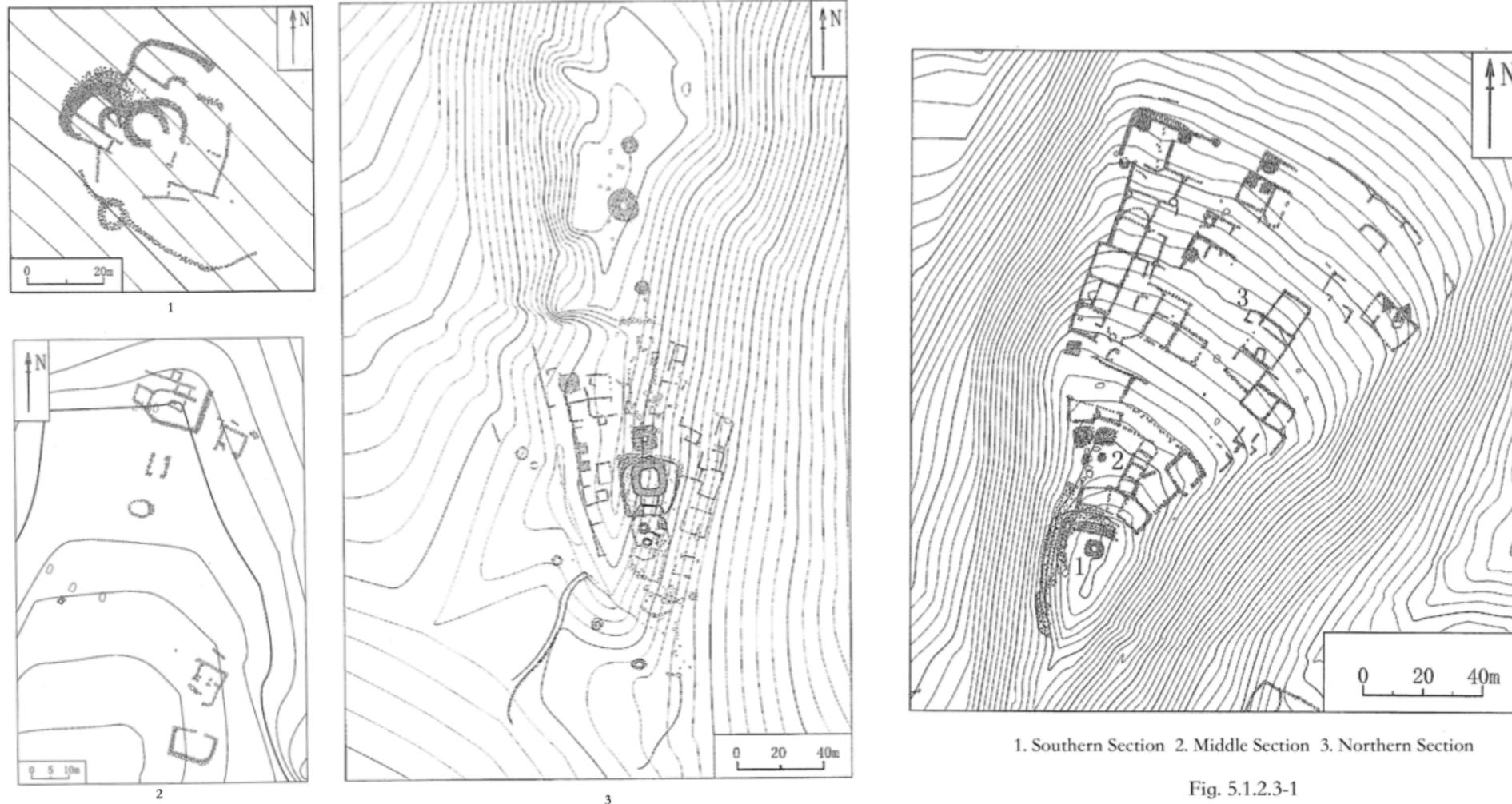


Fig. 5.1.2.3-1

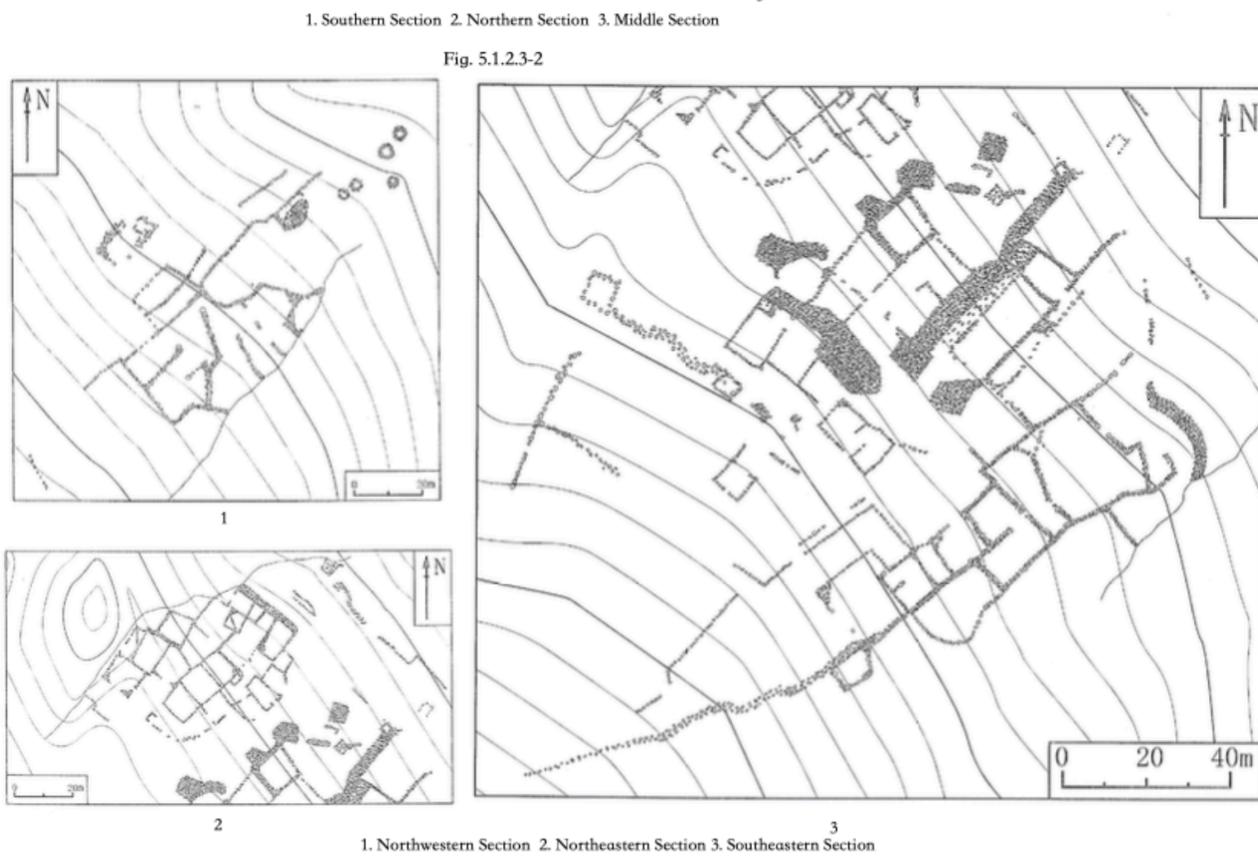


Fig. 5.1.2.3-2

Fig. 5.1.2.3-3

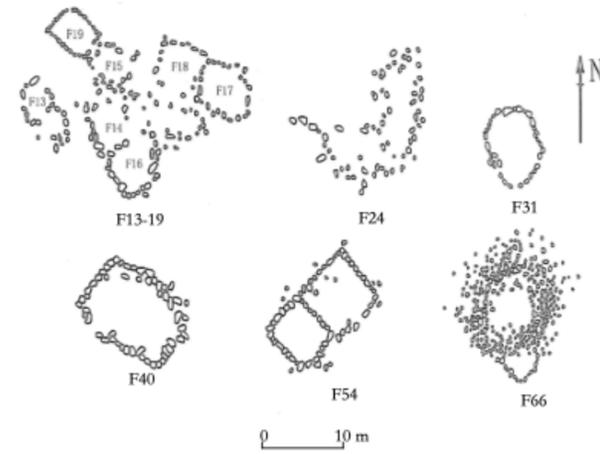


Fig. 5.1.2.3-4

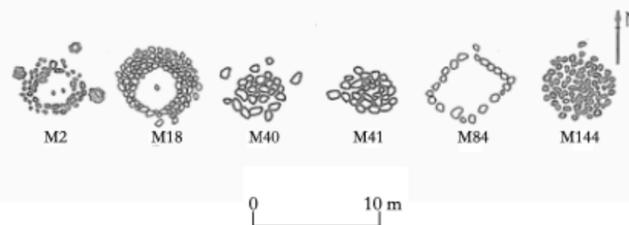


Fig. 5.1.2.3-5

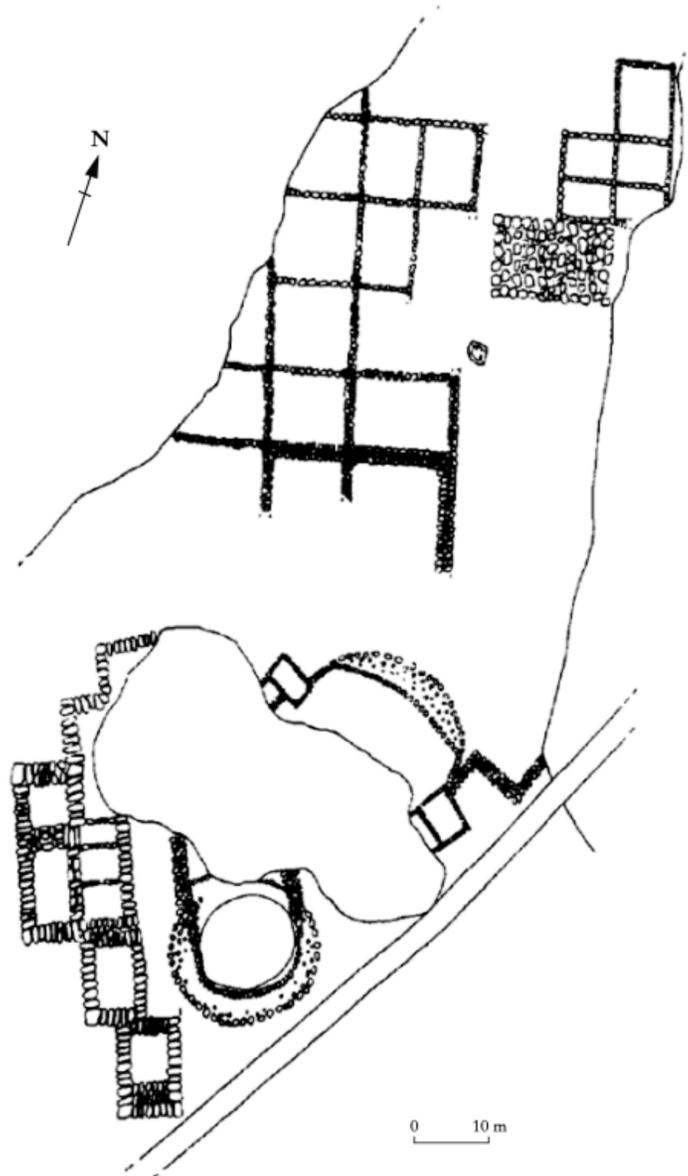


Fig. 5.1.2.4-1

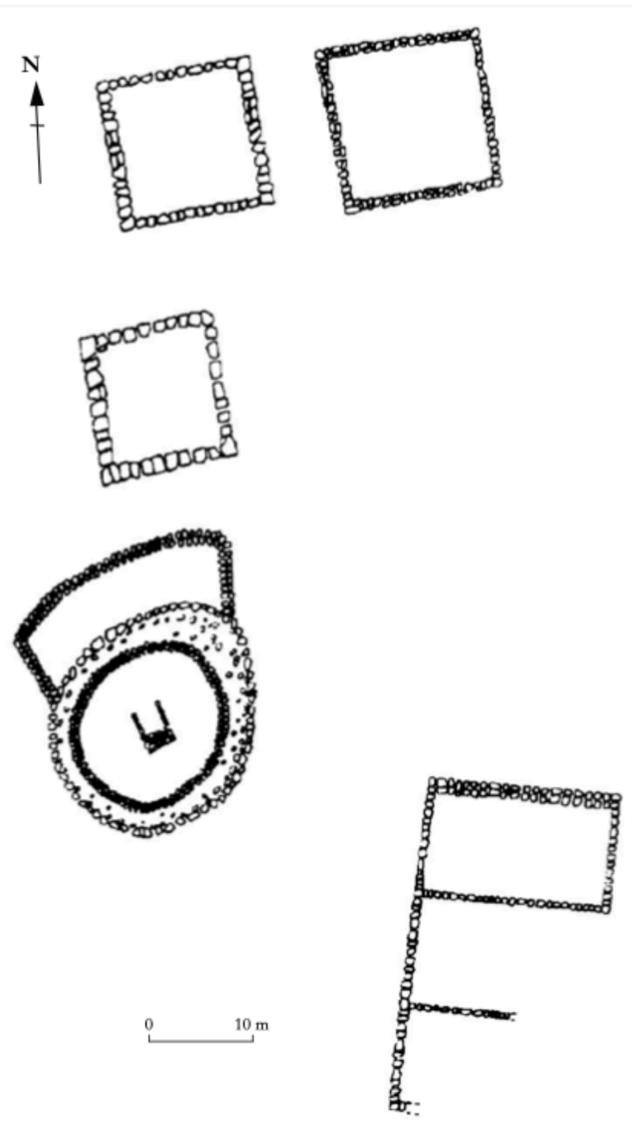


Fig. 5.1.2.4-2

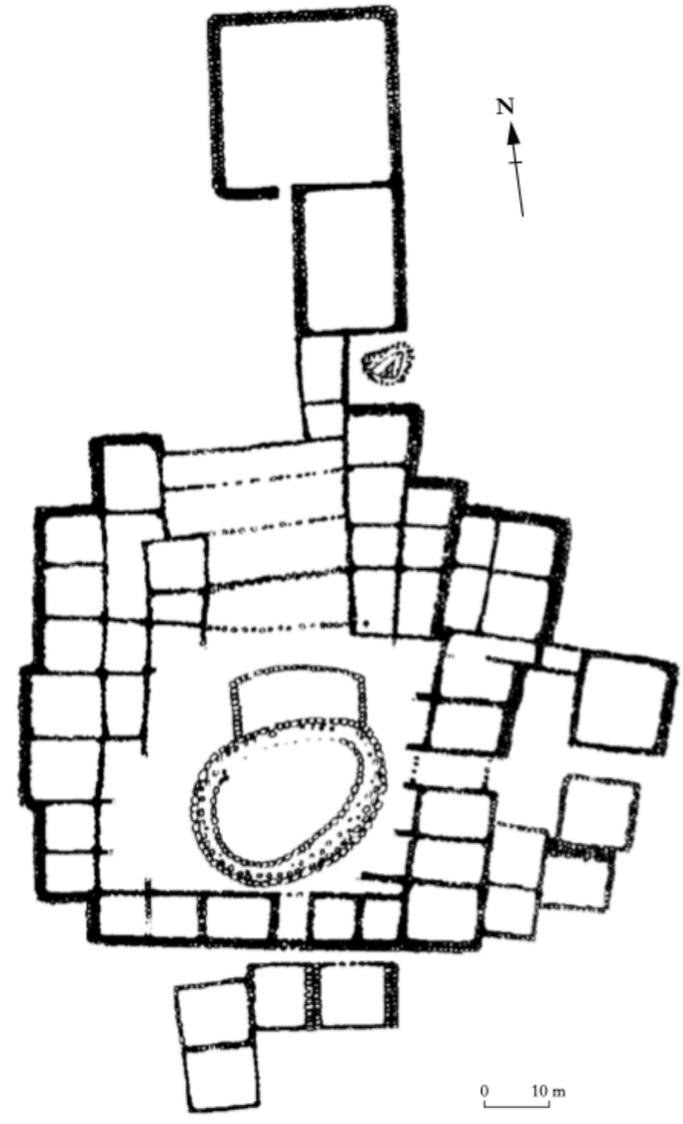
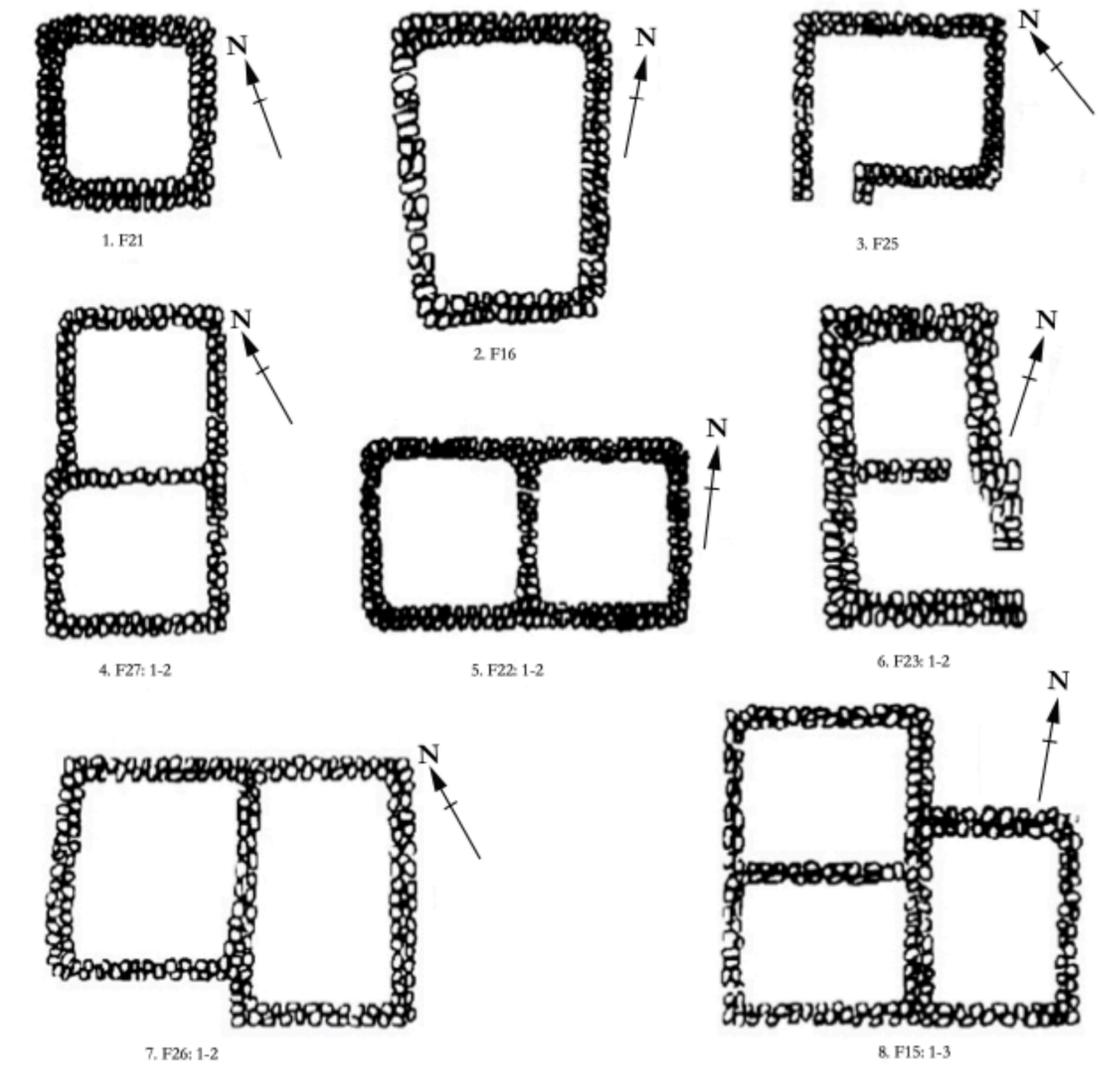
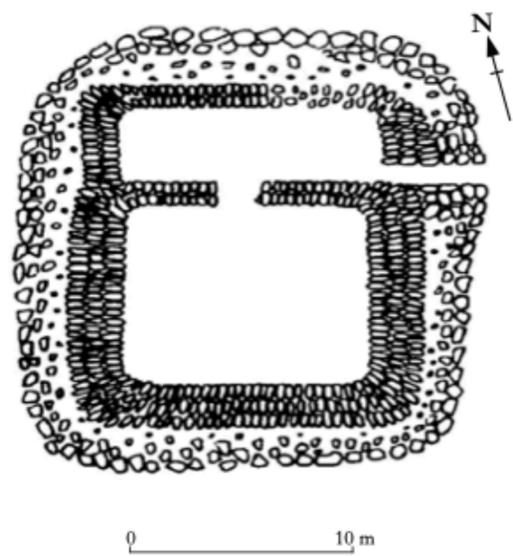


Fig. 5.1.2.4-3



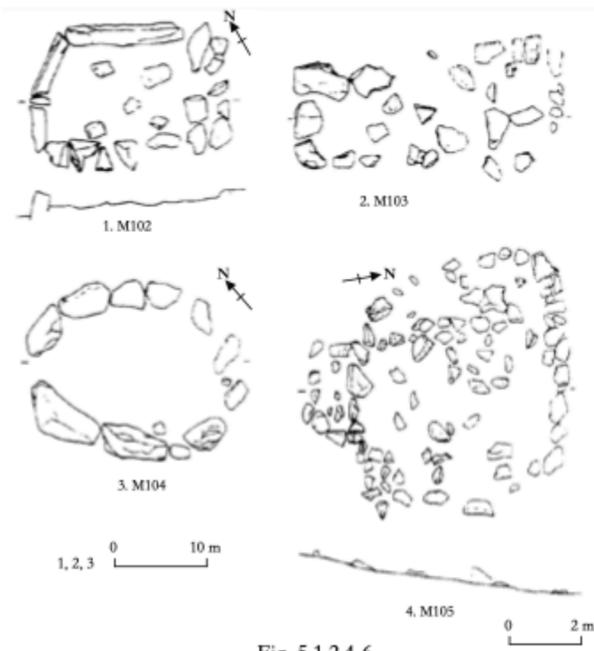
1, 2, 4, 5 0 4 m

Fig. 5.1.2.4-4 3, 6, 7, 8 0 10 m



0 10 m

Fig. 5.1.2.4-5



1, 2, 3 0 10 m

Fig. 5.1.2.4-6 0 2 m

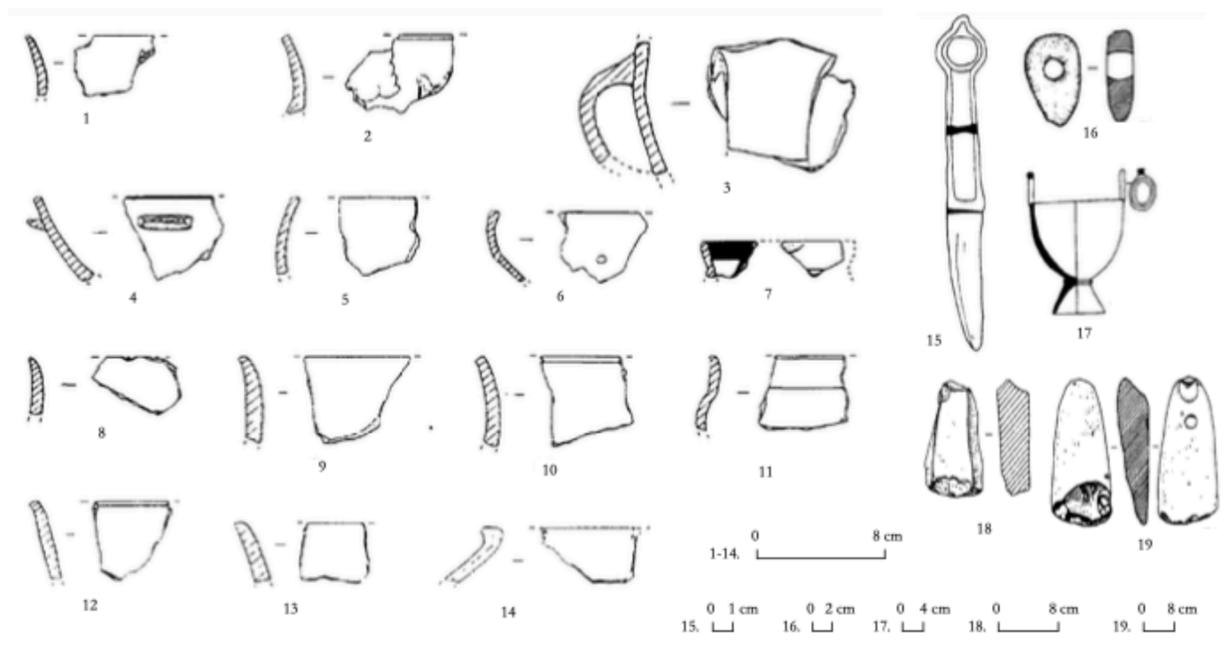


Fig. 5.1.2.4-8

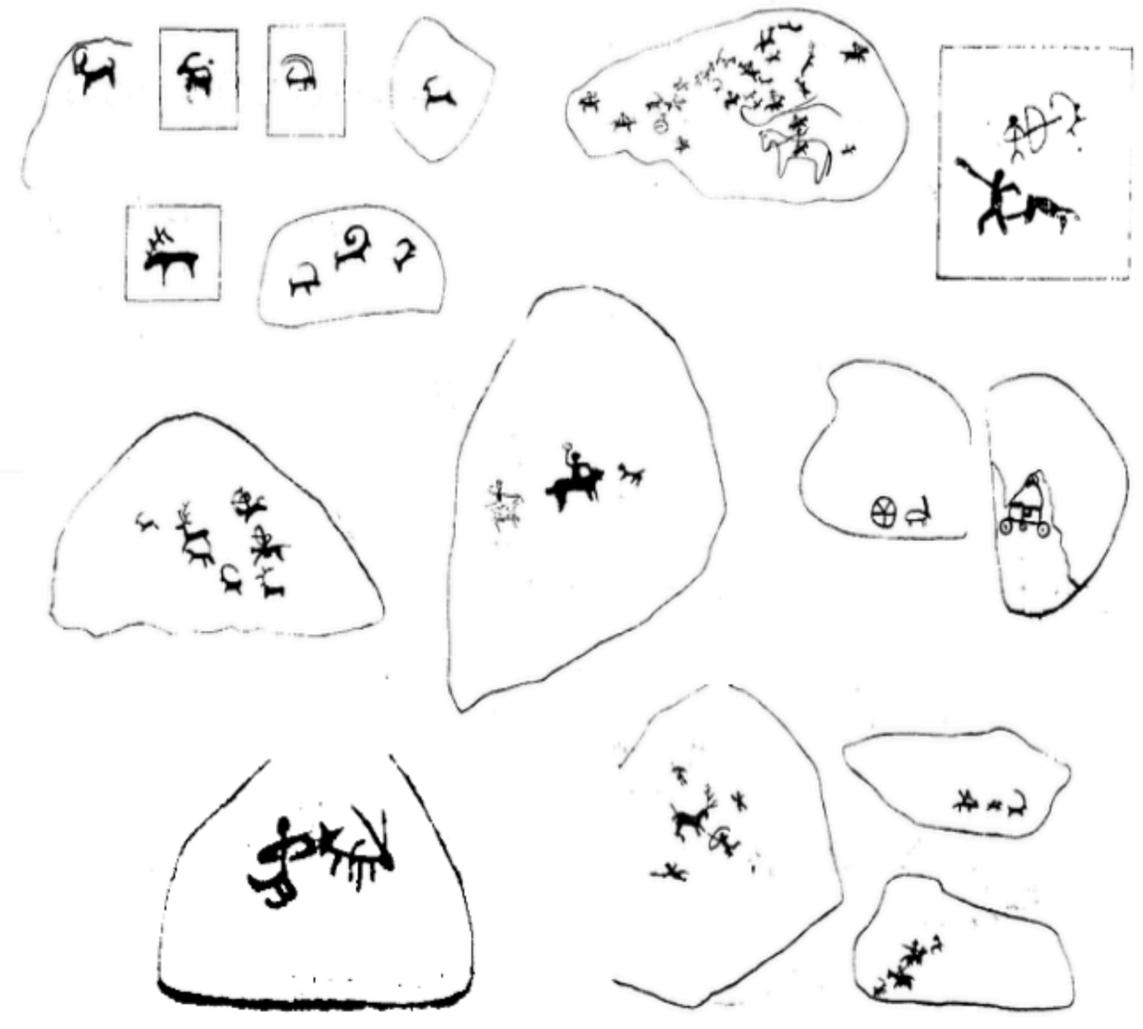


Fig. 5.1.2.4-7

M66

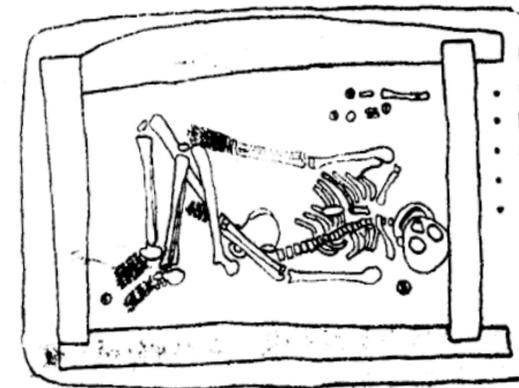
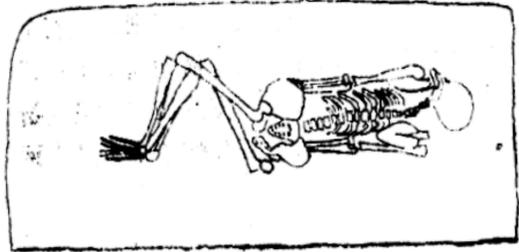
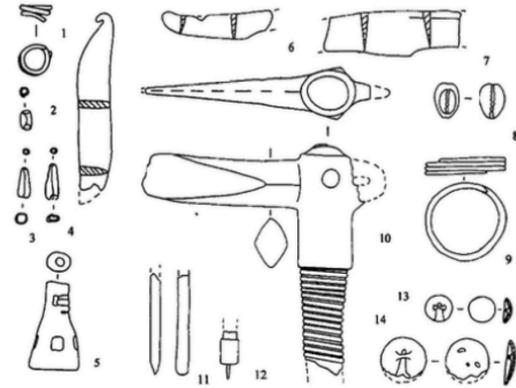


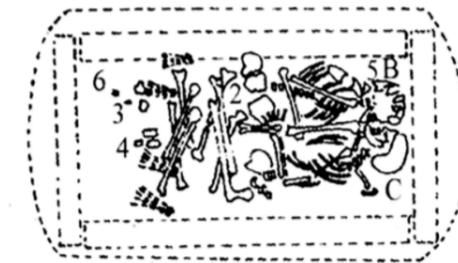
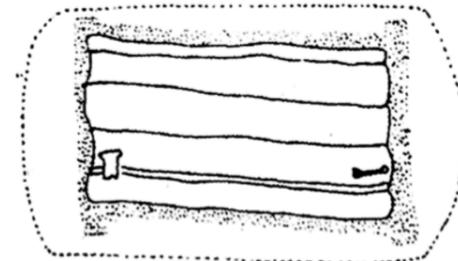
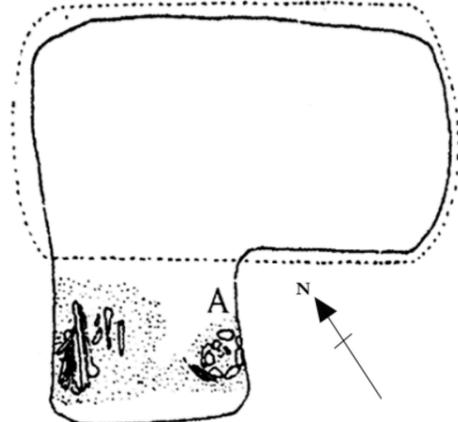
Fig. 5.1.2.5-1



1 & 9. Bronze Circle 2-4. Bronze Roll 5. Bronze Bell 6 & 7. Bronze Knife 8. Cowry 10. Bronze Axe 11. Bronze Axe 12. Bronze Awl 13 & 14. Bronze Button

Fig. 5.1.2.5-3

M95



0 20 cm

1 & 5. Bronze Earring, the diameter is 0.2-0.3cm
2. Bone Tube, the length is 7.8cm, diameter is 1.1-2cm
3. Bronze Ornament, the length is 1.35cm, diameter is 0.4-0.65cm
4. Pottery Jar
6. Bronze Button, the diameter is 1.1cm, thickness is 0.3cm

Fig. 5.1.2.5-2

Phase I	Phase II	Phase III
	<p data-bbox="2000 1094 2116 1119">Early Phase</p>	
	<p data-bbox="2000 1486 2116 1512">Late Phase</p>	

Fig. 5.1.2.5-4

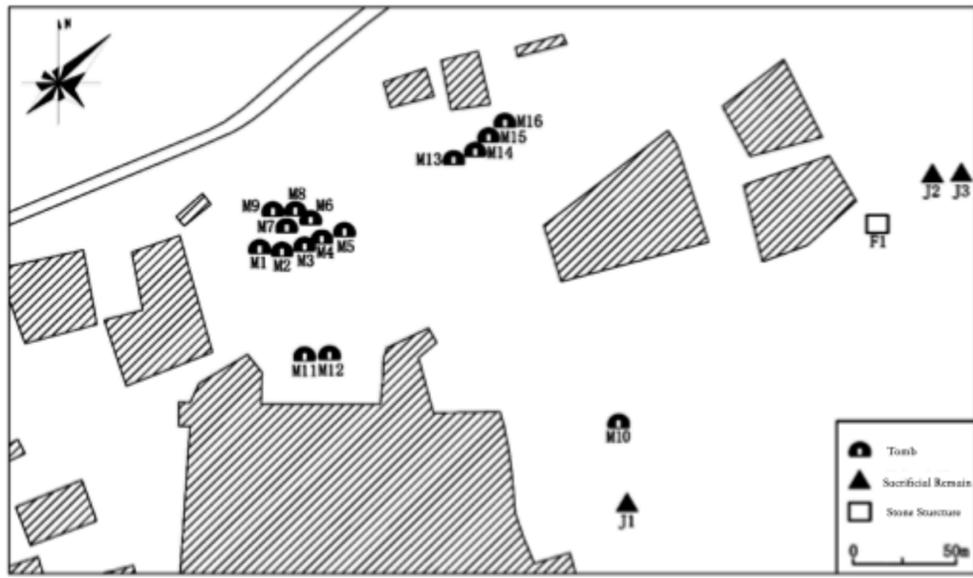


Fig. 5.1.2.6-1

M16

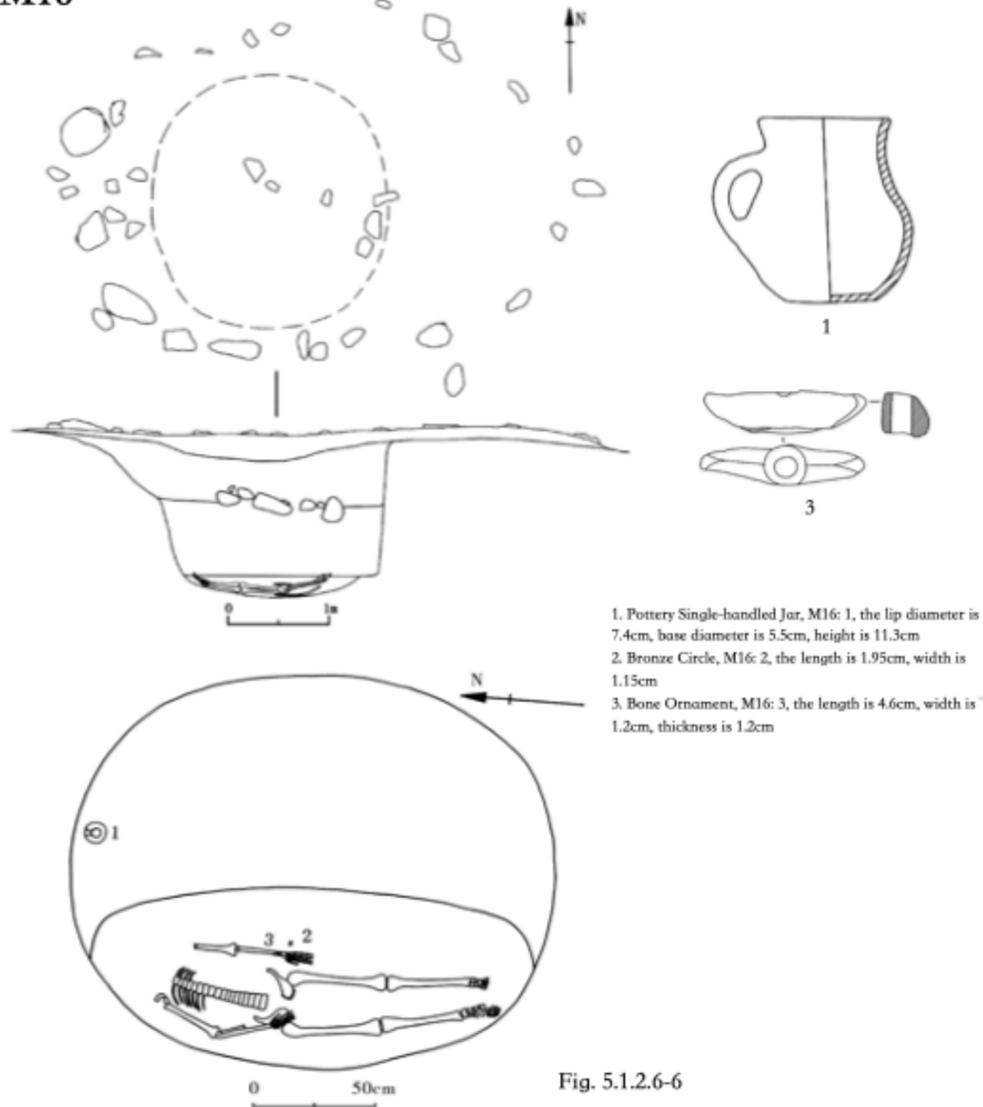


Fig. 5.1.2.6-6

M5

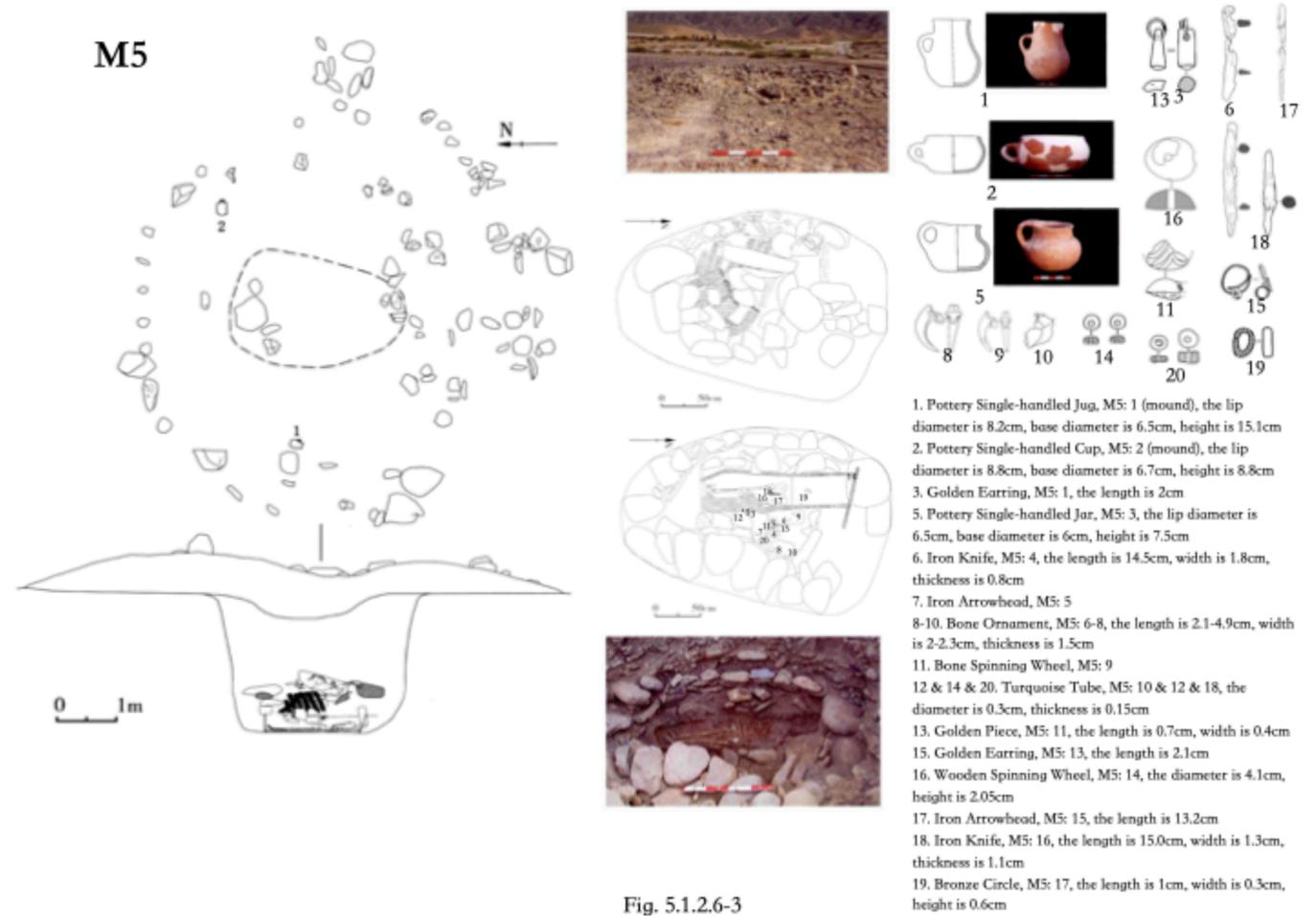


Fig. 5.1.2.6-3

M14

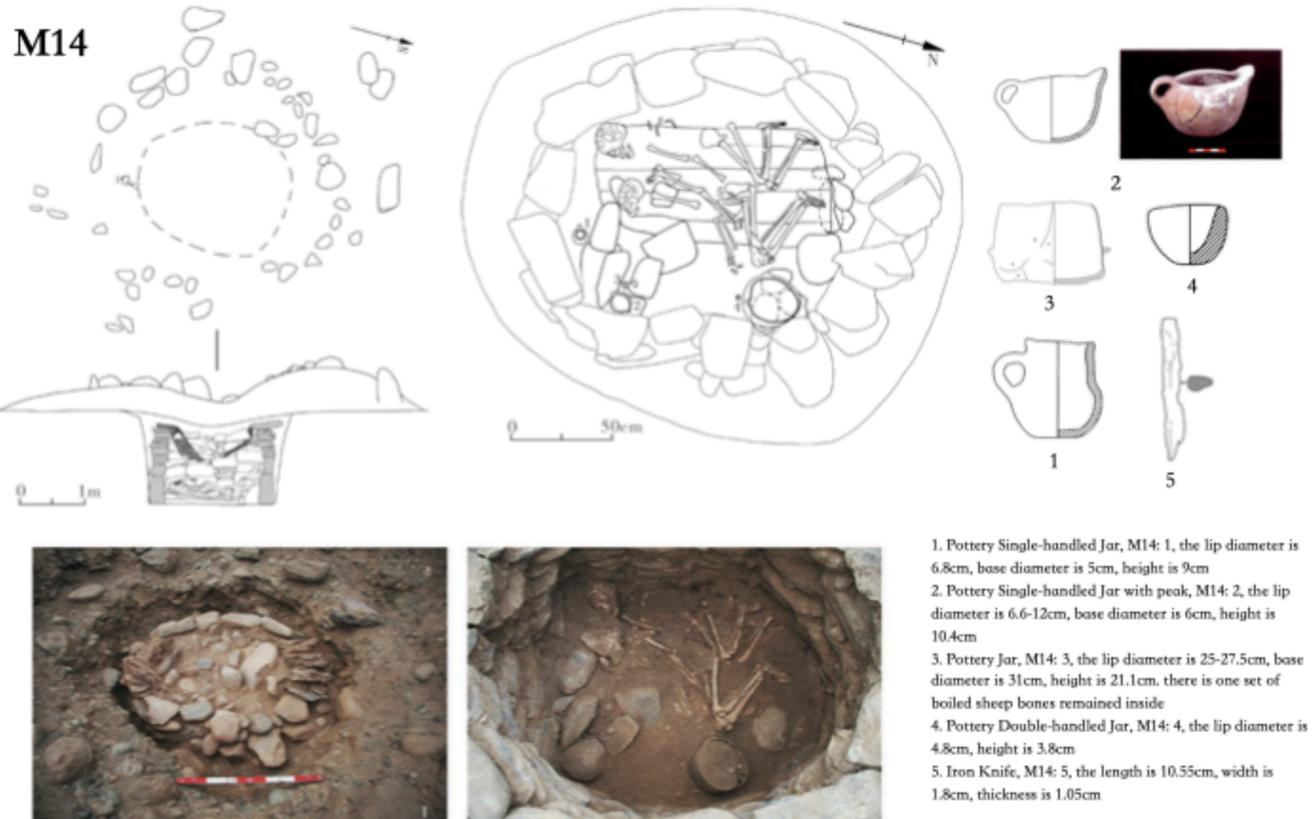


Fig. 5.1.2.6-5



Fig. 5.1.2.6-2

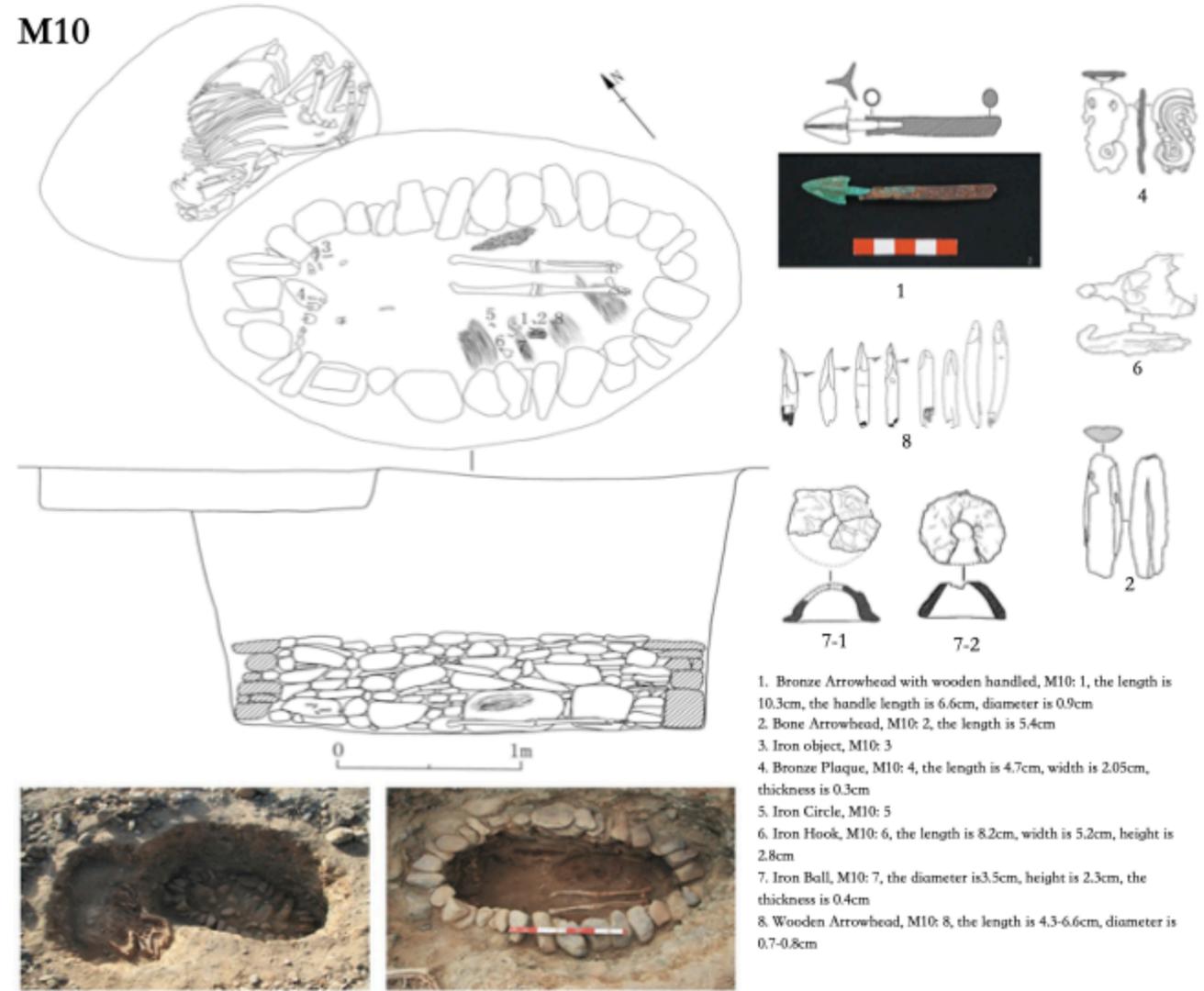


Fig. 5.1.2.6-4

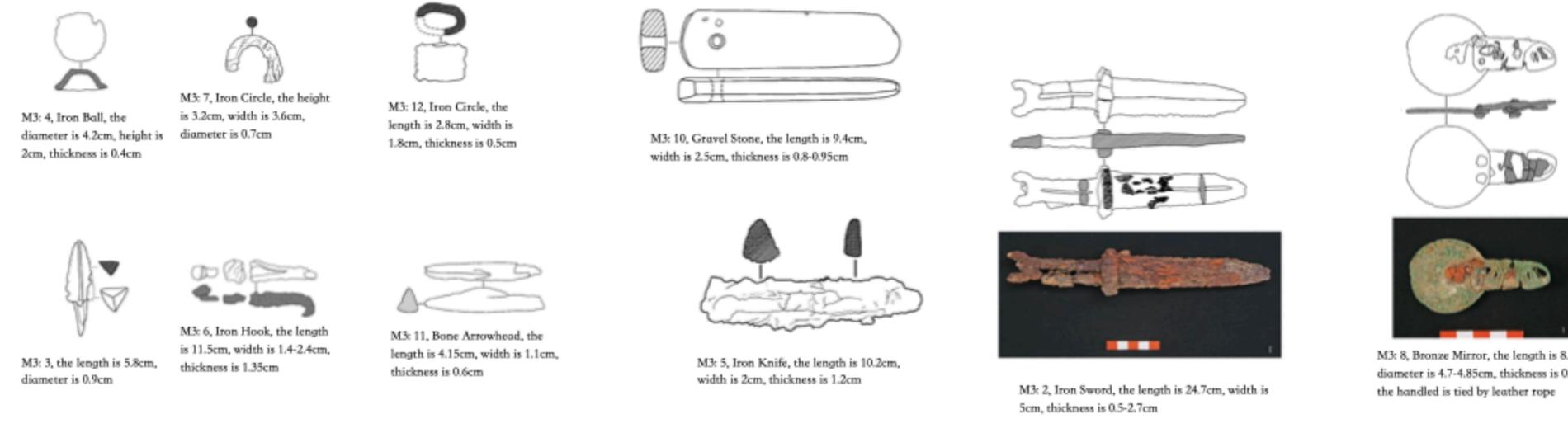
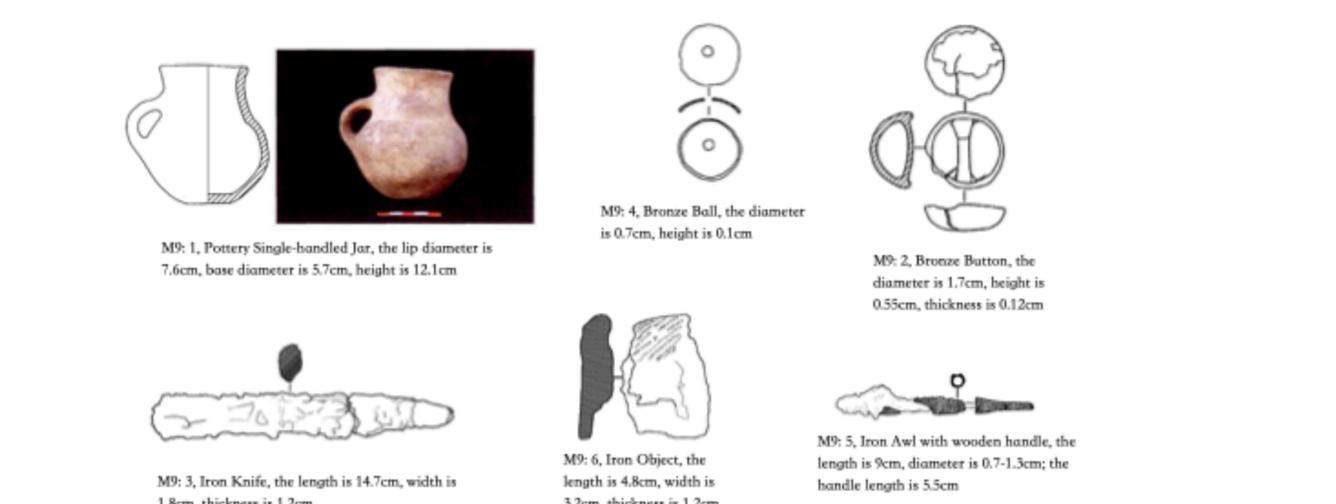
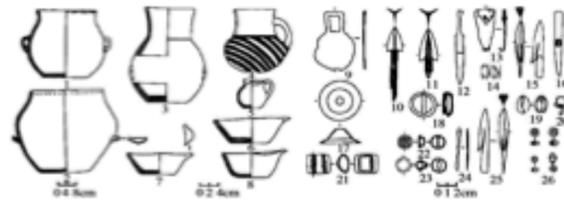
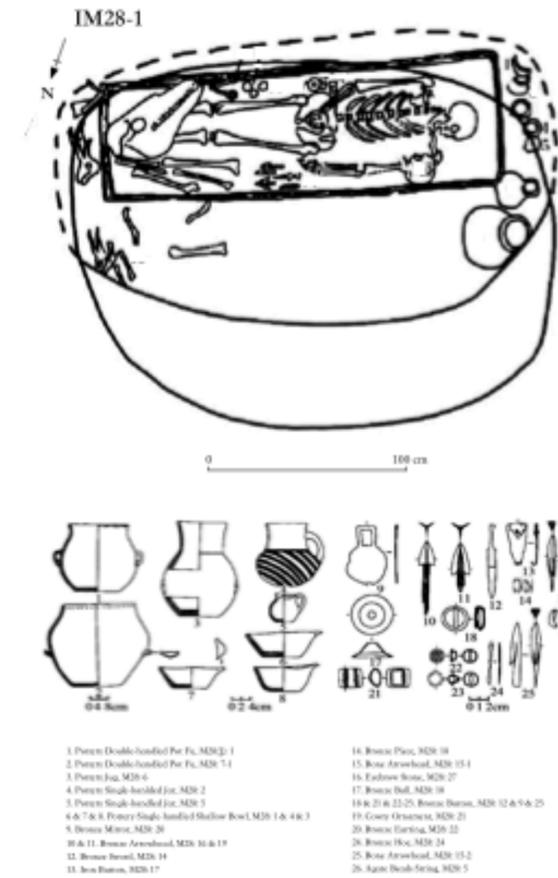
<p>M3</p>	 <p>M3: 4, Iron Ball, the diameter is 4.2cm, height is 2cm, thickness is 0.4cm</p> <p>M3: 7, Iron Circle, the height is 3.2cm, width is 3.6cm, diameter is 0.7cm</p> <p>M3: 12, Iron Circle, the length is 2.8cm, width is 1.8cm, thickness is 0.5cm</p> <p>M3: 10, Gravel Stone, the length is 9.4cm, width is 2.5cm, thickness is 0.8-0.95cm</p> <p>M3: 3, the length is 5.8cm, diameter is 0.9cm</p> <p>M3: 6, Iron Hook, the length is 11.5cm, width is 1.4-2.4cm, thickness is 1.35cm</p> <p>M3: 11, Bone Arrowhead, the length is 4.15cm, width is 1.1cm, thickness is 0.6cm</p> <p>M3: 5, Iron Knife, the length is 10.2cm, width is 2cm, thickness is 1.2cm</p> <p>M3: 2, Iron Sword, the length is 24.7cm, width is 5cm, thickness is 0.5-2.7cm</p> <p>M3: 8, Bronze Mirror, the length is 8.8cm, diameter is 4.7-4.85cm, thickness is 0.35cm; the handled is tied by leather rope</p>		
<p>M15</p>	 <p>M15: 2, Pottery Single-handled Jar, the lip diameter is 5.6cm, base diameter is 4cm, height is 7.8cm</p> <p>M15: 4, Pottery Single-handled Jar, the lip diameter is 6.5cm, base diameter is 6cm, height is 10.6cm</p> <p>M15: 5, Pottery Cup, the lip diameter is 12.7cm, base diameter is 9.5cm, height is 11.1cm</p> <p>M15: 1, Pottery Cup, the lip diameter is 11.5cm, base diameter is 7.2cm, height is 7.7cm</p> <p>M15: 3, Pottery Single-handled Jar, the lip diameter is 5.5cm, base diameter is 6cm, height is 8.9cm</p> <p>M15: 1, Bronze Mirror, the length is 9.9cm, diameter is 8.1cm, thickness is 0.25cm</p> <p>M15: 4, Turquoise Tube, the length is 0.85-1.6cm, diameter is 0.5-0.95cm</p> <p>M15: 5, Bone Tube, the length is 0.5-1.2cm, diameter is 0.42-0.58cm</p>	<p>M2</p>	 <p>M2: 1, Pottery Single-handled Jar, the lip diameter is 6.2cm, base diameter is 3.7cm, height is 6.1cm</p>
<p>M9</p>	 <p>M9: 1, Pottery Single-handled Jar, the lip diameter is 7.6cm, base diameter is 5.7cm, height is 12.1cm</p> <p>M9: 4, Bronze Ball, the diameter is 0.7cm, height is 0.1cm</p> <p>M9: 2, Bronze Button, the diameter is 1.7cm, height is 0.55cm, thickness is 0.12cm</p> <p>M9: 3, Iron Knife, the length is 14.7cm, width is 1.8cm, thickness is 1.2cm</p> <p>M9: 6, Iron Object, the length is 4.8cm, width is 3.2cm, thickness is 1.2cm</p> <p>M9: 5, Iron Awl with wooden handle, the length is 9cm, diameter is 0.7-1.3cm; the handle length is 5.5cm</p>	<p>M12</p>	 <p>M12: 1, Agate Bead, the height is 1.2cm, width is 0.95cm</p>  <p>M12: 2, Iron Knife, the length is 16.5cm, width is 1.4-1.7cm, thickness is 1.2cm</p>
		<p>M13</p>	 <p>M13: 1, Iron Knife, the length is 8.8cm, width is 2cm, thickness is 1.4cm</p>

Fig. 5.1.2.6-7

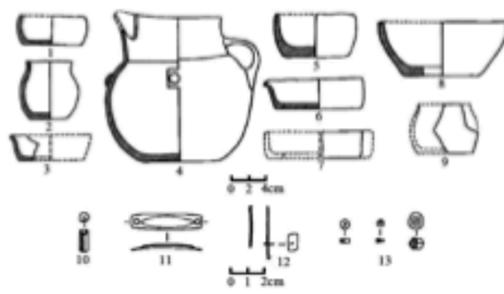
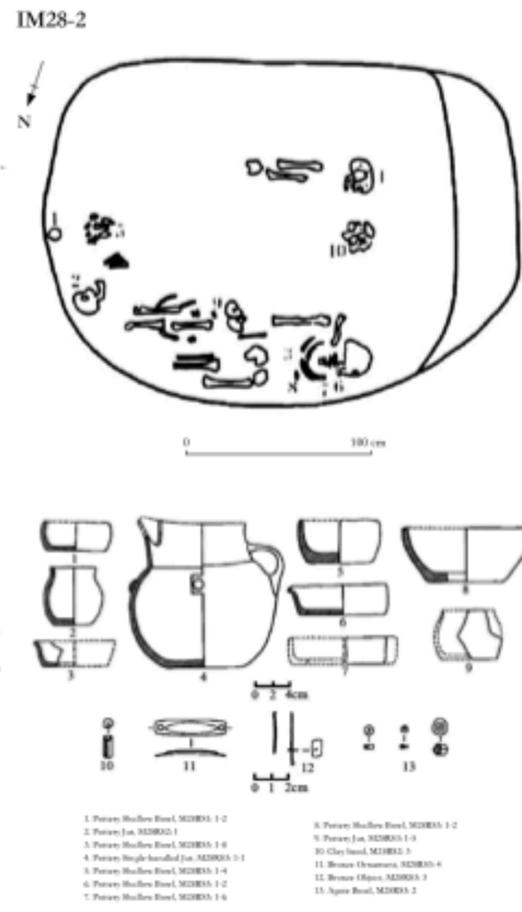


Fig. 5.1.2.7-1



1. Pottery Double-handled Pot Fu, IM28-1
2. Pottery Double-handled Pot Fu, IM28-1
3. Pottery Jug, IM28-6
4. Pottery Single-handled Jar, IM28-2
5. Pottery Single-handled Jar, IM28-3
- 6, 7, 8 & 9. Pottery Single-handled Shallow Bowl, IM28-1, 4, 4&7
10. Bronze Mirror, IM28-20
- 10A & 11. Bronze Arrowhead, IM28-10 & 17
12. Bronze Bead, IM28-14
13. Bone Bead, IM28-17
14. Bronze Pin, IM28-18
15. Bone Arrowhead, IM28-15, 1
16. Eyedown Stone, IM28-27
17. Bronze Nail, IM28-28
- 18 & 21 & 22 & 25. Bronze Bead, IM28-12 & 9 & 25
19. Ivory Ornament, IM28-23
20. Bronze Ear Ring, IM28-22
24. Bronze Hoop, IM28-34
25. Bone Arrowhead, IM28-13, 2
26. Ivory Tooth String, IM28-5
14. Bronze Pin, IM28-18
15. Bone Arrowhead, IM28-15, 1
16. Eyedown Stone, IM28-27
17. Bronze Nail, IM28-28
- 18 & 21 & 22 & 25. Bronze Bead, IM28-12 & 9 & 25
19. Ivory Ornament, IM28-23
20. Bronze Ear Ring, IM28-22
24. Bronze Hoop, IM28-34
25. Bone Arrowhead, IM28-13, 2
26. Ivory Tooth String, IM28-5

Fig. 5.1.2.7-21



1. Pottery Shallow Bowl, IM28-1, 1-2
2. Pottery Jar, IM28-20, 1
3. Pottery Shallow Bowl, IM28-10, 1-4
4. Pottery Single-handled Jar, IM28-10, 1-1
5. Pottery Shallow Bowl, IM28-10, 1-4
6. Pottery Shallow Bowl, IM28-10, 1-2
7. Pottery Shallow Bowl, IM28-10, 1-6
8. Pottery Shallow Bowl, IM28-10, 1-2
9. Pottery Jar, IM28-10, 1-1
10. Clay Bead, IM28-10, 5
11. Bronze Urn-neck, IM28-10, 4
12. Bronze Hoop, IM28-10, 1
13. Ivory Tooth String, IM28-10, 2

Fig. 5.1.2.7-22

IM1	 Pottery Single-handled Jar, IM1-3	 Bronze Knife, IM1-7	 Pottery Shallow Bowl, IM1-4	IM21	 Pottery Double-handled Pot Fu, IM21-1	 Bronze Hoop (Phibos), IM21-9	 Bronze Sword, IM21-11
IM2	 Pottery Single-handled Jar, IM2-3	 Pottery Double-handled Jar, IM2-4	 Pottery Single-handled Jar, IM2-5	IM22	 Bronze Mirror, IM22-6	 Bronze Bell, IM22-3	 Bronze Arrowhead, IM22-7
IM3	 Clay Bead String, IM3-1&3	 Iron Knife, IM3-7		IM25	 Bronze Mirror, IM25-4	 Bronze Arrowhead, IM25-3	 Bronze Knife, IM25-9
IM4	 Bronze Pin, IM4-1	 Bronze Nail, IM4-27		IM24	 Bronze Mirror, IM24-18	 Bronze Hoop, IM24-12	
IM5	 Pottery Single-handled Jar, IM5-14	 Pottery Single-handled Jar, IM5-6		IM29	 Pottery Single-handled Jar, IM29-6	 Iron Knife, IM29-1	 Bronze Bead, IM29-5, 4
IM8	 Pottery Single-handled Jar, IM8-4	 Iron Knife, IM8-5		IM30	 Pottery Single-handled Jar, IM30-6	 Pottery Single-handled Jar, IM30-1	 Bronze Knife, IM30-7
IM10	 Pottery Single-handled Jar, IM10-23	 Bronze Mirror, IM10-5	 Bronze Bead, IM10-7	IM31	 Iron Hoop, IM31-18	 Bronze Hoop, IM31-17	 Bronze Hoop, IM31-16
IM12	 Bronze Mirror, IM12-6	 Bronze Knife, IM12-7		IM35	 Bronze Pin, IM35-2, 11	 Bronze Hoop, IM35-2, 30	 Bronze Hoop, IM35-3
IM17	 Pottery Pot Vase, IM17-7	 Copper Ornament, IM17-19	 Bronze Arrowhead, IM17-6	IM50	 Pottery Double-handled Jug, IM50-1	 Bronze Bead, IM50-14	
IM18	 Bronze Mirror, IM18-21	 Pottery Single-handled Shallow Bowl, IM18-4		IM49	 Pottery Shallow Bowl, IM49-7	 Bronze Arrowhead, IM49-5, 1	
IM20	 Bronze Mirror, IM20-1	 Bronze Mirror, IM20-5	 Bronze Urn-neck, IM20-1, 4	IM36	 Bronze Bead, IM36-2	 Copper Hoop, IM36-1	
IM52	 Bronze Mirror, IM52-21	 Bronze Hoop, IM52-30	 Bronze Hoop, IM52-9	IM2	 Bronze Hoop, IM2-25	 Bronze Bead, IM2-5, 4	 Bronze Ornament, IM2-4
OTHERS	 Pottery Beaker-shaped Pot Fu, IM7-2	 Pottery Single-handled Cup, IM7-30	 Pottery Single-handled Jar, IM1-1		 Pottery Shallow Bowl, IM7-3	 Pottery Shallow Bowl, IM10-4	 Bronze Hoop, IM28-16

Fig. 5.1.2.7-3

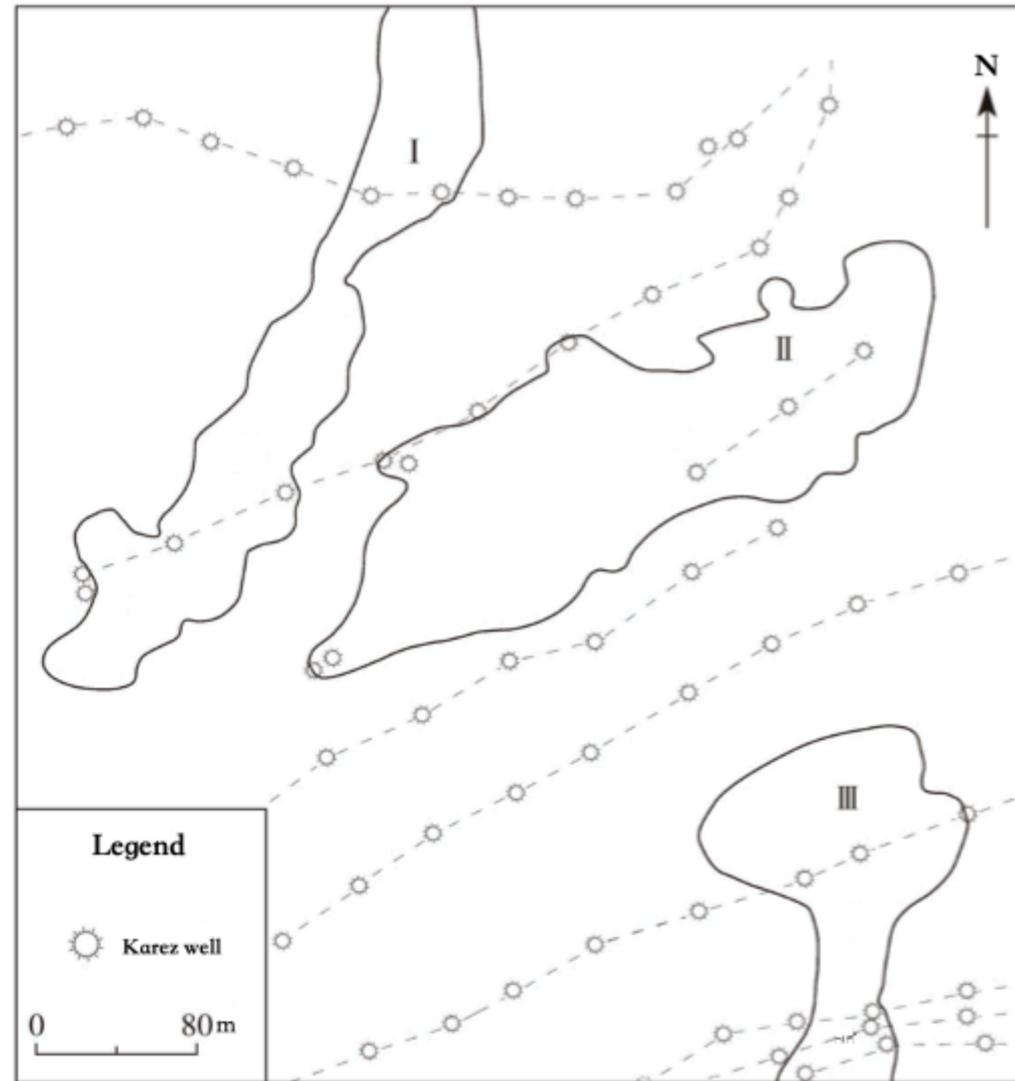


Fig. 5.1.3.1-1

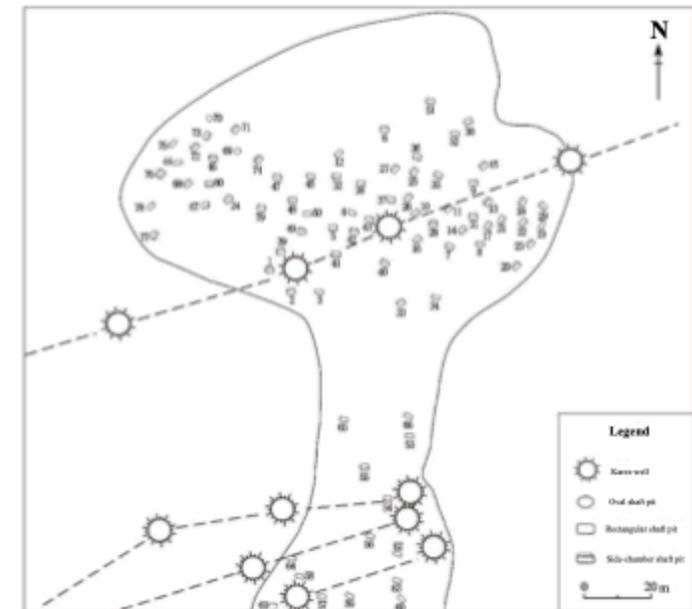




Fig. 5.13.1-2



Fig. 5.1.1-2-3

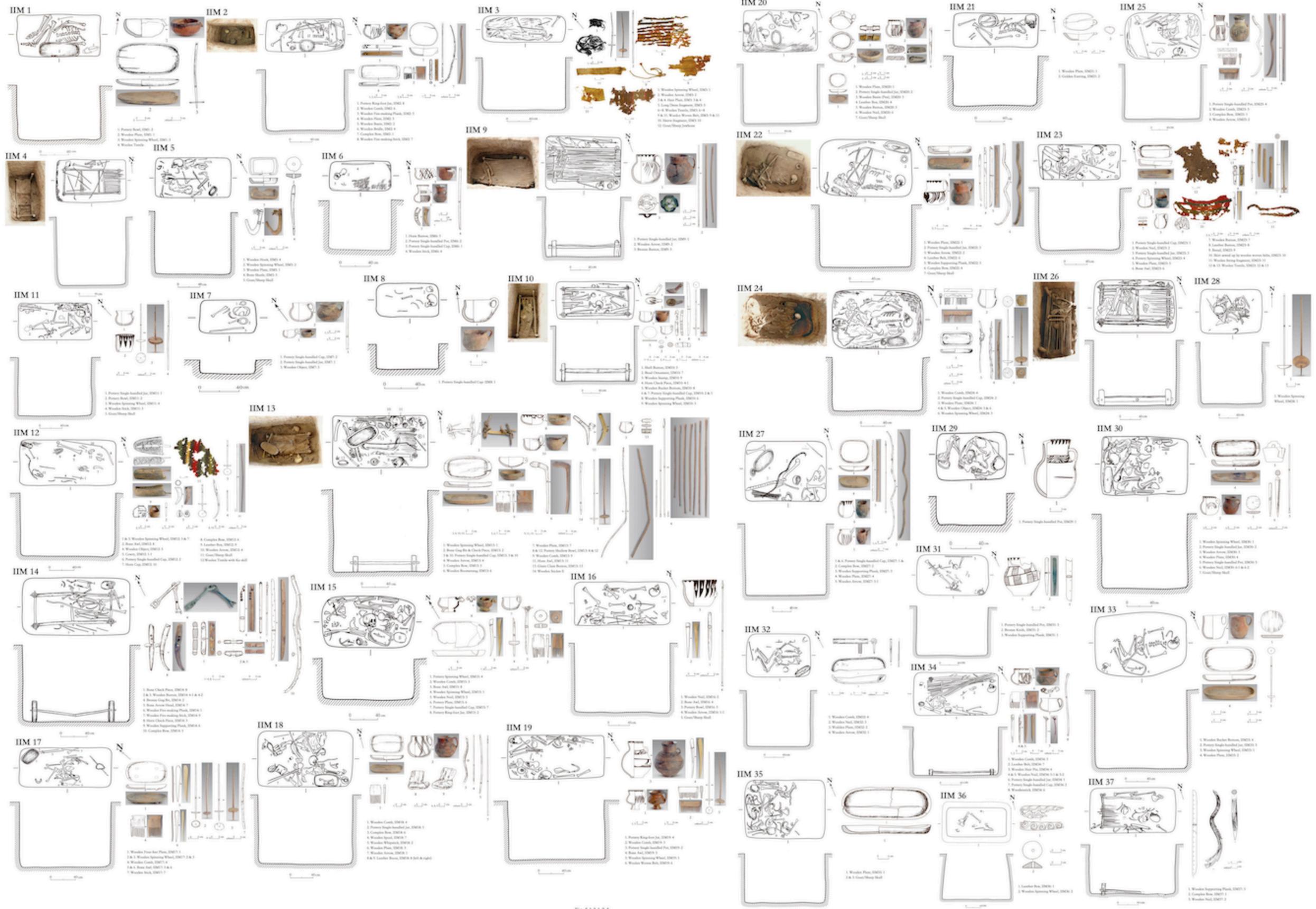


Fig. 5.1.31-35



Fig. 5.13.1-24



Fig. 5.1.3.1-2-7

IIM 132

IIM 133



Fig. 53.31-28



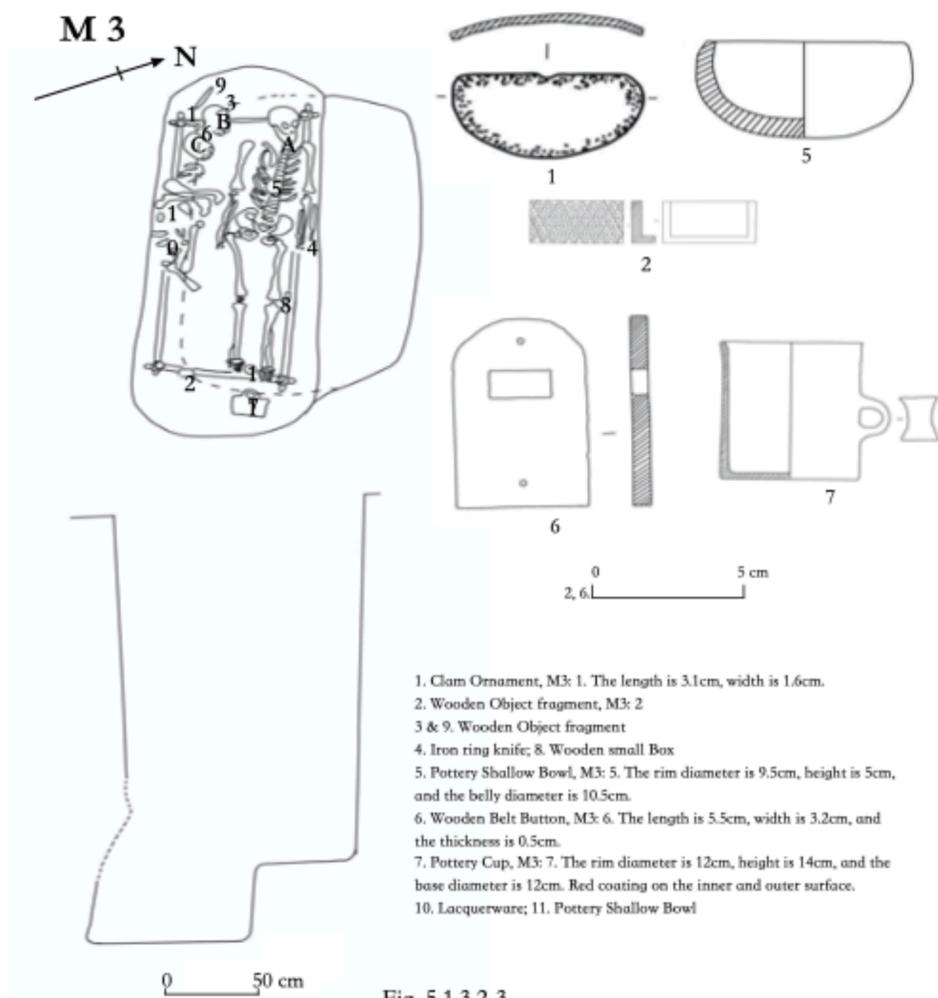
Fig. 5.133-29



Fig. 5.1.3.1-2.0

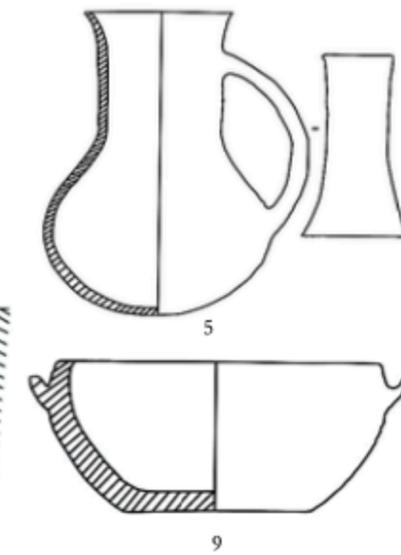
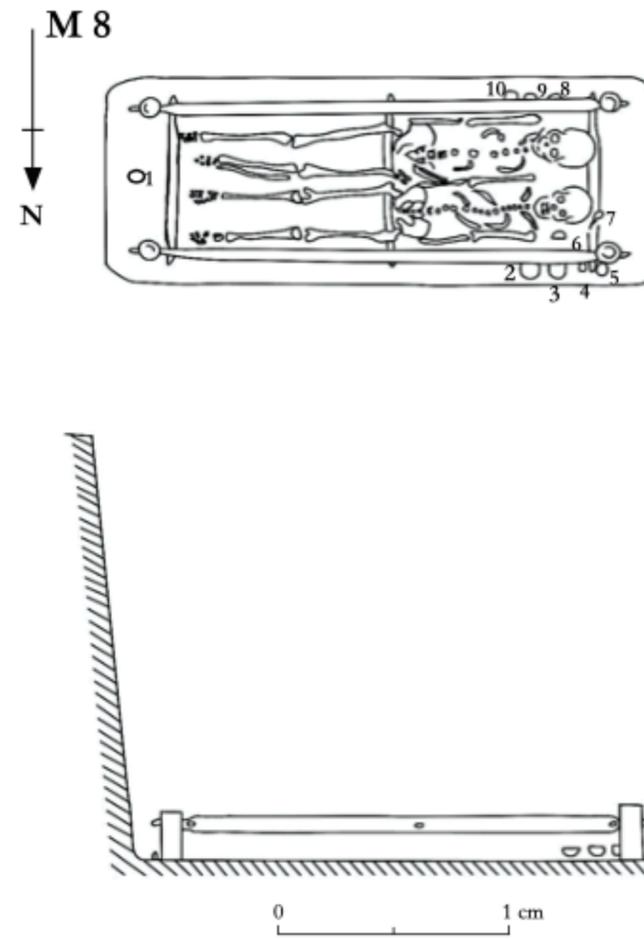






1. Clam Ornament, M3: 1. The length is 3.1cm, width is 1.6cm.
2. Wooden Object fragment, M3: 2
- 3 & 9. Wooden Object fragment
4. Iron ring knife; 8. Wooden small Box
5. Pottery Shallow Bowl, M3: 5. The rim diameter is 9.5cm, height is 5cm, and the belly diameter is 10.5cm.
6. Wooden Belt Button, M3: 6. The length is 5.5cm, width is 3.2cm, and the thickness is 0.5cm.
7. Pottery Cup, M3: 7. The rim diameter is 12cm, height is 14cm, and the base diameter is 12cm. Red coating on the inner and outer surface.
10. Lacquerware; 11. Pottery Shallow Bowl

Fig. 5.1.3.2-3



- 1 & 3. Pottery Bowl; 2. Painted Pottery Bowl
4. Painted Pottery Jar; 6. Wooden Comb
5. Pottery Jug, M8: 5. The rim diameter is 7.5cm, height is 15cm, and the belly diameter is 10cm. Red coating.
7. Hair net; 8. Wooden Basin
9. Pottery Bowl, M8: 9. The rim diameter is 11cm, height is 6.5cm, and the base diameter is 7cm. Red coating.
10. Pottery Painted Jug; 11. Wooden Couch

Fig. 5.1.3.2-4

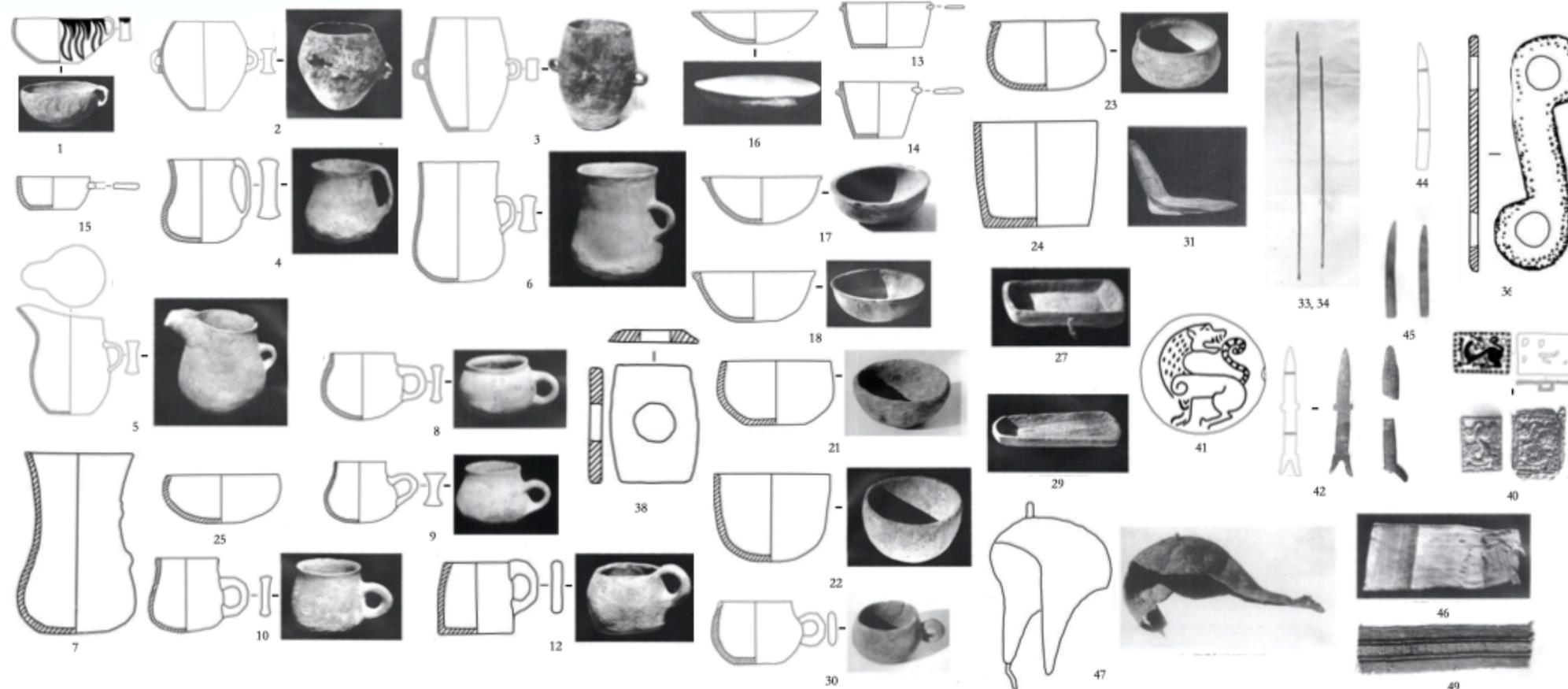


Fig. 5.1.3.2-6

Nr. I Cemetery

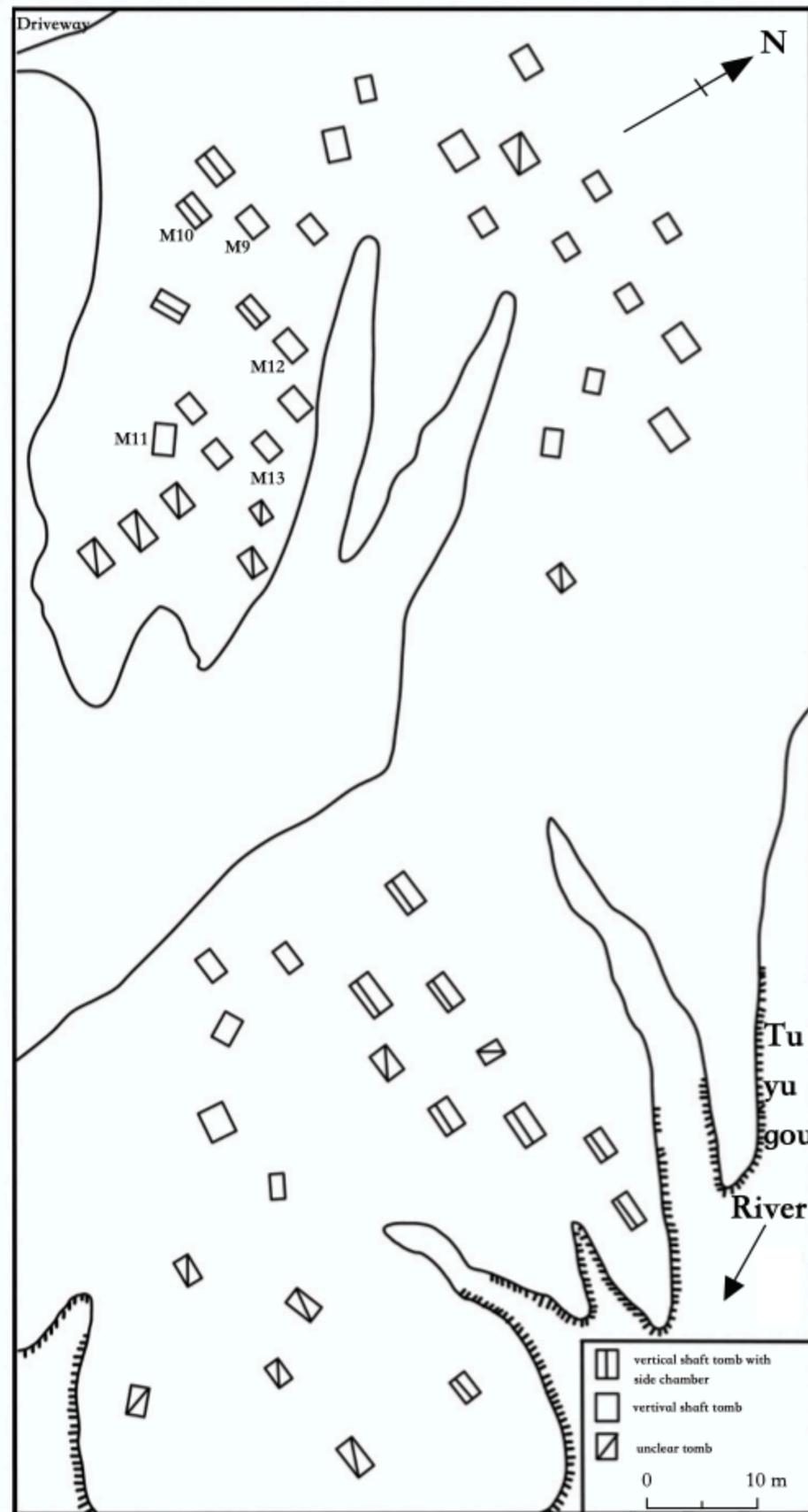


Fig. 5.1.3.2-1

Nr. III Cemetery

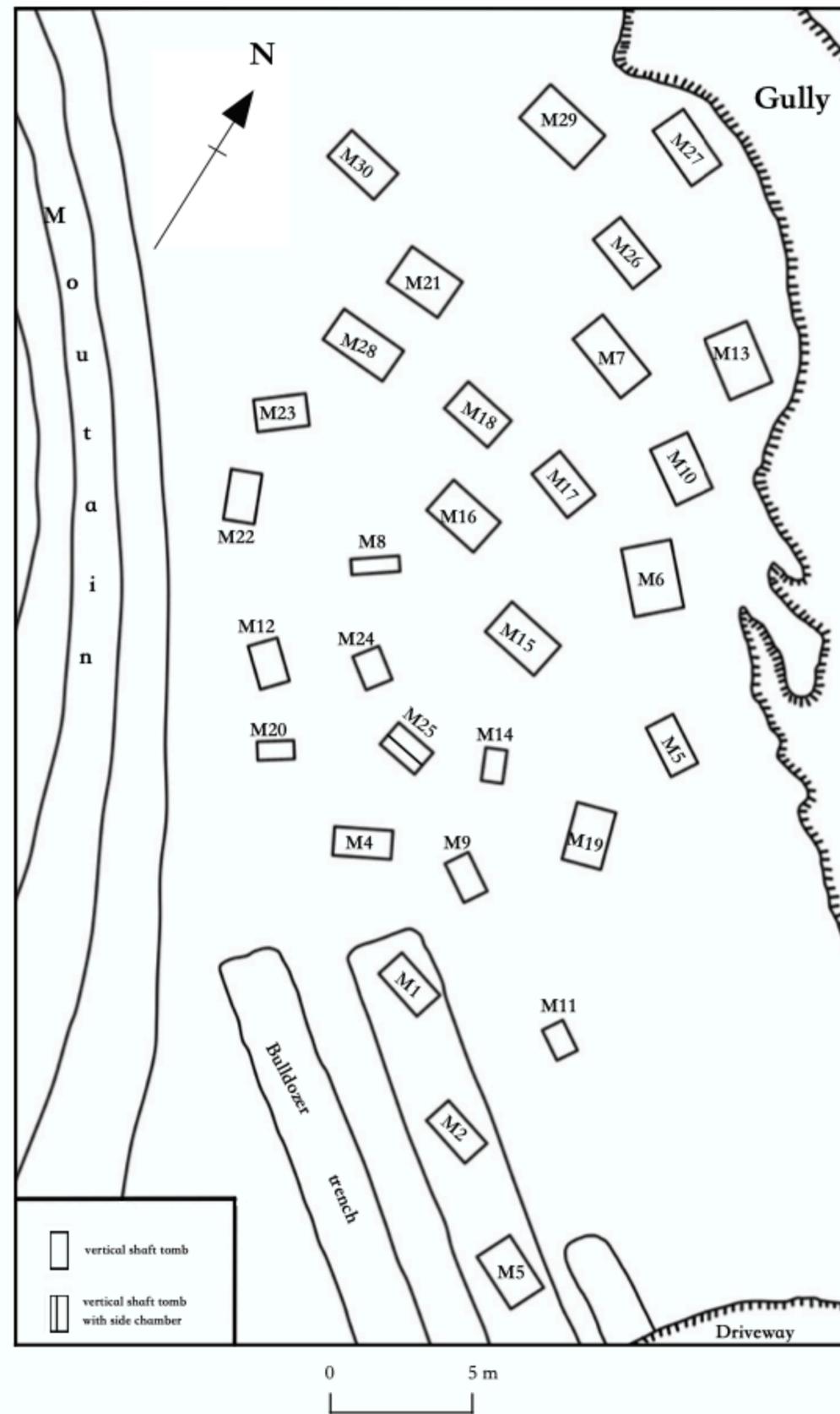
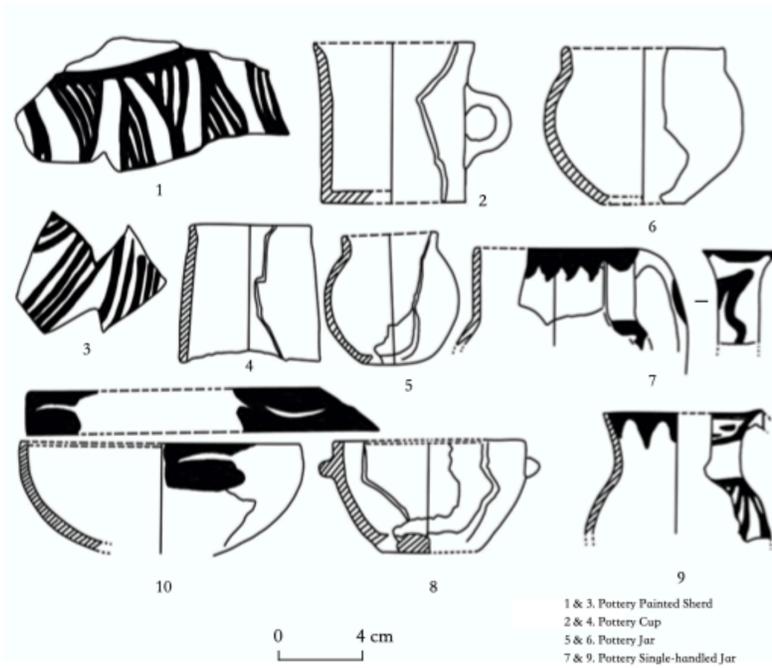


Fig. 5.1.3.2-2



0 8 m

Fig. 5.1.3.2-8

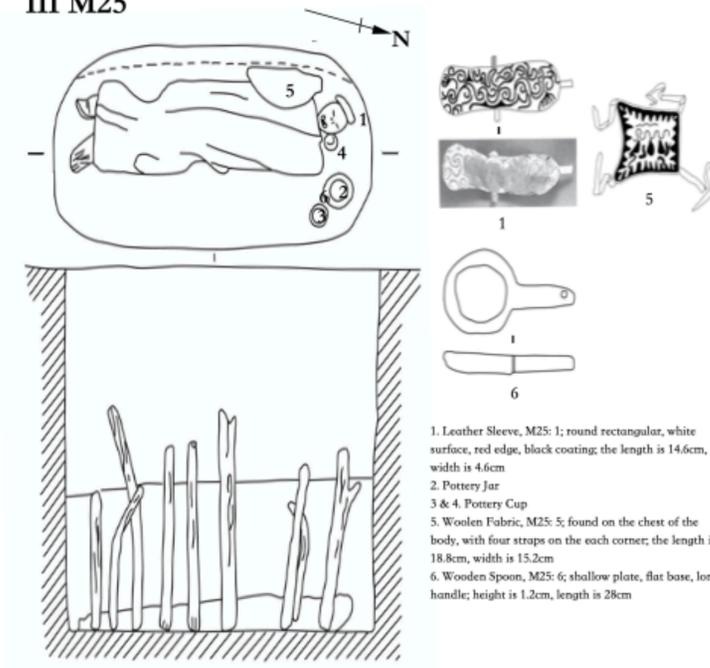


0 4 cm

Fig. 5.1.3.2-7

- 1 & 3. Pottery Painted Sherd
- 2 & 4. Pottery Cup
- 5 & 6. Pottery Jar
- 7 & 9. Pottery Single-handled Jar
- 8. Pottery Pot (Fu)
- 10. Pottery Shallow Bowl

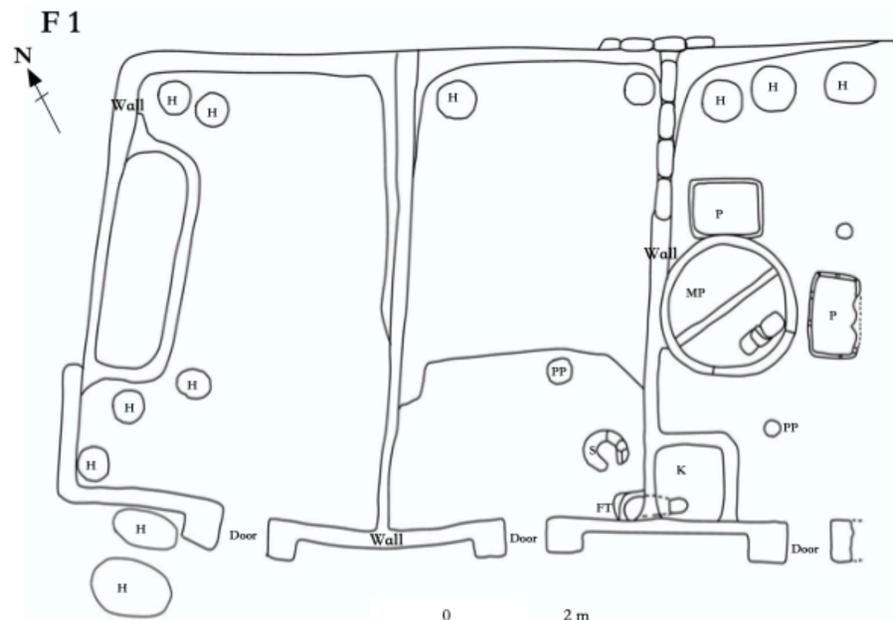
III M25



0 50 cm

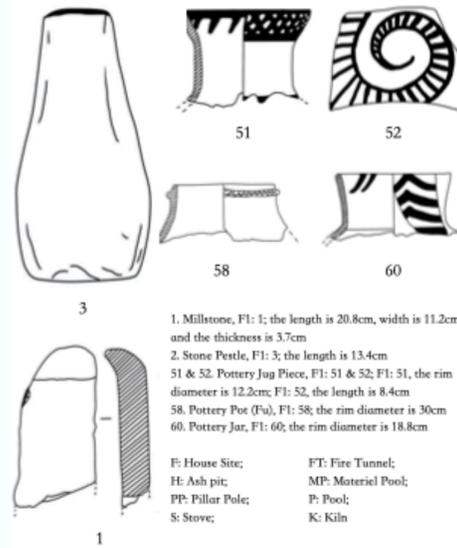
Fig. 5.1.3.2-15

- 1. Leather Sleeve, M25: 1; round rectangular, white surface, red edge, black coating; the length is 14.6cm, width is 4.6cm
- 2. Pottery Jar
- 3 & 4. Pottery Cup
- 5. Woolen Fabric, M25: 5; found on the chest of the body, with four straps on each corner; the length is 18.8cm, width is 15.2cm
- 6. Wooden Spoon, M25: 6; shallow plate, flat base, long handle; height is 1.2cm, length is 28cm



0 2 m

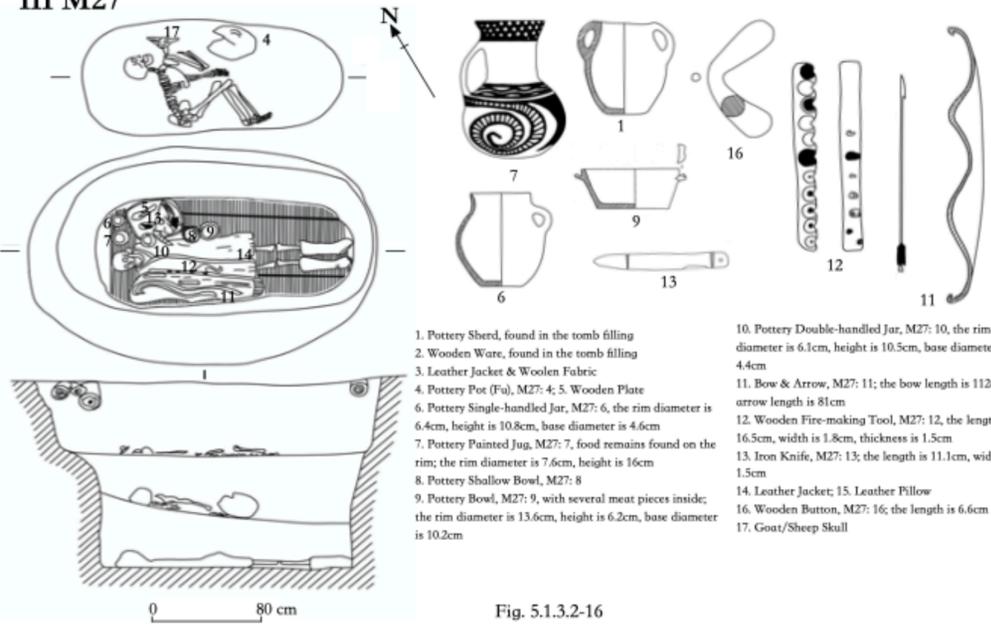
Fig. 5.1.3.2-9



- 1. Millstone, F1: 1; the length is 20.8cm, width is 11.2cm, and the thickness is 3.7cm
- 2. Stone Pestle, F1: 3; the length is 13.4cm
- 51 & 52. Pottery Jug Piece, F1: 51 & 52; F1: 51, the rim diameter is 12.2cm; F1: 52, the length is 8.4cm
- 58. Pottery Pot (Fu), F1: 58; the rim diameter is 30cm
- 60. Pottery Jar, F1: 60; the rim diameter is 18.8cm

- F: House Site; FT: Fire Tunnel;
- H: Ash pit; MP: Materiel Pool;
- PP: Pillar Pole; P: Pool;
- S: Stove; K: Kiln

III M27



0 80 cm

Fig. 5.1.3.2-16

- 1. Pottery Sherd, found in the tomb filling
- 2. Wooden Ware, found in the tomb filling
- 3. Leather Jacket & Woolen Fabric
- 4. Pottery Pot (Fu), M27: 4; 5. Wooden Plate
- 6. Pottery Single-handled Jar, M27: 6, the rim diameter is 6.4cm, height is 10.8cm, base diameter is 4.6cm
- 7. Pottery Painted Jug, M27: 7, food remains found on the rim; the rim diameter is 7.6cm, height is 16cm
- 8. Pottery Shallow Bowl, M27: 8
- 9. Pottery Bowl, M27: 9, with several meat pieces inside; the rim diameter is 13.6cm, height is 6.2cm, base diameter is 10.2cm
- 10. Pottery Double-handled Jar, M27: 10, the rim diameter is 6.1cm, height is 10.5cm, base diameter is 4.4cm
- 11. Bow & Arrow, M27: 11; the bow length is 112cm, arrow length is 81cm
- 12. Wooden Fire-making Tool, M27: 12, the length is 16.5cm, width is 1.8cm, thickness is 1.5cm
- 13. Iron Knife, M27: 13; the length is 11.1cm, width is 1.5cm
- 14. Leather Jacket; 15. Leather Pillow
- 16. Wooden Button, M27: 16; the length is 6.6cm
- 17. Goat/Sheep Skull

92SASM10

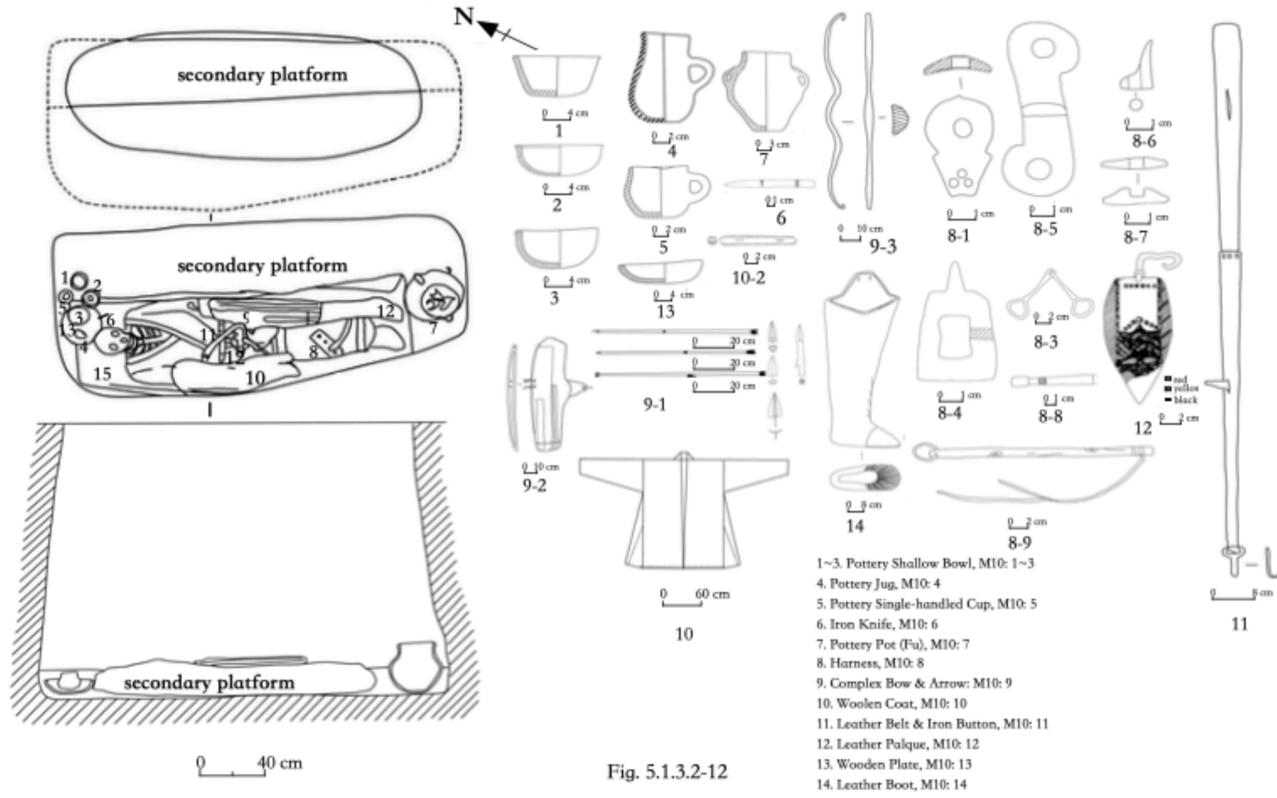


Fig. 5.1.3.2-12

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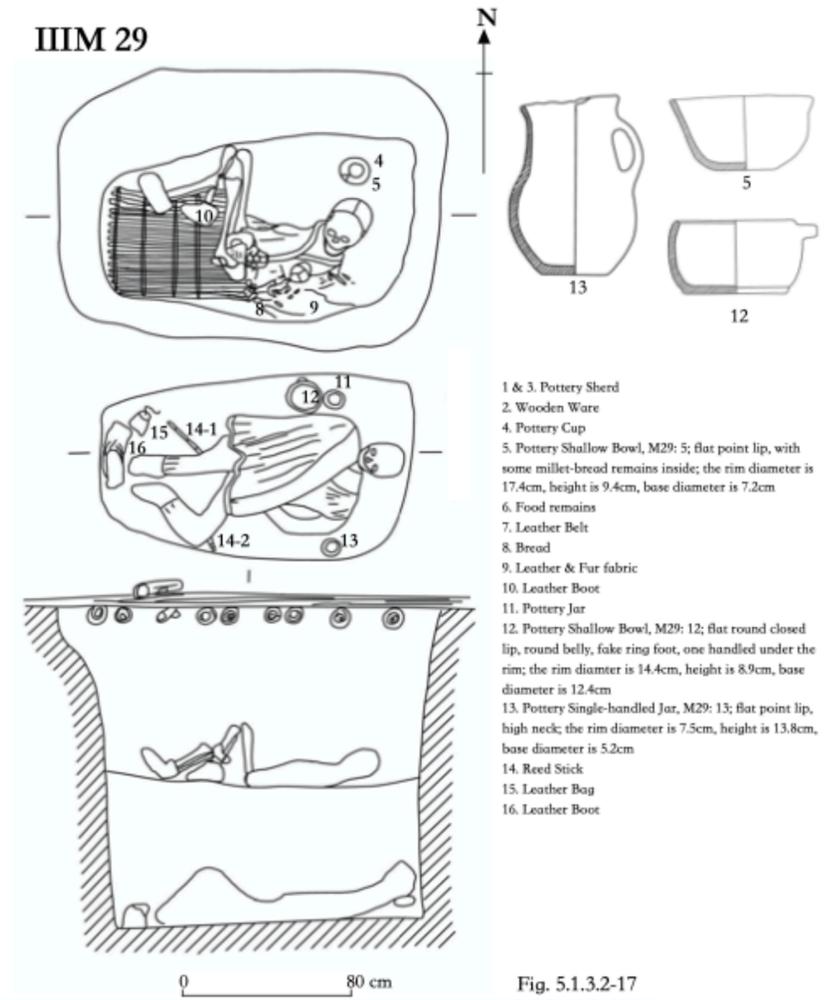


Fig. 5.1.3.2-17

92SASM11

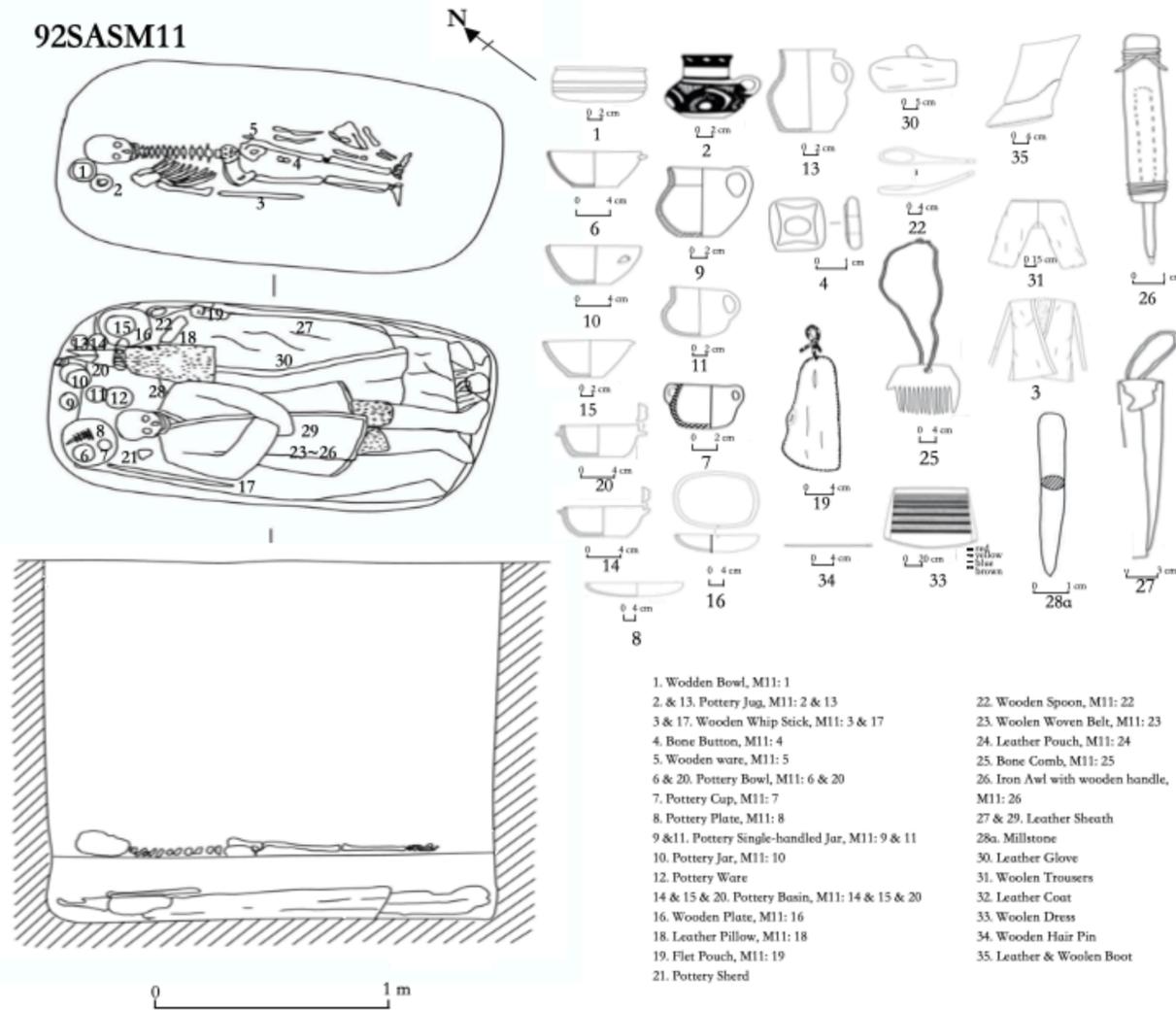


Fig. 5.1.3.2-13

III M8

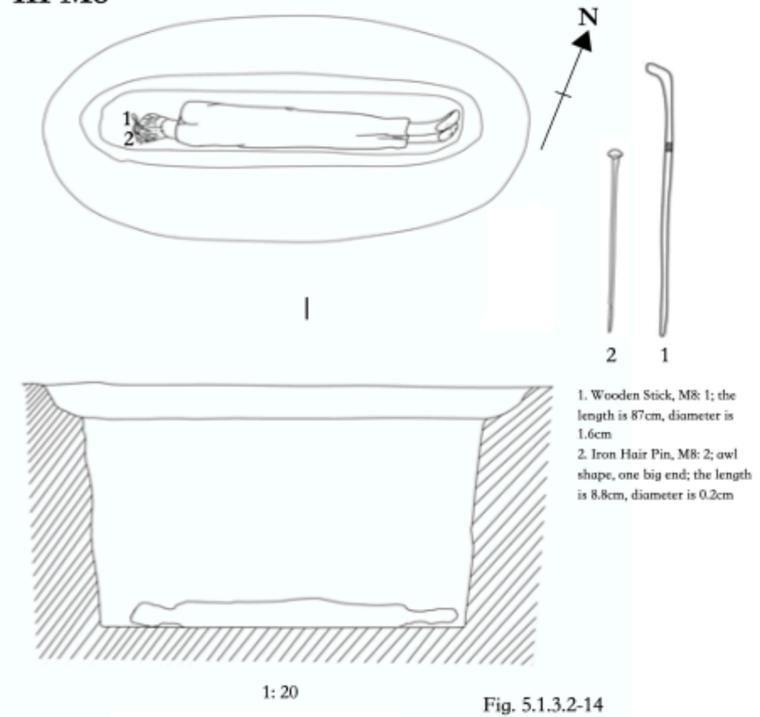


Fig. 5.1.3.2-14

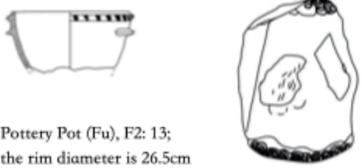
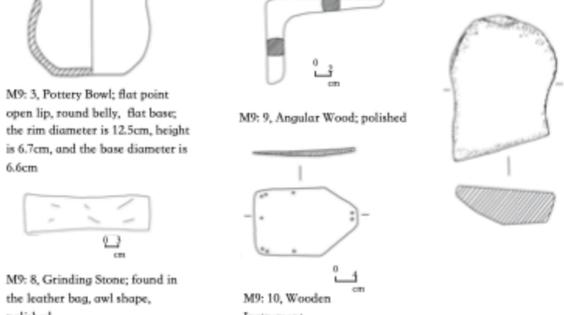
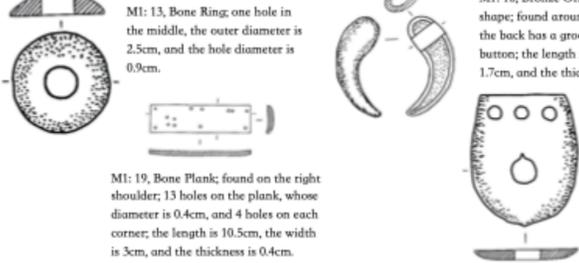
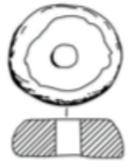
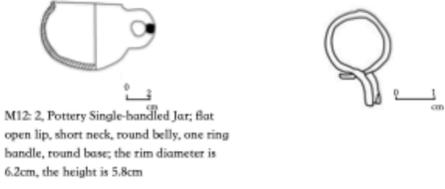
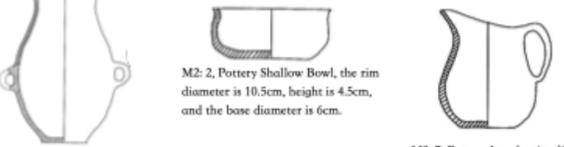
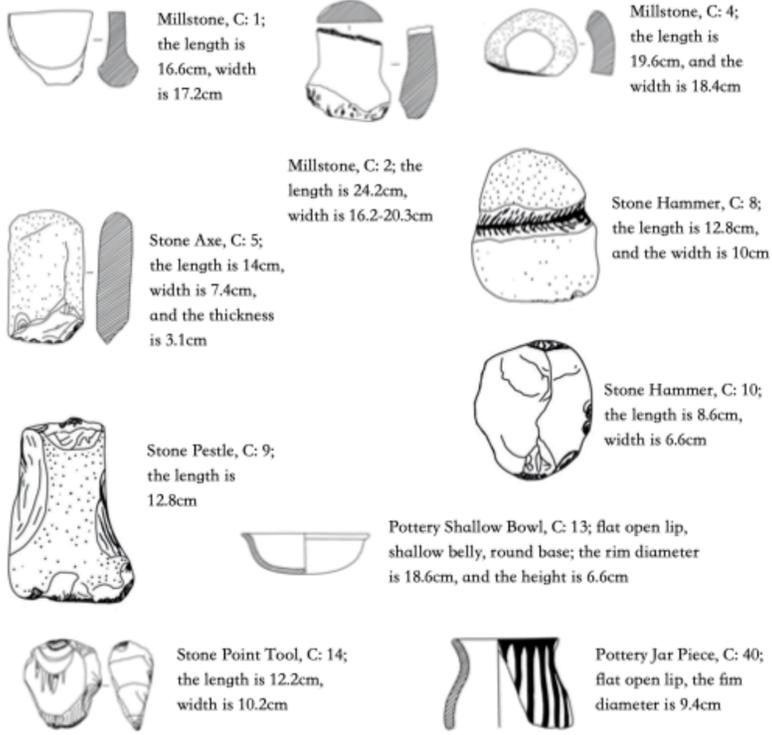
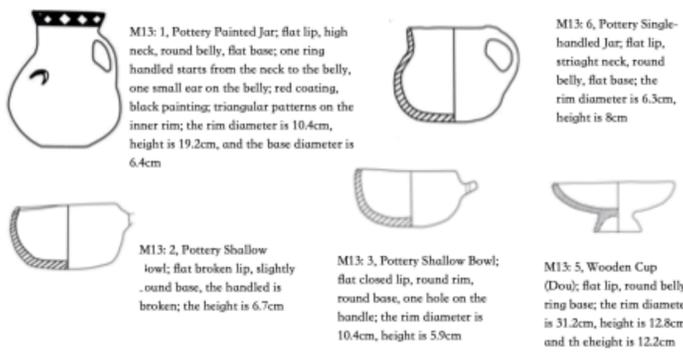
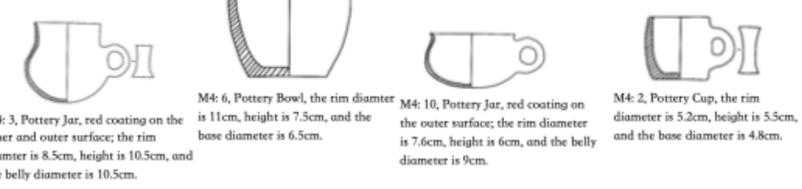
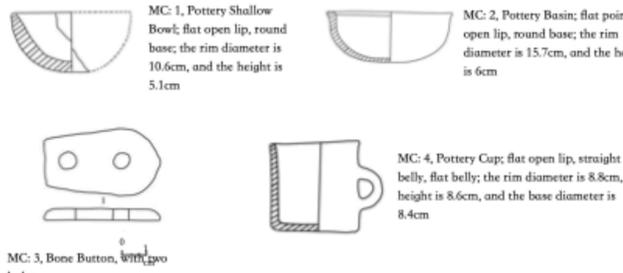
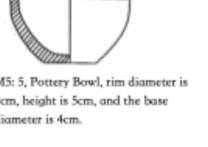
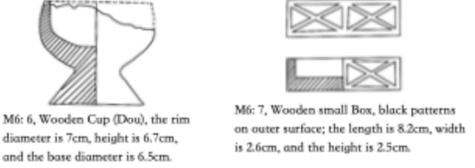
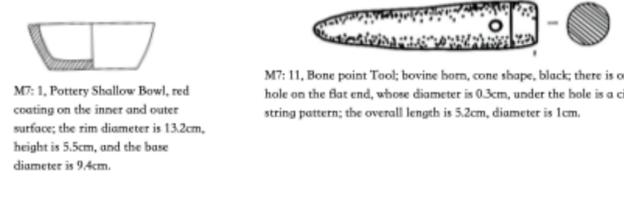
F2	 <p>Pottery Pot (Fu), F2: 13; the rim diameter is 26.5cm</p> <p>Stone Hammer, F2: 15; the length is 11.9cm, and the width is 7.6cm</p>	<p>M 9</p>  <p>M9: 3, Pottery Bowl; flat point open lip, round belly, flat base; the rim diameter is 12.5cm, height is 6.7cm, and the base diameter is 6.6cm</p> <p>M9: 8, Grinding Stone; found in the leather bag, awl shape, polished</p> <p>M9: 9, Angular Wood; polished</p> <p>M9: 10, Wooden Instrument</p> <p>M9: 5, Millstone; one corner is broken, the grinding surface is arc; the length is 16.2cm, and the width is 12cm</p>	<p>M 1</p>  <p>M1: 13, Bone Ring; one hole in the middle, the outer diameter is 2.5cm, and the hole diameter is 0.9cm.</p> <p>M1: 19, Bone Plank; found on the right shoulder; 13 holes on the plank, whose diameter is 0.4cm, and 4 holes on each corner; the length is 10.5cm, the width is 3cm, and the thickness is 0.4cm.</p> <p>M1: 16, Bronze Ornament in tooth shape; found around the knee part; the back has a groove and a ring button; the length is 5.2cm, width is 1.7cm, and the thickness is 1.2cm</p> <p>M1: 20, Bone Plaque; 3 small holes on the upper part, whose diameter is 0.5cm; and 1 hole on the lower central part, whose diameter is 1cm; the plaque length is 4.5cm, width is 3.5cm, and the thickness is 0.3cm.</p>
F3	 <p>Stone Spinning Wheel, F3: 4; the diameter is 3.6cm, and the thickness is 1.3cm</p>	<p>M 1 2</p>  <p>M12: 2, Pottery Single-handed Jar; flat open lip, short neck, round belly, one ring handle, round base; the rim diameter is 6.2cm, the height is 5.8cm</p> <p>M12: 8, Bronze Earring</p>	<p>M 2</p>  <p>M2: 1, Pottery Jar; one infant inside; the rim diameter is 20cm, height is 48cm, the base diameter is 14.5cm.</p> <p>M2: 2, Pottery Shallow Bowl, the rim diameter is 10.5cm, height is 4.5cm, and the base diameter is 6cm.</p> <p>M2: 7, Pottery Jar, the rim diameter is 5.5cm, height is 9.5cm, and the base diameter is 4cm.</p>
Collection	 <p>Millstone, C: 1; the length is 16.6cm, width is 17.2cm</p> <p>Millstone, C: 2; the length is 24.2cm, width is 16.2-20.3cm</p> <p>Millstone, C: 4; the length is 19.6cm, and the width is 18.4cm</p> <p>Stone Hammer, C: 5; the length is 14cm, width is 7.4cm, and the thickness is 3.1cm</p> <p>Stone Hammer, C: 8; the length is 12.8cm, and the width is 10cm</p> <p>Stone Hammer, C: 10; the length is 8.6cm, width is 6.6cm</p> <p>Stone Pestle, C: 9; the length is 12.8cm</p> <p>Pottery Shallow Bowl, C: 13; flat open lip, shallow belly, round base; the rim diameter is 18.6cm, and the height is 6.6cm</p> <p>Stone Point Tool, C: 14; the length is 12.2cm, width is 10.2cm</p> <p>Pottery Jar Piece, C: 40; flat open lip, the rim diameter is 9.4cm</p>	<p>M 1 3</p>  <p>M13: 1, Pottery Painted Jar; flat lip, high neck, round belly, flat base; one ring handle starts from the neck to the belly, one small ear on the belly; red coating, black painting; triangular patterns on the inner rim; the rim diameter is 10.4cm, height is 19.2cm, and the base diameter is 6.4cm</p> <p>M13: 2, Pottery Shallow Bowl; flat broken lip, slightly round base, the handle is broken; the height is 6.7cm</p> <p>M13: 3, Pottery Shallow Bowl; flat closed lip, round rim, round base, one hole on the handle; the rim diameter is 10.4cm, height is 5.9cm</p> <p>M13: 5, Wooden Cup (Dou); flat lip, round belly, ring base; the rim diameter is 31.2cm, height is 12.8cm, and the height is 12.2cm</p> <p>M13: 6, Pottery Single-handed Jar; flat lip, straight neck, round belly, flat base; the rim diameter is 6.3cm, height is 8cm</p>	<p>M 4</p>  <p>M4: 3, Pottery Jar, red coating on the inner and outer surface; the rim diameter is 8.5cm, height is 10.5cm, and the belly diameter is 10.5cm.</p> <p>M4: 6, Pottery Bowl, the rim diameter is 11cm, height is 7.5cm, and the base diameter is 6.5cm.</p> <p>M4: 10, Pottery Jar, red coating on the outer surface; the rim diameter is 7.6cm, height is 6cm, and the belly diameter is 9cm.</p> <p>M4: 2, Pottery Cup, the rim diameter is 5.2cm, height is 5.5cm, and the base diameter is 4.8cm.</p>
		<p>M C (Collection)</p>  <p>MC: 1, Pottery Shallow Bowl; flat open lip, round base; the rim diameter is 10.6cm, and the height is 5.1cm</p> <p>MC: 2, Pottery Basin; flat point open lip, round base; the rim diameter is 15.7cm, and the height is 6cm</p> <p>MC: 3, Bone Button, two holes</p> <p>MC: 4, Pottery Cup; flat open lip, straight belly, flat belly; the rim diameter is 8.8cm, height is 8.6cm, and the base diameter is 8.4cm</p>	<p>M 5</p>  <p>M5: 5, Pottery Bowl, rim diameter is 9cm, height is 5cm, and the base diameter is 4cm.</p>
			<p>M 6</p>  <p>M6: 6, Wooden Cup (Dou), the rim diameter is 7cm, height is 6.7cm, and the base diameter is 6.5cm.</p> <p>M6: 7, Wooden small Box, black patterns on outer surface; the length is 8.2cm, width is 2.6cm, and the height is 2.5cm.</p>
			<p>M 7</p>  <p>M7: 1, Pottery Shallow Bowl, red coating on the inner and outer surface; the rim diameter is 13.2cm, height is 5.5cm, and the base diameter is 9.4cm.</p> <p>M7: 11, Bone point Tool; bovine horn, cone shape, black; there is one small hole on the flat end, whose diameter is 0.3cm, under the hole is a circle of string pattern; the overall length is 5.2cm, diameter is 1cm.</p>

Fig. 5.1.3.2-10

Fig. 5.1.3.2-11

Fig. 1.3.2-5

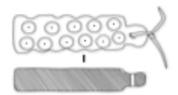
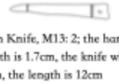
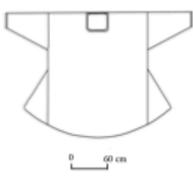
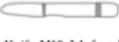
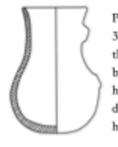
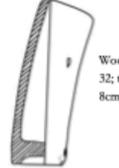
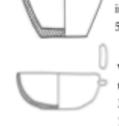
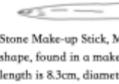
M 3	 <p>Wooden Plaque, M3: 2; each end has one hole with one leather strap going through; the length is 10.5cm, width is 3.2-5.4cm</p>  <p>Wooden Fire-making Tool, M3: 3; the round end has one hole with one leather strap going through; the length is 9.1cm, width is 2.8cm, and the thickness is 1.8cm</p>	M 12	 <p>Pottery Basin, M12: 4; one goat/sheep bone inside; the rim diameter is 22.4cm, height is 11.2cm, base diameter is 8.2cm</p>  <p>Iron Arrowhead, M12: 7; some bronze rust left on the surface; the length is 3.3cm</p>  <p>Necklace, M12: 8; including one turquoise bead and eight Amomum tsak-ko</p>	M 6	 <p>Wooden Plate, M6: 1; the length is 28.8cm, width is 24.8cm, height is 9.4cm</p>  <p>Wooden Plate, M6: 21; the rim diameter is 29-24cm, height is 27.2cm</p>  <p>Horn Comb, M6: 10; the length is 5.5cm, width is 5.8cm</p>  <p>Wooden Plate, M6: 13; oval, one vertical era handle; the length is 23.6cm, width is 20.4cm, height is 7.2cm</p>
M 4	 <p>Pottery Bowl, M4: 1; the rim diameter is 12.3cm, height is 7.6cm, base diameter is 11.2cm</p>  <p>Stone Pestle, M4: 9; found on the jaw of the body; the length is 16cm, the width is 4.8cm</p>  <p>Wooden Bow & Arrow, M4: 8; the length of the bow is 121cm; the length of the arrow is 9cm</p>	M 13	 <p>Pottery Single-handled Jar, M13: 7; the rim diameter is 9.8cm, height is 11.6cm, base diameter is 8.8cm</p>  <p>Pottery Single-handled Jar, M13: 3; the rim diameter is 8.2cm, height is 7.6cm</p>  <p>Iron Button, M13: 10; round, one small button on one side; the diameter is 5.8cm</p>  <p>Leather Pillow, M13: 13; the length is 6.8cm, width is 2.2cm</p>  <p>Iron Belt Buckle, M13: 11; polished, one end is circle; the length is 9cm</p>  <p>Wooden Box, M13: 8; the rim length is 18.6cm, width is 12.2cm; the base length is 17.6cm, width is 12.4cm; the height is 10cm</p>  <p>Iron Knife, M13: 2; the handle width is 1.7cm, the knife width is 1cm, the length is 12cm</p>	M 6	 <p>Pottery Jar, M6: 2; the rim diameter is 6.8cm, height is 8.9cm, base diameter is 3.6cm</p>  <p>Leather Pillow, M6: 26; trapezoid, the edge was sewed by red woolen yarn; the length is 12cm, width is 4.4cm</p>  <p>Pottery Cup (Dou), M6: 20; the rim diameter is 17.8cm, height is 17.6cm, base diameter is 11.5cm</p>  <p>Iron Plaque, M6: 3; round-rectangular, one small hole on one end; the length is 7cm, width is 3.8cm</p>  <p>Pottery Shallow Bowl, M6: 15; flat closed point lip, round belly; the rim diameter is 11.2cm, height is 5.6cm</p>  <p>Woolen Jacket, M6: C; made by white woolen fabric, the neckband is round-rectangular, arc lower hem; the neckband and cuff were sewed by red yarns (0.5cm wide); the overall length is 94cm, the sleeve length is 158cm, the width of the sleeve is 11cm, the length of the neckband is 64cm</p>  <p>Pottery Single-handled Cup, M6: 16; the rim diameter is 12cm, height is 7.6cm, base diameter is 6cm</p>  <p>Pottery Single-handled Cup, M6: 18; the rim diameter is 12.5cm, height is 10.2cm, base diameter is 4.8cm</p>
M 5	 <p>Pottery Double-handled Jar Piece, M5: C; the rim diameter is 12cm</p>  <p>Pottery Bucket-shaped Cup, M5: 8; the rim diameter is 9.6cm, height is 11.2cm, and the base diameter is 7.8cm</p>  <p>Iron Needle, M5: 1 & 2; the longer one is 5.2cm, and the shorter one is 2.7cm</p>	M 18	 <p>Iron Knife, M18: 3-1; found in one leather sheath; the length is 9.2cm, width is 1cm</p>  <p>Leather Bag, M18: 6; sewed by animal tendon strap; with one wooden ware found inside; the length is 5.4cm, radius is 1.9cm</p>  <p>Leather Sheath, M18: 3-2; found with one iron knife inside; the length is 9.2cm, width is 1cm</p>  <p>Leather Bag, M18: 2; rectangular, several leather straps going through different holes; the length is 5.2cm, width is 2.8cm</p>	M 15	 <p>Pottery Jug, M15: 35; flat round lip, thin neck, round base; one broken handle; the rim diameter is 7cm, height is 12.2cm</p>  <p>Pottery Single-handled Jar, M15: 16; flat open lip, round belly, flat base; the rim diameter is 8.5cm, height is 12cm, base diameter is 5.5cm</p>  <p>Pottery Bucket-shaped Cup, M15: 10; flat point lip, slightly round belly, flat base; the rim diameter is 9.4cm, height is 10.2cm, base diameter is 9cm</p>  <p>Wooden Bucket, M15: 32; the diameter is 8cm, height is 23.4cm</p>  <p>Pottery Pot (Fu), M15: 5; the rim diameter is 20.8cm, height is 23.8cm, base diameter is 11.5cm</p>  <p>Pottery Bowl, M15: 18; the rim diameter is 11, height is 5.6cm, base diameter is 5.3cm</p>  <p>Pottery Single-handled Jar, M15: 31; the rim diameter is 7.9cm, height is 7.3cm, base diameter is 4.3cm</p>  <p>Pottery Shallow Bowl, M15: 9; one goat/sheep bone in side; the rim diameter is 12.4cm, height is 9.6cm, base diameter is 6.4cm</p>  <p>Pottery Single-handled Jar, M15: 8b; the rim diameter is 4.2cm, height is 4.8cm, base diameter is 2.2cm</p>  <p>Wooden Plate, M15: 19; the rim diameter is 32-26.5cm, the height is 10.2cm</p>  <p>Wooden Spoon, M15: 2; the diameter is 14.8cm, thickness is 2.4cm, the length is 28cm</p>  <p>Stone Make-up Stick, M15: 28; awl shape, found in a make-up bag; the length is 8.3cm, diameter is 1cm</p>
M 7	 <p>Pottery Single-handled Jar, M7: 2; the rim diameter is 8.8cm, height is 7.6cm</p>  <p>Wooden Plate, M7: 4; the length is 24.8cm, width is 18cm, height is 6.4cm</p>	M 21	 <p>Pottery Single-handled Cup with Spout, M21: 1; the rim diameter is 6.2-7.8cm, height is 9.2cm, base diameter is 5.2cm</p>  <p>Wooden Bowl, M21: 2; the rim diameter is 17.2cm, height is 8.8cm</p>	M 9	 <p>Pottery Bowl, M9: 4; the rim diameter is 8.5cm, height is 4.8cm, base diameter is 4.2cm</p>  <p>Wooden Stick, M9: 1; the diameter is 2.2cm, length is 101.5cm</p>
M 9	 <p>Pottery Bowl, M9: 4; the rim diameter is 8.5cm, height is 4.8cm, base diameter is 4.2cm</p>  <p>Wooden Stick, M9: 1; the diameter is 2.2cm, length is 101.5cm</p>	M 22	 <p>Pottery Shallow Bowl, M22: 1; the rim diameter is 10.8cm, height is 5.2cm</p>	M 17	 <p>Pottery Double-handled Jar, M17: 1; flat open lip, deep round belly, flat base; some outer patterns under the rim; the rim diameter is 16cm, height is 48cm, base diameter is 12cm</p>  <p>Pottery Single-handled Jar, M17: 3; the rim diameter is 8.2cm, height is 10.8cm, base diameter is 6.7cm</p>  <p>Wooden Stick, M17: 2; one end has the fire-making remains; the length is 12.8cm, diameter is 0.9cm</p>  <p>Wooden Plate, M17: 6; shallow plate, flat base; the surface is purple; with three small pottery wares inside; the rim length is 31.2cm, width is 15.2cm, height is 4.6cm</p>  <p>Pottery Bowl, M17: 5; the rim diameter is 10.6cm, height is 6cm, base diameter is 6.8cm</p>  <p>Bronze Mirror, M17: 8; the diameter is 9.3cm, thickness is 0.1cm</p>
M 10	 <p>Pottery Shallow Bowl, M10: 1; the rim diameter is 12.2cm, base diameter is 6.2cm</p>  <p>Pottery Single-handled Jar, M10: 2; the rim diameter is 8.2cm, height is 8.8cm, base diameter is 5.6cm</p>  <p>Pottery Bowl, M10: 3; the rim diameter is 14cm, height is 8.2cm, base diameter is 7.2cm</p>	M 30	 <p>Wooden Bowl, M30: 2; the rim diameter is 115.6cm, height is 5.7cm</p>  <p>Wooden Stick, M30: 6; with one angular banded on one end; the length is 80cm, diameter is 1.5cm</p>	M 17	 <p>Pottery Double-handled Jar, M17: 1; flat open lip, deep round belly, flat base; some outer patterns under the rim; the rim diameter is 16cm, height is 48cm, base diameter is 12cm</p>  <p>Pottery Single-handled Jar, M17: 3; the rim diameter is 8.2cm, height is 10.8cm, base diameter is 6.7cm</p>  <p>Wooden Stick, M17: 2; one end has the fire-making remains; the length is 12.8cm, diameter is 0.9cm</p>  <p>Wooden Plate, M17: 6; shallow plate, flat base; the surface is purple; with three small pottery wares inside; the rim length is 31.2cm, width is 15.2cm, height is 4.6cm</p>  <p>Pottery Bowl, M17: 5; the rim diameter is 10.6cm, height is 6cm, base diameter is 6.8cm</p>  <p>Bronze Mirror, M17: 8; the diameter is 9.3cm, thickness is 0.1cm</p>

Fig. 5.1.3.2-18

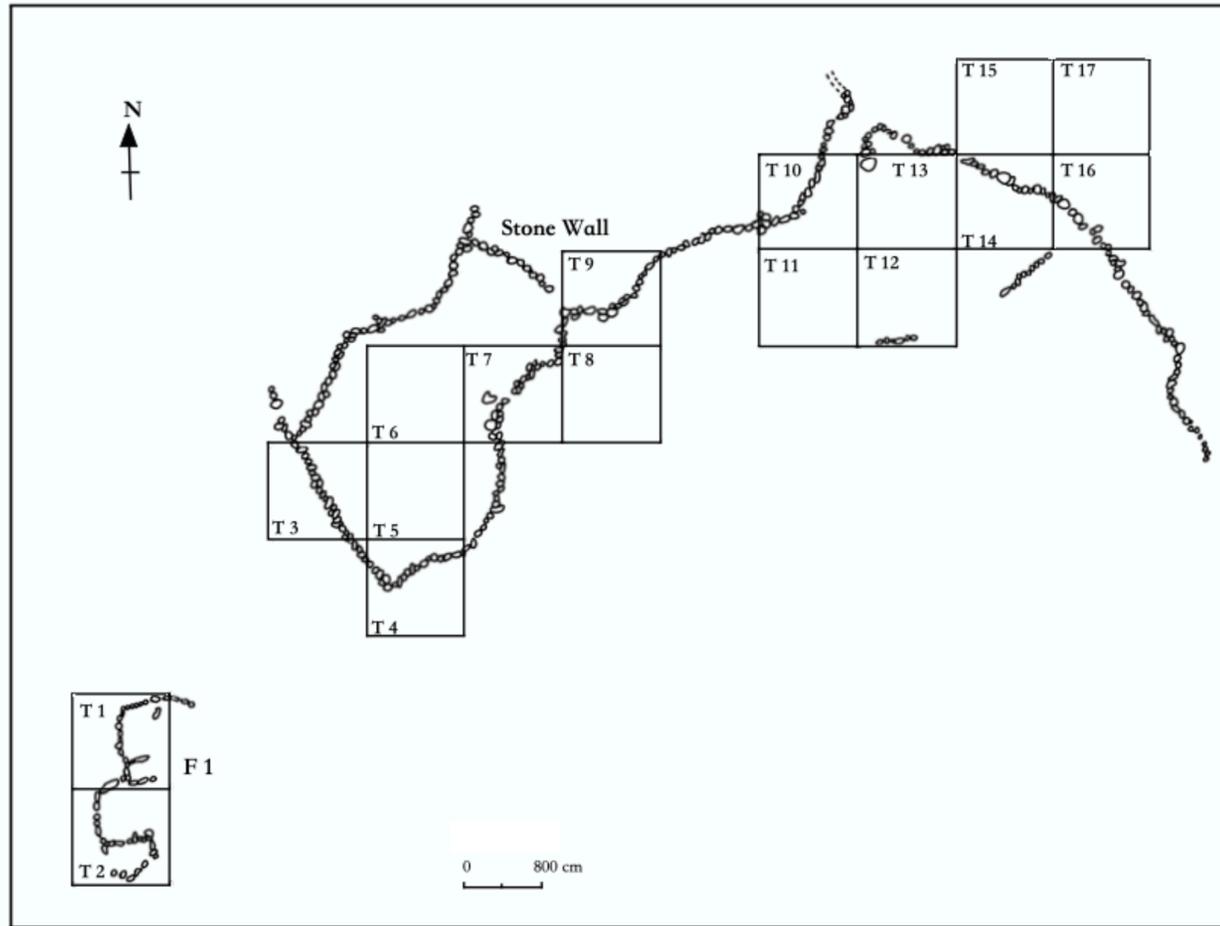


Fig. 5.1.3.3-1

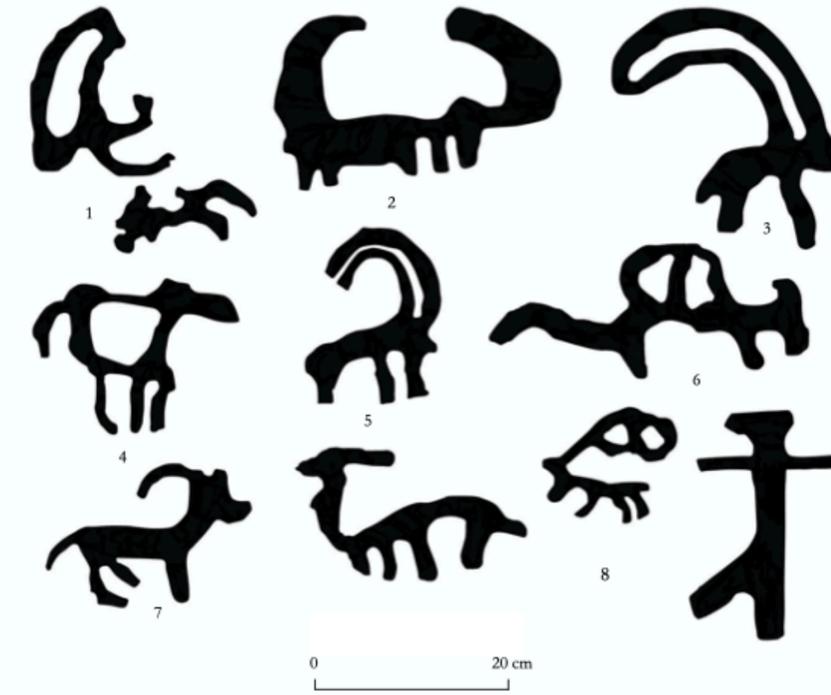
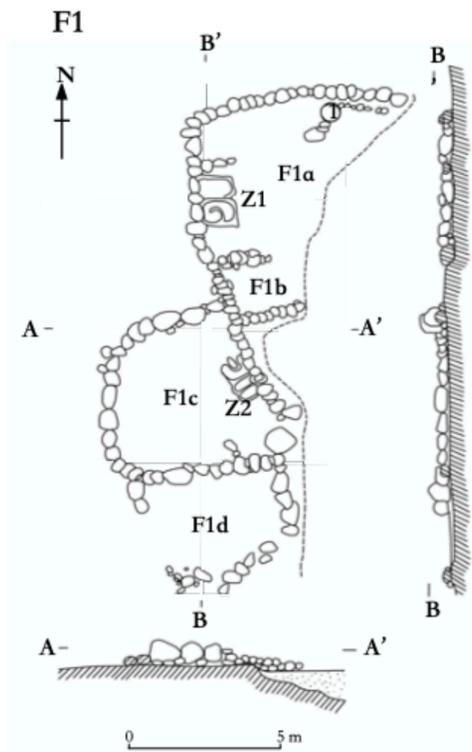


Fig. 5.1.3.3-4



F 1 a	1 The height is 5.2cm	14 The height is 5.8cm	12 The rim diameter is 11cm, the height is 8.6cm
	32 The diameter is 27.5cm, the thickness is 1.8cm	2 The height is 5.7cm	36 The height is 11.2cm
	4 The height is 4cm	35 The height is 8.8cm	17 The height is 7cm

1. Pottery Jar, F1: 1
Z represent the stove found in the room
All findings are pottery pieces

Fig. 5.1.3.3-2



F1

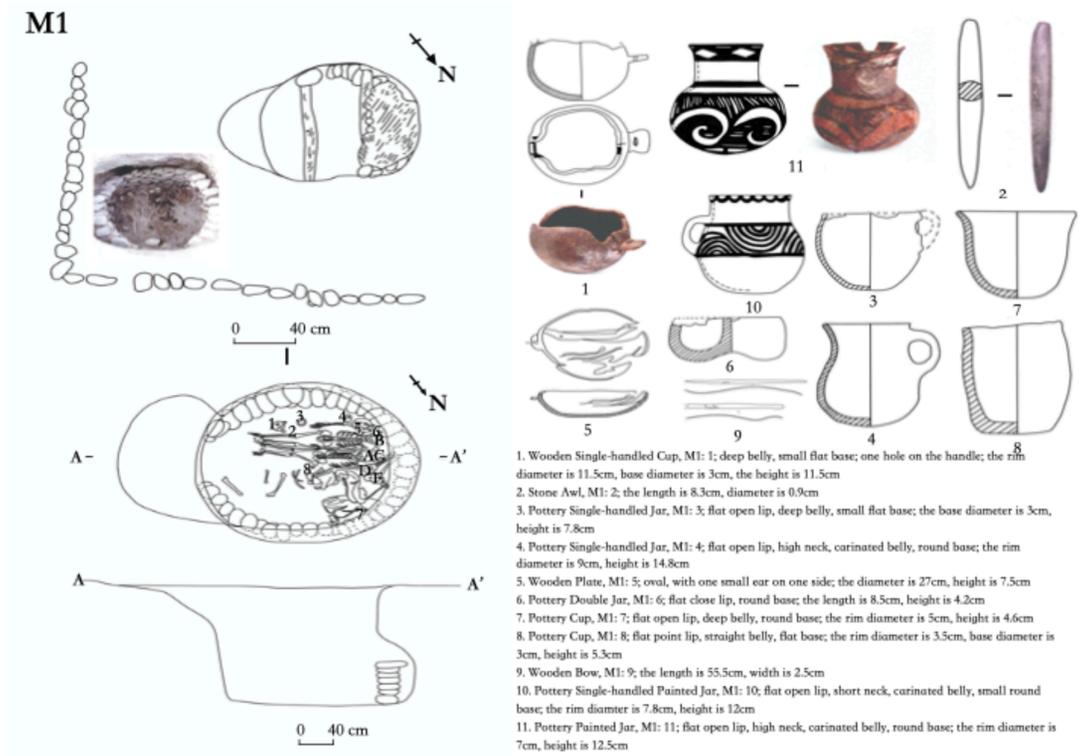


Fig. 5.1.3.3-5

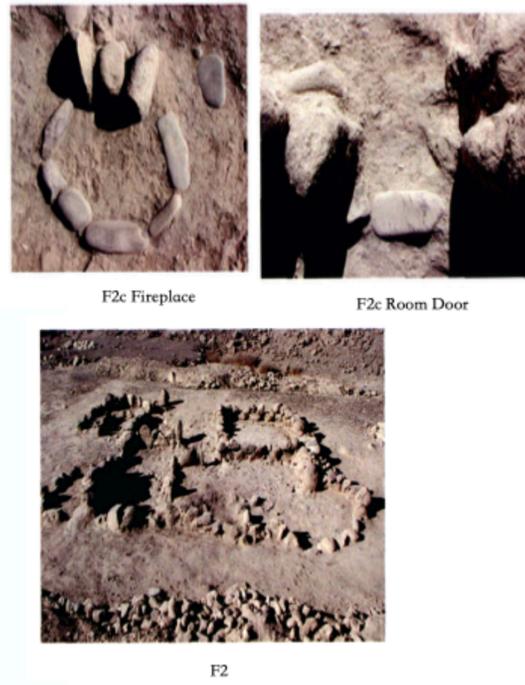
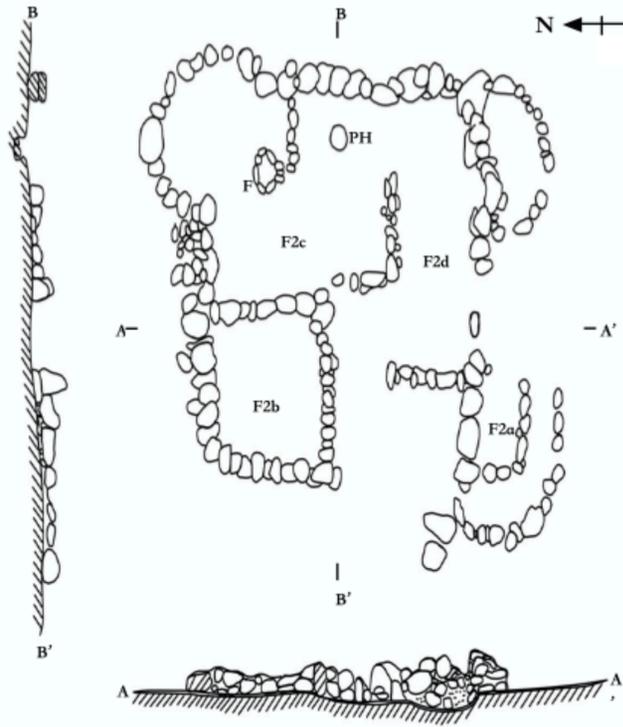
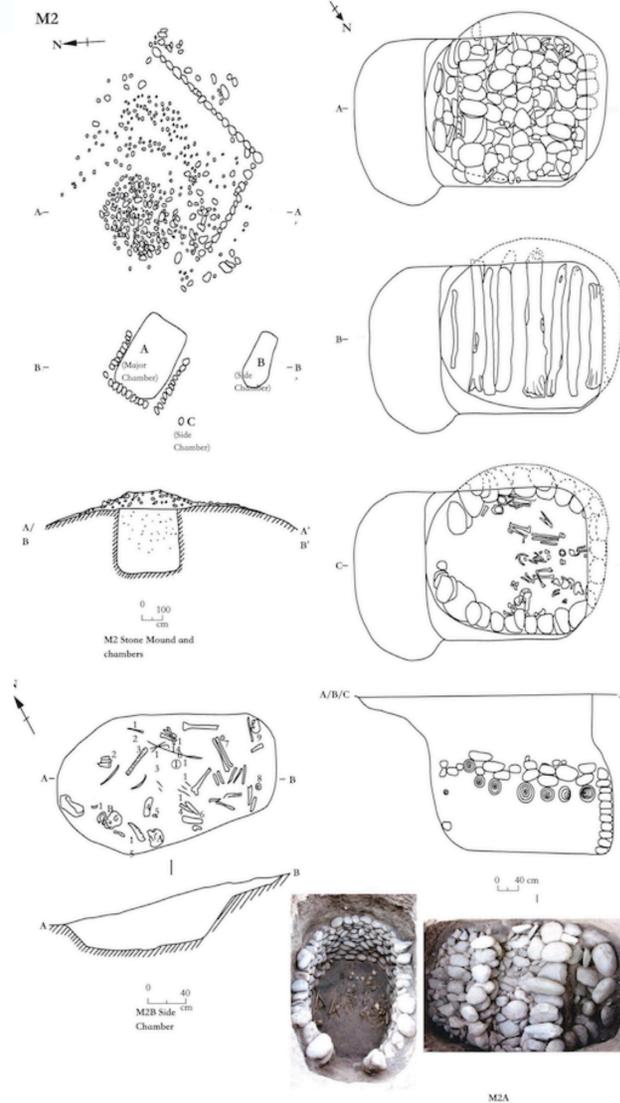


Fig. 5.1.3.3-3

F2	F2a	F2b	F2c	F2d
8 Mittstone, the length is 31.6cm, width is 11.8cm	24 The height is 6cm	6 The height is 5.8cm	5 Double-handled Painted Jar, the rim diameter is 15.4cm, base diameter is 8.6cm, height is 35cm	14 The height is 5cm
7 Millstone, the length is 42cm, width is 25.4cm	100 Millstone, the length is 16cm, width is 10.6cm	45 The height is 5.5cm	7 Millstone, the length is 42cm, width is 25.4cm	12 The height is 5.4cm
41 The height is 6cm	3 The height is 3.9cm	31 The height is 6.8cm	28 The height is 7.8cm	5 The height is 5.3cm
6 The height is 6cm	102 Stone Mortar, the longer diameter is 36cm, shorter diameter is 26.6cm; the hole longer diameter is 17.6cm, shorter diameter is 15.4cm; the depth is 7.6cm	56 The height is 5.4cm	30 Millstone, the length is 22cm, width is 14.4cm	6 The height is 5.3cm
15 The height is 4.4cm	78 The height is 7cm	37 The height is 4.8cm	21 The height is 6cm	9 The height is 5.6cm
2 The height is 3.8cm	32 The rim diameter is 10cm, height is 5.5cm	71 The height is 7cm	14 The height is 3.6cm	10 The height is 5cm
51 The height is 5.4cm	54 The rim diameter is 8cm, height is 4.9cm	91 The height is 6cm	23 The height is 6cm	
	99 The height is 2.4cm	66 The height is 7.2cm	16 The height is 9.5cm	
	47 The height is 5.5cm	101 Millstone, the length is 11cm, width is 12.2cm	19 The height is 6cm	
	96 The height is 3.2cm	65 The height is 9.8cm	20 The height is 4.3cm	



M2A	M2B	M2C	M
2 Pottery Painted Jar, the rim diameter is 8cm, height is 9.8cm, base diameter is 7.5cm	9 Pottery Single-handled Painted Jar, the rim diameter is 7.8cm, height is 14.4cm	1 Wooden Shallow Bowl, one small ear on one side, with one hole on it, several wooden shavings found on the bowl, the rim diameter is 12.14cm, the base diameter is 9.12.5cm, the height is 7.3cm	3 Turquoise Bead, with holes on the center; the bigger one is 0.5cm diameter and 0.6cm high, the hole diameter is 0.15cm; the smaller one is 0.35cm diameter and 0.3cm high, the hole diameter is 0.15cm
5 Pottery Single-handled Jar, the rim diameter is 8cm, height is 11.7cm	3 Wooden Plank, the long diameter is 21.6cm, height is 6.4cm	2 Wooden Plank, the length is 14.8cm	13 Bead, the bigger one is 0.75cm diameter and 0.6cm high, the hole diameter is 0.15cm; the smaller one is 0.5cm diameter and 0.3cm high, the hole diameter is 0.15cm
4 Pottery Spinning Wheel, one drilling hole on the center, the diameter is 3.5cm, height is 1cm, the hole diameter is 0.8-0.9cm	6 Wooden Plank, the long diameter is 21.6cm, height is 6.4cm	4 Wooden Plank, the length is 11.8cm	7 Agate Bead, the diameter is 0.8cm, the hole diameter is 0.1cm
3 Pottery Single-handled Jar (Shaded), round base, the height is 5cm	1 Wooden Plank, the length is 11.8cm	7 Wooden Object, the length is 17.2cm, width is 1.1cm, thickness is 0.6cm	4 Bead, the height is 1.5cm, the hole diameter is 0.7-2cm
1 Pottery Spinning Wheel, one hole on the center, with one spinning stick left inside, the longer diameter is 4.2cm, shorter diameter is 3.5cm, the thickness is 0.5cm	13 Wooden Object, with two rows of holes on one edge, the hole diameter is 1.8cm; the length is 10cm, width is 2.2cm, thickness is 0.8cm	8 Wooden Object, the length is 17.2cm, width is 1.1cm, thickness is 0.6cm	11 Gold Foli Piece, the length is 3.1cm, width is 2.3cm
6 Wooden Spinning Wheel, one hole on the center, with one spinning stick left inside, the longer diameter is 4.2cm, shorter diameter is 3.5cm, the thickness is 0.5cm	14 Wooden Stick, the longest length is 0.5m, if tapered diameter is 1.2cm	10 Wooden Object, the length is 17.2cm, width is 1.1cm, thickness is 0.6cm	18 Bronze Ornament in sheep shape, the length is 4.6cm, height is 4.2cm
14 Wooden Stick, the longest length is 0.5m, if tapered diameter is 1.2cm	10 Wooden Object, the length is 17.2cm, width is 1.1cm, thickness is 0.6cm	12 Wooden Spinning Wheel, the length is 14.8cm	16 Bronze Ornament, the length is 5cm, width is 2.5cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	19 Bronze Earring, the diameter is 1.3-1.8cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	2 Wooden Plank, the length is 11.8cm	8 Wooden Object, the length is 17.2cm, width is 1.1cm, thickness is 0.6cm	17 Bronze Ornament, the length is 3cm, width is 2.3cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	3 Wooden Plank, the length is 11.8cm	12 Wooden Spinning Wheel, the length is 14.8cm	6 Bronze Plaque, the length is 4.4cm, width is 3.3cm, thickness is 0.2cm, the hole diameter is 0.1cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	4 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	1 Wooden Object, the length is 5-7.5cm, the width is 1.2-1.4cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	14 Bone Awl, the length is 8.2cm, the width is 0.8cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	1 Wooden Object, the length is 11.5-11.7cm, the diameter is 1.2-1.4cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	8 Golden Earring, with one agate bead at the bottom; the length is 4.5cm, diameter is 1.5cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	23 Wooden Object, made by tree branches, the length is 17.6cm, the diameter is 0.6cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	20 Bronze Earring, the length is 3.6cm, the diameter is 1.8cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	21 Wooden Object, the length is 6.4-7cm, the diameter is 0.5-0.8cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	15 Pottery Jar Shard, the Height is 8.8cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	9 Iron Awl, the end was found in a wooden handle, he length is 4.4cm, the diameter is 0.9cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	24 Wooden Object, the length is 16.5cm, width is 1.6cm, the hole diameter is 0.3-0.8cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	25 Wooden Object, one drilling hole on the center, the length is 7.9cm, the hole diameter is 0.4cm
1 Wooden Plank, with one small ear on one side, with the length is 10.2cm	1 Wooden Plank, the length is 11.8cm	1 Wooden Spinning Wheel, the length is 14.8cm	5 Bronze Hoe, the length is 16cm, diameter is 1.3cm

Fig. 5.1.3.3-6

Fig. 5.1.3.7

76WYM18

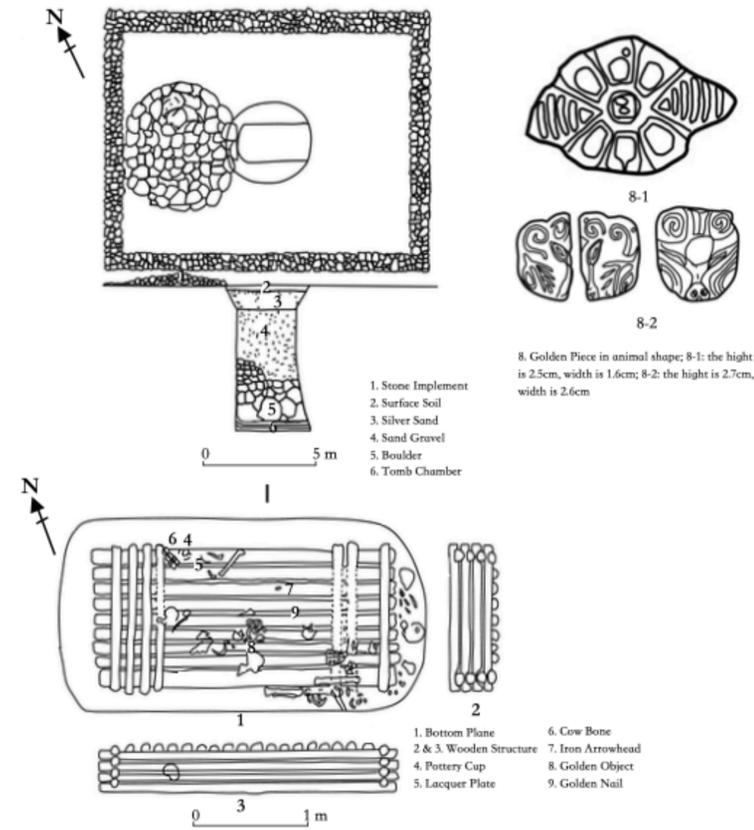


Fig. 5.1.3.4-1

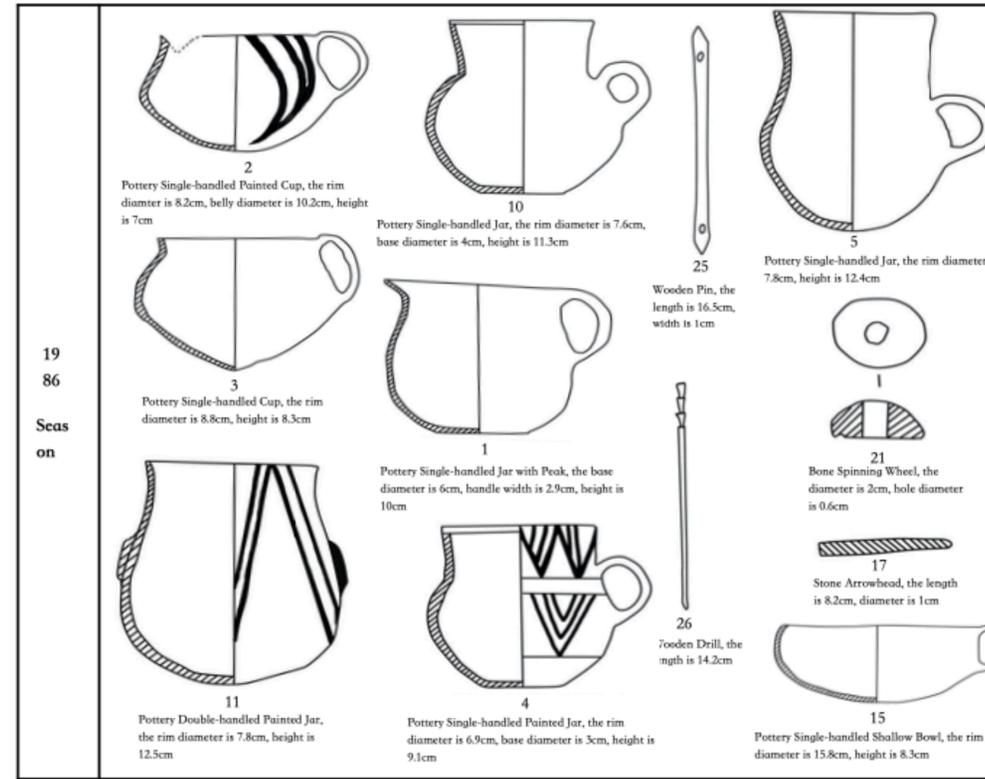


Fig. 5.1.3.4-3

77WYM30

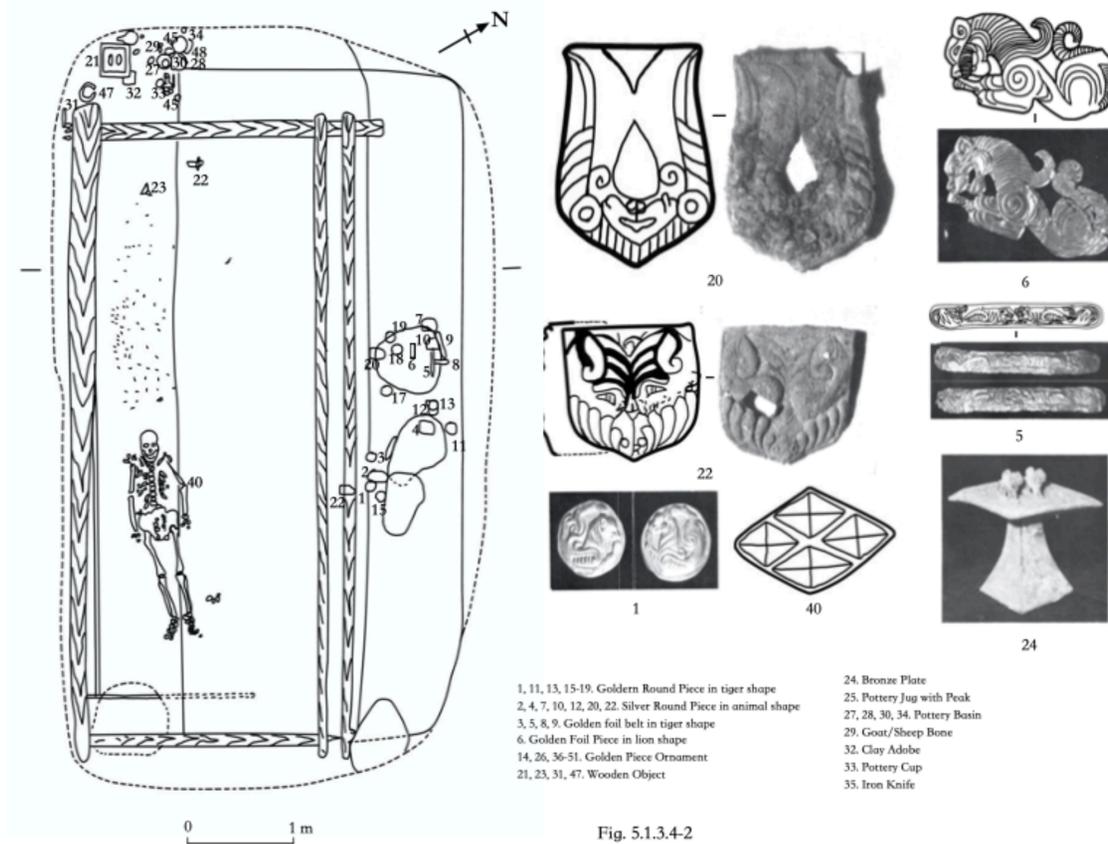
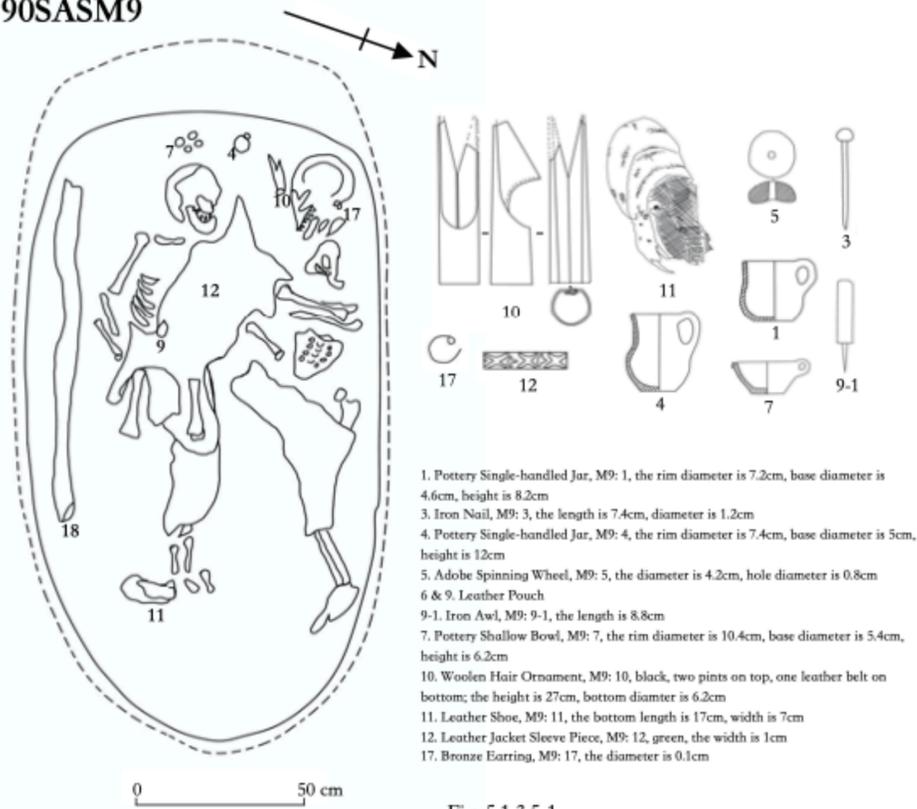


Fig. 5.1.3.4-2

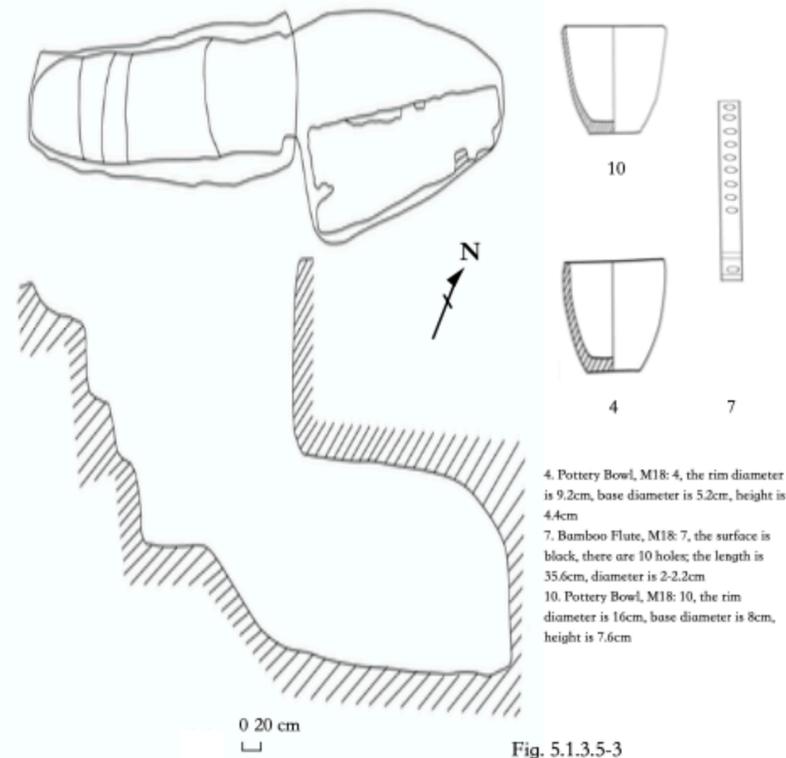
90SASM9



1. Pottery Single-handled Jar, M9: 1, the rim diameter is 7.2cm, base diameter is 4.6cm, height is 8.2cm
3. Iron Nail, M9: 3, the length is 7.4cm, diameter is 1.2cm
4. Pottery Single-handled Jar, M9: 4, the rim diameter is 7.4cm, base diameter is 5cm, height is 12cm
5. Adobe Spinning Wheel, M9: 5, the diameter is 4.2cm, hole diameter is 0.8cm
- 6 & 9. Leather Pouch
- 9-1. Iron Awl, M9: 9-1, the length is 8.8cm
7. Pottery Shallow Bowl, M9: 7, the rim diameter is 10.4cm, base diameter is 5.4cm, height is 6.2cm
10. Woolen Hair Ornament, M9: 10, black, two pints on top, one leather belt on bottom; the height is 27cm, bottom diameter is 6.2cm
11. Leather Shoe, M9: 11, the bottom length is 17cm, width is 7cm
12. Leather Jacket Sleeve Piece, M9: 12, green, the width is 1cm
17. Bronze Earring, M9: 17, the diameter is 0.1cm

Fig. 5.1.3.5-1

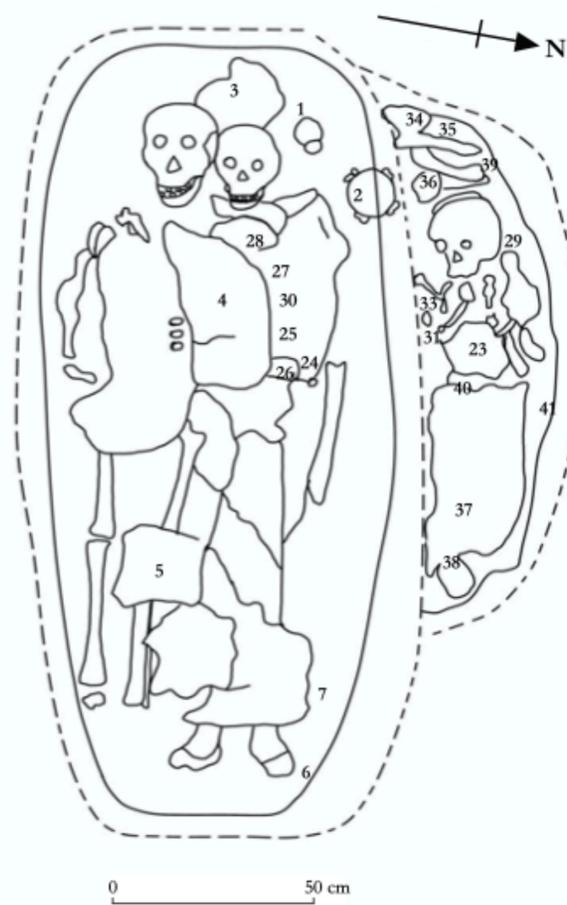
90SASM18



4. Pottery Bowl, M18: 4, the rim diameter is 9.2cm, base diameter is 5.2cm, height is 4.4cm
7. Bamboo Flute, M18: 7, the surface is black, there are 10 holes; the length is 35.6cm, diameter is 2.2cm
10. Pottery Bowl, M18: 10, the rim diameter is 16cm, base diameter is 8cm, height is 7.6cm

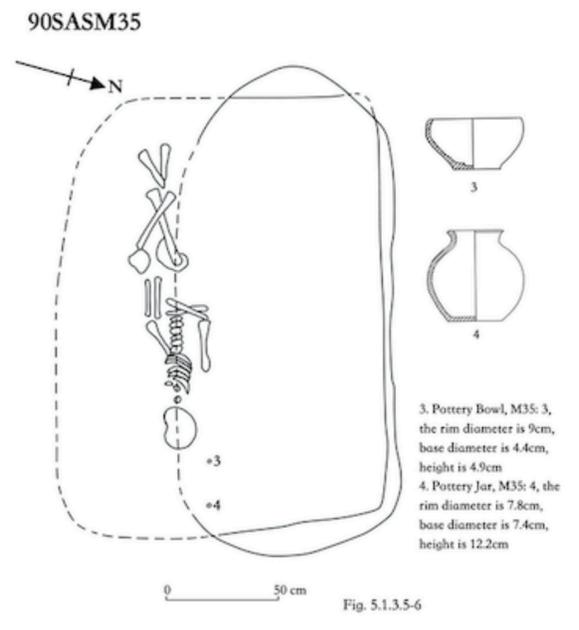
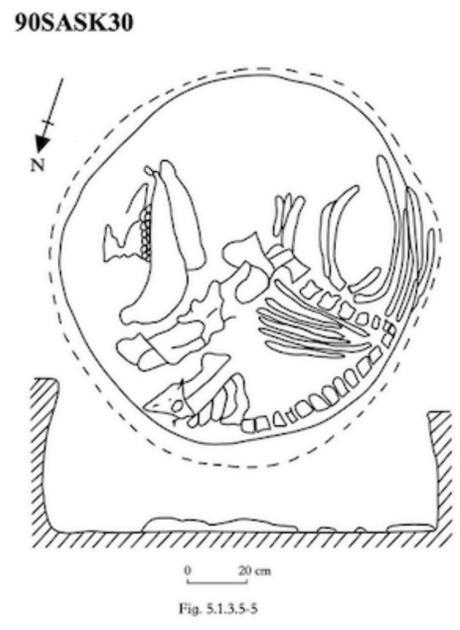
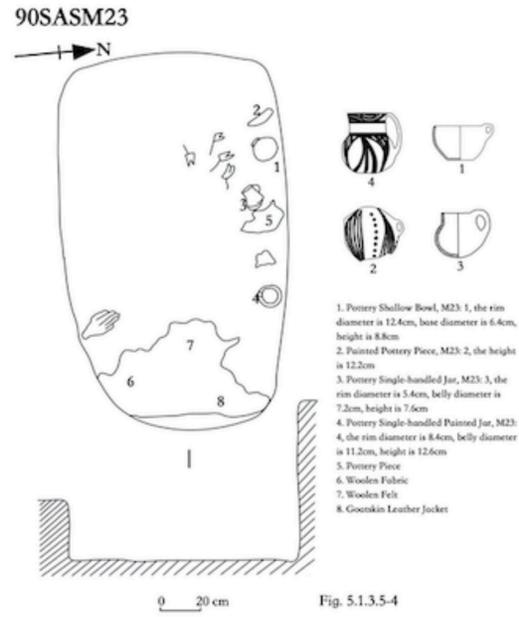
Fig. 5.1.3.5-3

90SASM13



1. Pottery Jar, M13: 1, the rim diameter is 6.2cm, height is 8.6cm
 2. Pottery Shallow Bowl, M13: 2, the rim diameter is 12.7cm, height is 6.8cm
 4. Leather Jacket Piece, M13: 4, the width is 2-2.5cm
 - 5 & 7 & 30 & 37 & 40. Woolen Fabric
 8. Gravel Stone, M13: 8, the length is 15.5cm, width is 4.3cm, thickness is 1.3cm
 9. Pottery Shallow Bowl, M13: 9, the rim diameter is 13cm, base diameter is 8cm, height is 7.4cm
 10. Pottery Shallow Bowl, M13: 10, the rim diameter is 11.8cm, height is 6.4cm
 11. Pottery Single-handled Jar, M13: 11, the rim diameter is 8.2cm, base diameter is 7.4cm, height is 21cm
 12. Pottery Painted Jug, M13: 12, the rim diameter is 5.4cm, height is 11.4cm
 13. Pottery Jar, M13: 13, the rim diameter is 7.4cm, height is 8.2cm
 14. Pottery Shallow Bowl, M13: 14, the rim diameter is 11.4cm, height is 7.8cm
 15. Wooden Plate, M13: 15, the length is 31.4cm, width is 27.2cm, height is 8.2cm
 16. Wooden Spinn, M13: 16, the rim length is 9.8cm, width is 8cm, height is 5.6cm
 17. Woolen Felt Fabric
 18. Leather Pillow, M13: 18, the length is 23.8cm, width is 8.2cm, thickness is 4cm
 - 19 & 39. Hair Ornament
 20. Horn Comb, M13: 20, the height is 5cm, width is 4.5cm
 21. Wooden Plate, M13: 21, one edge was broken and sewed by yarn, the length is 34.4cm, width is 25.6cm, height is 7cm
 22. Painted Pottery Piece
 23. Wooden Walking Stick, M13: 23, the length is 71.8cm, the handle length is 7.5cm, diameter is 1.2-1.5cm
 24. Iron Knife and Leather Sheath, M13: 24; the knife length is 10.4cm, handle length is 5.5cm, width is 1cm; the sheath length is 14cm, width is 4cm
 25. Leather Pouch
 26. Eyebrow Stone, M13: 26, the length is 6.5cm, diameter is 0.9cm
 27. Iron Plaque, M13: 27, the diameter is 2.7cm, handle length is 0.8cm, thickness is 0.1cm
 28. Iron Ornament, M13: 28, the diameter is 0.7cm, length is 1.4cm
 29. Horn Comb, M13: 29, the length is 4.5cm, width is 5.2cm
 31. Wooden Object, M13: 31, the length is 7cm, width is 5.5cm, thickness is 1cm
 32. Stone Bead, M13: 32, the height is between 0.2-0.7cm, the diameter is between 0.4-1.2cm, the hole diameter is between 0.2-0.4cm
 33. Wooden Spinning Wheel, M13: 33, the diameter is 4.2cm, thickness is 0.6cm, hole diameter is 0.6cm
 34. Woolen Hair Ornament, M13: 34, the length is 7cm, height is 24cm
 35. Wooden Stick, M13: 35, the length is 26.5cm
 36. Leather Pillow
 38. Leather Boot, M13: 38, the bottom length is 23cm, width is 8.5cm, the height is 23cm
 41. Leather Jacket Sleeve, M13: 41, the length is 86cm, width is 4-11cm
- There are food remains found in M13: 2 & 9, all carbonized, in round shape, the diameter is between 2-4cm

Fig. 5.1.3.5-2



M 5	<p>Pottery Painted Piece, the height is 10cm. Horn Single-handled Cup, the rim diameter is 11.8cm, height is 24.8cm.</p>	M 29	<p>Leather Belt, the length is 90.1cm, width is 2.6cm.</p>
M 10	<p>Pottery Painted Bowl, the rim diameter is 9cm, base diameter is 5cm, height is 4.2cm. Pottery Jar, the rim diameter is 7.4cm, base diameter is 6.4cm, height is 11.8cm. Pottery Single-handled Jar, the rim diameter is 9.8cm, base diameter is 6.4cm, height is 16.5cm. Pottery Painted Bowl, the rim diameter is 15.8cm, base diameter is 8.6cm, height is 7.6cm. Wooden Comb, the height is 6.5cm. Pottery Jar, the rim diameter is 7.4cm, base diameter is 6.4cm, height is 11.8cm. Pottery Single-handled Jar, the rim diameter is 9.8cm, base diameter is 6.4cm, height is 16.5cm. Pottery Painted Bowl, the rim diameter is 15.8cm, base diameter is 8.6cm, height is 7.6cm. Cowry Ornament, the length is 2.2cm, width is 1.6cm. Wig, the general length is 42cm. Wooden Plank, the length is 56.5cm, width is 32cm. Leather Shoe, the length is 22.5cm, width is 8.5cm.</p>		
M 16	<p>Leather Pouch, the width is 5.9cm, height is 11cm. Leather Belt & Buckle, the belt length is 25.4cm, width is 0.8cm, the buckle length is 5cm, width is 2cm. Wooden Square Stick, the length is 12.6cm, width is 10.4cm. Leather Pouch, the height is 23.1cm, length is 14.5cm, width is 13.4cm.</p>		
M 22	<p>Leather Shoe, the bottom length is 19cm, width is 7.2cm.</p>	M 28	<p>Leather Pouch, the height is 5.7cm, width is 2.8cm.</p>
M 33	<p>Pottery Single-handled Painted Jar, the rim diameter is 6.4cm, belly diameter is 8cm, the height is 8.4cm. Pottery Triple-handled Painted Jar, the rim diameter is 10.6cm, base diameter is 8.4cm, height is 27.8cm.</p>		

Fig. 5.1.3.5-7

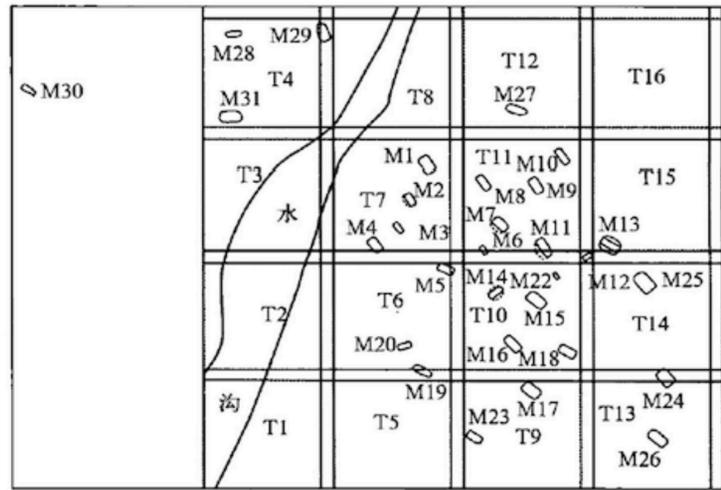
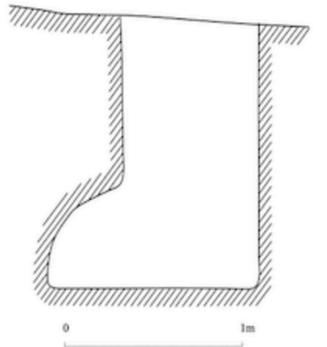


Fig. 5.1.3.6-1



1. Pottery Single-handed Jar, M2: 1, the lip diameter is 10.5cm, base diameter is 9.5cm, height is 20.5cm
2. Pottery Single-handed Cup, M2: 2, the lip diameter is 9.2cm, base diameter is 6.5cm, height is 8.2cm
3. Pottery Single-handed Cup, M2: 3, the lip diameter is 6.2cm, base diameter is 6.4cm, height is 7.2cm
4. Wooden Bowl, M2: 4, the lip diameter is 16.0-16.8cm, height is 4.2cm
5. Wooden Bowl, M2: 5, the length is 112.5cm, diameter is 2.2cm
6. Wooden Bowl, M2: 6, the length is 39.5cm, diameter is 2.2cm
7. Wooden Stick, M2: 7, the length is 42.4cm, diameter is 4.6cm
8. Wooden Leg, M2: 8, the length is 52cm, width is 7.2-8.4cm

Fig. 5.1.3.6-2

M29

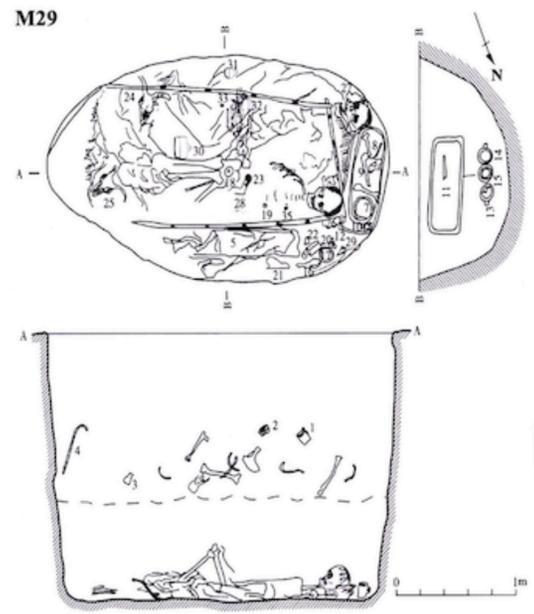
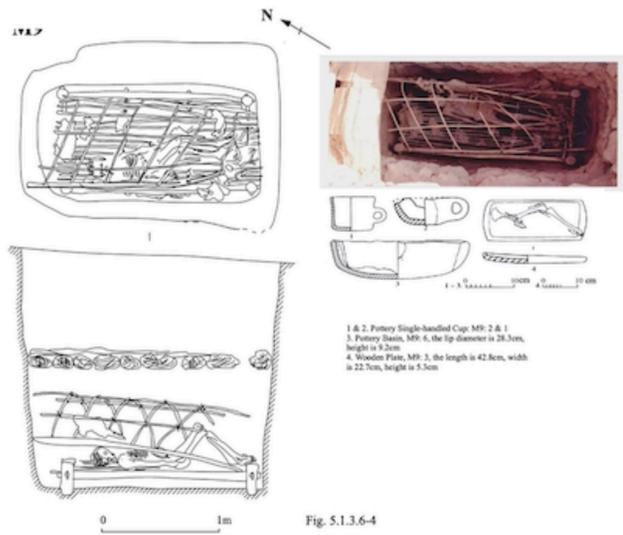


Fig. 5.1.3.6-7



- 1 & 2. Pottery Single-handed Cup, M9: 2 & 1
3. Pottery Basin, M9: 3, the lip diameter is 28.3cm, height is 6.2cm
4. Wooden Plate, M9: 4, the length is 42.6cm, width is 22.7cm, height is 6.5cm

Fig. 5.1.3.6-4

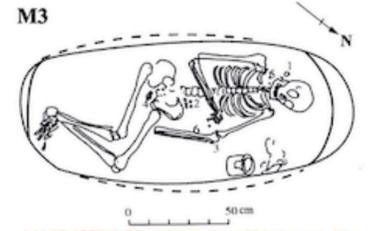
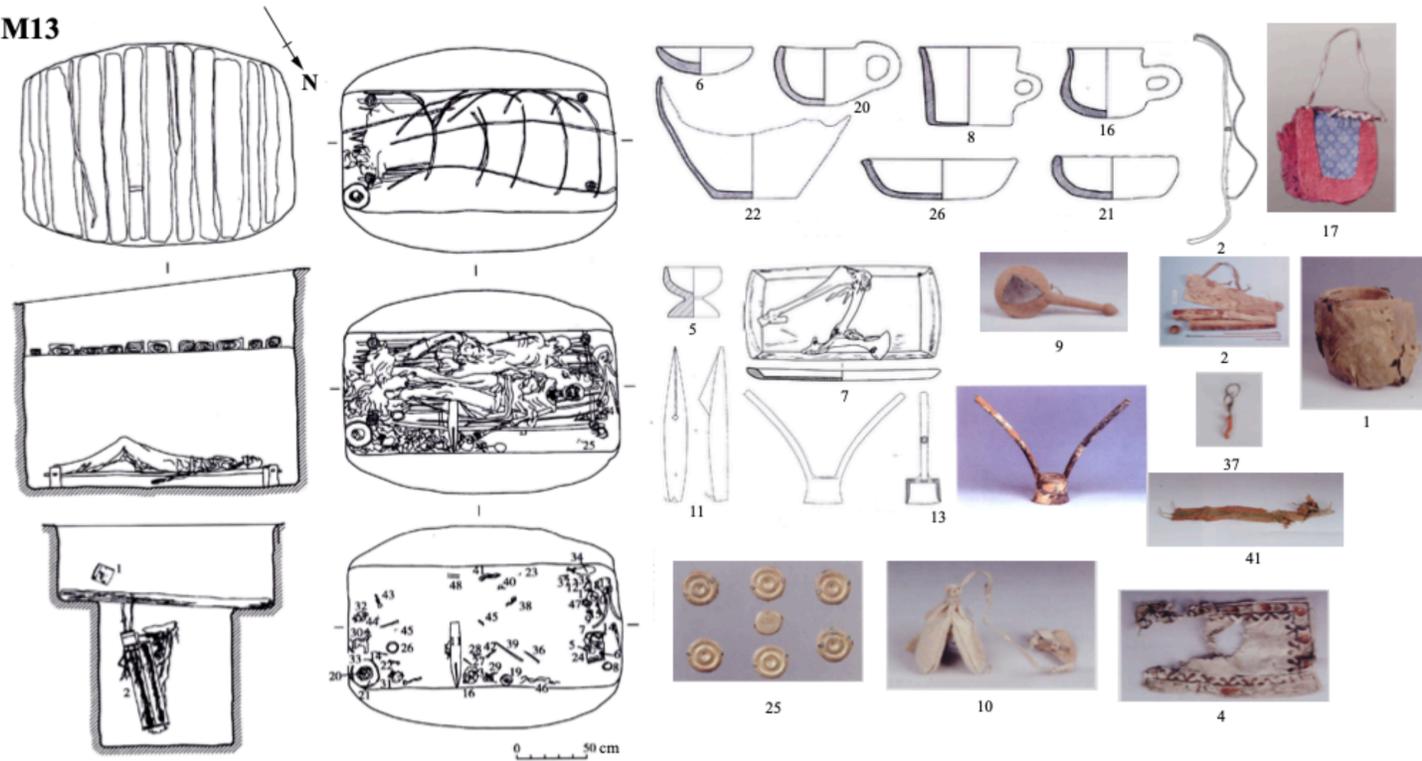


Fig. 5.1.3.6-3

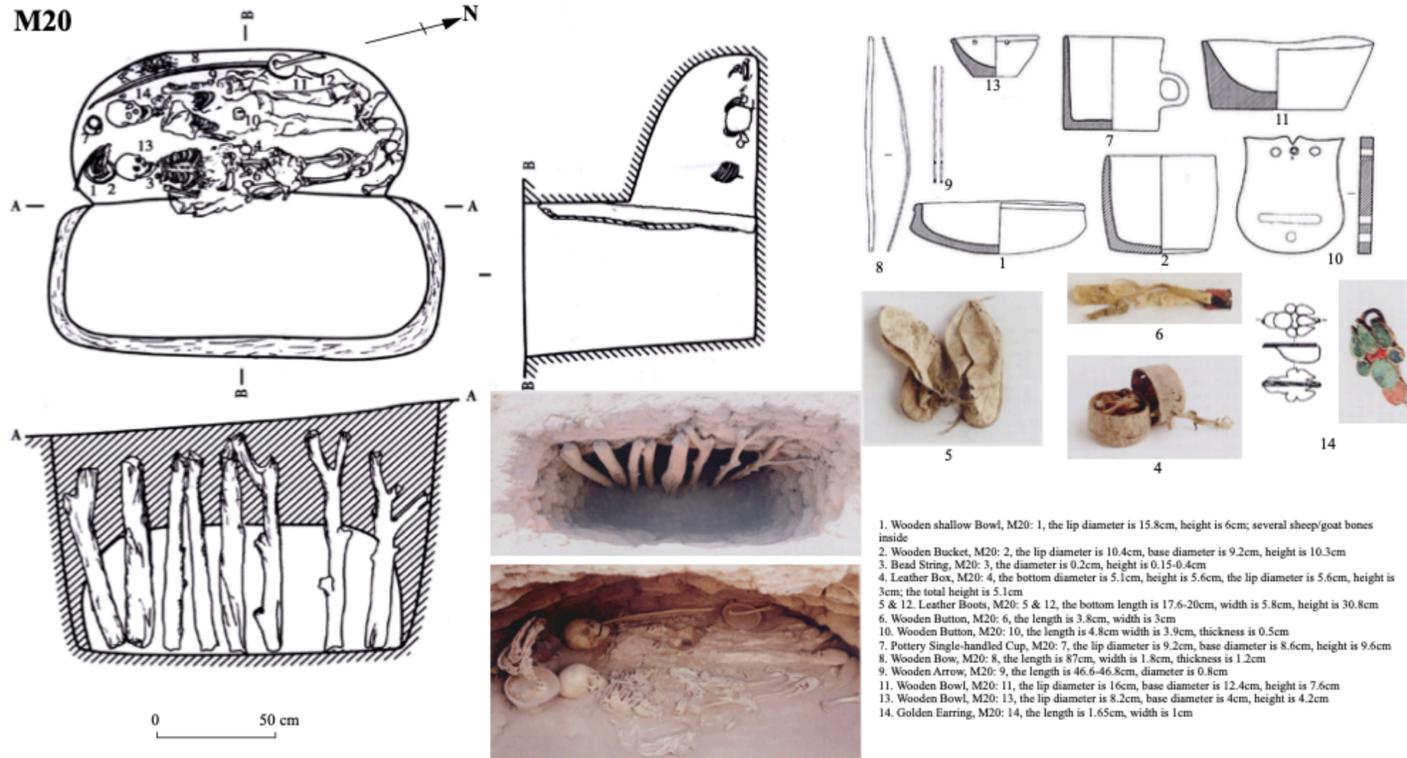
M13



1. Leather Drum, M13: 1, the base is made by wood; the lip diameter is 15cm, base diameter is 15.3cm, height is 16.4cm
2. Wooden Bow & Arrow and Arrow Bag, M13: 2, the bow length is 120.9cm, width is 3.8cm; the arrow length is 23.5/52.7/23.5cm, the diameter is 1cm; the bag length is 96.6cm, width is 30cm
3. Silk Piece, M13: 3, sewed by one yellow silk piece and one red silk piece
4. Leather Piece, M13: 4, sewed by two pieces of sheepskin, with red & black colored painting on it; the length is 44.8cm, width is 30.2cm
5. Wooden pot Dou, M13: 5, the lip diameter is 10cm, base diameter is 9.1cm, height is 9.4cm
6. Pottery shallow Bowl, M13: 6, the lip diameter is 9.1cm, height is 3.4cm
7. Wooden Plate, M13: 7, the length is 34.2cm, width is 17.4cm, height is 1.8cm; one goat/sheep leg found inside
8. Pottery Single-handled Cup, M13: 8, the lip diameter is 9.3cm, base diameter is 7.6cm, height is 9.7cm
9. Bronze Mirror with wooden frame, M13: 9, the length is 10.5cm, diameter is 4.4cm, thickness is 0.4cm
10. Leather Pouch, M13: 10, the length is 11.5cm
11. Wooden Hair Ornament, the width is 4.6cm, height is 62.8cm
13. Wooden Hair Ornament, lip diameter is 3.6cm, thickness is 0.3cm; the stick diameter is 0.6cm, height is 45.28cm
14. Reed branch, M13: 14, the length is 54.4cm, diameter is 1.8cm
16. Pottery Single-handled Cup, M13: 16, the lip diameter is 7.2cm, height is 8.6cm
17. Silk pouch, M13: 17, the length is 26.5cm, width is 14.2cm
19. Mud Lamp, M13: 19, the length is 15.4cm, width is 9cm
20. Pottery single-handled Cup, M13: 20, the lip diameter is 7.1cm, base diameter is 3.2cm, height is 7.9cm
21. Pottery shallow Bowl, M13: 21, the lip diameter is 11.4cm, base diameter is 8cm, height is 5.2cm
22. Pottery Jar, M13: 22, the base diameter is 10cm, height is 18.9cm
- 23-25. Bronze Button with golden coating, M13: 23-25, the diameter is 1cm, thickness is 0.1cm
26. Pottery shallow Bowl, M13: 26, the lip diameter is 14.1, base diameter is 7.4cm, height is 4.9cm
34. Leather Pouch, M13: 34, the length is 11.1cm
35. Iron Knife, M13: 35, the length is 8cm, handle width is 0.5cm, knife width is 1.1cm
37. Golden Earring, M13: 37, the length is 3.8cm
38. Iron Button, M13: 38, the length is 5.1cm, button diameter is 3.2cm
40. Bone Box, M13: 40, the base diameter is 5.6cm, upper height is 2.66cm, lower height is 3.1cm
41. Silk Band, M13: 41, the length is 52.2cm, width is 1.8cm
45. Leather Bag; 46. Leather Belt; 48. Wooden Object
47. Glass Bead, M13: 47, the diameter is 0.5cm, hole diameter is 0.3cm
- 12 & 39. Wooden Stick; 18 & 31. Leather Pouch; 15. Wooden Spinning wheel & shaft
- 27 & 36 & 42 & 44. Wooden Nail; 28. Wooden object; 29. Wooden Stick; 30. Leather Boot; 32. Silk Bag; 33. Wooden Stick

Fig. 5.1.3.6-5

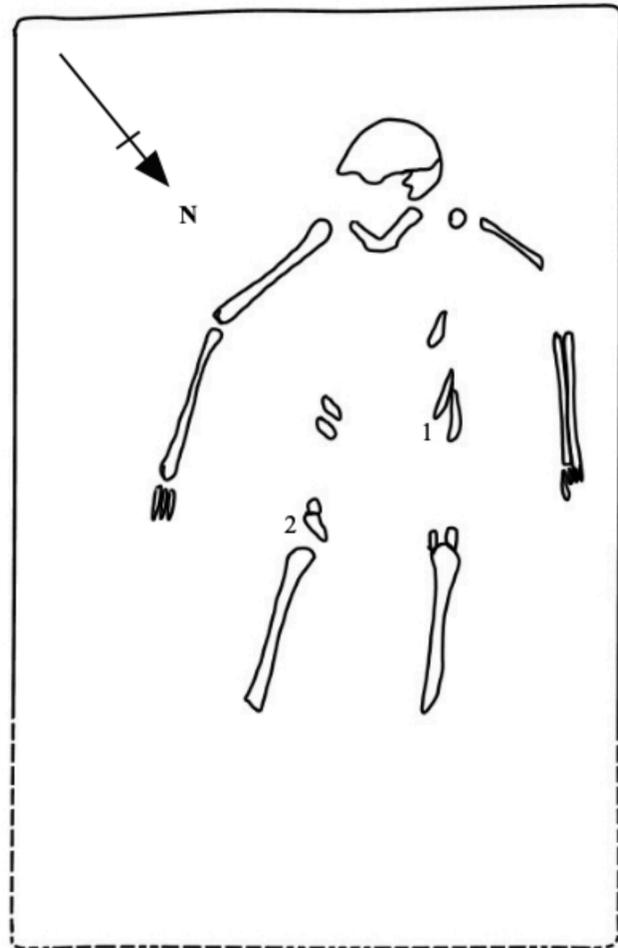
M20



1. Wooden shallow Bowl, M20: 1, the lip diameter is 15.8cm, height is 6cm; several sheep/goat bones inside
2. Wooden Bucket, M20: 2, the lip diameter is 10.4cm, base diameter is 9.2cm, height is 10.3cm
3. Bead String, M20: 3, the diameter is 0.2cm, height is 0.15-0.4cm
4. Leather Box, M20: 4, the bottom diameter is 5.1cm, height is 5.6cm, the lip diameter is 5.6cm, height is 3cm; the total height is 5.1cm
- 5 & 12. Leather Boots, M20: 5 & 12, the bottom length is 17.6-20cm, width is 5.8cm, height is 30.8cm
6. Wooden Button, M20: 6, the length is 3.8cm, width is 3cm
10. Wooden Button, M20: 10, the length is 4.8cm, width is 3.9cm, thickness is 0.5cm
7. Pottery Single-handled Cup, M20: 7, the lip diameter is 9.2cm, base diameter is 8.6cm, height is 9.6cm
8. Wooden Bowl, M20: 8, the length is 7cm, width is 1.8cm, thickness is 1.2cm
9. Wooden Arrow, M20: 9, the length is 46.6-46.8cm, diameter is 0.8cm
11. Wooden Bowl, M20: 11, the lip diameter is 16cm, base diameter is 12.4cm, height is 7.6cm
13. Wooden Bowl, M20: 13, the lip diameter is 8.2cm, base diameter is 4cm, height is 4.2cm
14. Golden Earring, M20: 14, the length is 1.65cm, width is 1cm

Fig. 5.1.3.6-6

80TADM18

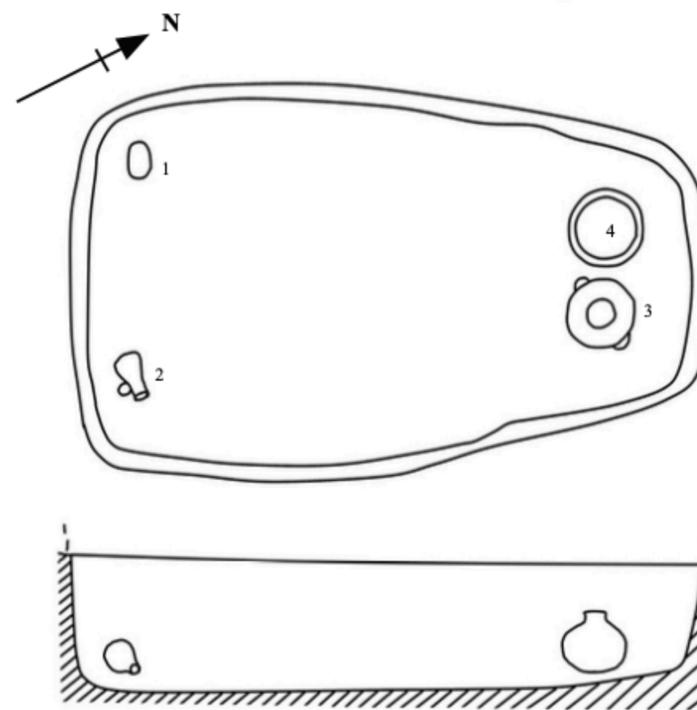


0 50 cm

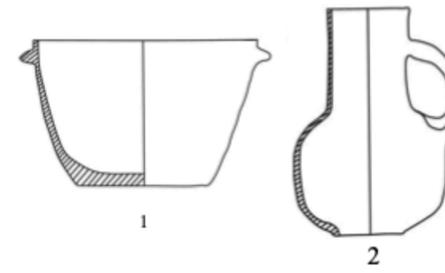
- 1. Iron Piece
- 2. Iron Arrowhead

Fig. 5.1.3.7-1

80TADM22



0 50 cm



- 1. Pottery Double-handled Basin, 80TADM22: 1, the lip diameter is 14.4cm, base diameter is 8.4cm, height is 8.4cm
- 2. Pottery Single-handled Jar, 80TADM22: 2, the lip diameter is 5cm, belly diameter is 10cm, height is 13.2cm
- 3. Pottery Colored Jar
- 4. Pottery Jar

Fig. 5.1.3.7-2

80TADM0	<p>M0: 1, Colored Pottery Jug, the lip diameter is 6.5cm, belly diameter is 11cm, height is 12cm</p> <p>M0: 2, Colored Pottery Jar, the lip diameter is 8.5cm, base diameter is 6.5cm, height is 13cm</p> <p>M0: 3, Colored Pottery Jar, the lip diameter is 5.3cm, belly diameter is 6cm, height is 6.5cm</p> <p>M0: 4, Colored Pottery Jar, the lip diameter is 8cm, height is 7.8cm</p> <p>M0: 5, Pottery Cup (Dou), the base diameter is 10cm, height is 7cm</p> <p>M0: 7, Pottery Single-handed Jar, the lip diameter is 7cm, belly diameter is 9cm, height is 12cm</p> <p>M0: 9, Pottery Plate, the lip diameter is 14cm, base diameter is 7cm, height is 4cm</p> <p>M0: 10, Pottery Gang, the lip diameter is 12cm, base diameter is 11cm, height is 16.5cm</p> <p>M0: 11, Knife Stone, the length is 9cm, width is 2.5cm, thickness is 1cm</p> <p>M0: 12, Knife Stone, the length is 5.8cm, width is 2.3cm, thickness is 0.5cm</p> <p>M0: 13, Bronze Plaque, the length is 8.2cm, width is 4.5cm, thickness is 0.3cm</p>
80TADM10	<p>M10: 1, Pottery Double-handed Jar, the lip diameter is 4cm, belly diameter is 5.4cm, base diameter is 3cm, height is 5.5cm</p> <p>M10: 2, Pottery Shallow Bowl, the lip diameter is 14cm, base diameter is 5cm, height is 6cm</p> <p>M10: 3, Pottery Single-handed Jar, the lip diameter is 9cm, belly diameter is 11cm, base diameter is 5cm, height is 10cm</p> <p>M10: 4, Pottery Spoon, the lip diameter is 9.2cm, base diameter is 7cm, height is 6cm, the handle length is 3.2cm</p>
Other Grave Goods	<p>M3: 1, Pottery Colored Jug, the lip diameter is 5.5cm, belly diameter is 12cm, height is 12cm</p> <p>M20: 1, Pottery Single-handed Colored Jar, the lip diameter is 6cm, belly diameter is 11cm, height is 14cm</p> <p>M45: 1, Pottery Colored Jar, the lip diameter is 7cm, belly diameter is 11cm, height is 12cm</p> <p>M33: 2, Pottery Colored Jar, the lip diameter is 7cm, thickness is 0.5cm, height is 12cm</p> <p>M43: 1, Pottery Colored Bowl, the lip diameter is 12cm, base diameter is 8cm, height is 7cm</p> <p>M23: 1, Pottery Single-handed Colored Jar, the lip diameter is 10cm, belly diameter is 20cm, base diameter is 9cm, height is 24cm</p> <p>M19: 1, Pottery Shallow Bowl, the lip diameter is 14cm, height is 5.2cm</p> <p>M35: 1, Pottery Bowl, the lip diameter is 12.5cm, base diameter is 7.6cm, height is 8cm</p> <p>M1: 1, Pottery Bowl, the lip diameter is 11.2cm, base diameter is 8.2cm, height is 6cm</p> <p>M15: 1, Pottery Single-handed Cup, the lip diameter is 7.5cm, base diameter is 7cm, height is 9cm</p> <p>M6: 1, Pottery Single-handed Colored Jar, the lip diameter is 7cm, belly diameter is 9cm, height is 7cm</p> <p>M37: 1, Pottery Yu, the lip diameter is 18.4cm, height is 10.8cm</p> <p>M9: 1, Pottery Shallow Bowl, the lip diameter is 14cm, base diameter is 10cm, height is 6.4cm</p> <p>M13: 1, Stone Spinning Wheel, the diameter is 4cm, hole diameter is 0.8cm, thickness is 0.9cm</p> <p>M26: 1, Pottery Spinning Wheel, the diameter is 4cm, hole diameter is 0.8cm, the thickness is 1.4cm</p> <p>M48: 1, Pottery Colored Shallow Bowl, the lip diameter is 16cm, height is 5cm</p> <p>M16: 1, Pottery Double-handed Jar, the lip diameter is 14cm, belly diameter is 24cm, height is 28cm</p> <p>M41: 1, Pottery Single-handed Shallow Bowl, the lip diameter is 12cm, height is 6cm, the handle length is 1.5cm</p> <p>M7: 1, Pottery Basin, the lip diameter is 23cm, base diameter is 15cm, height is 11.5cm</p> <p>M31: 2, Pottery Single-handed Cup, the lip diameter is 11cm, base diameter is 10.5cm, height is 10cm</p> <p>M40: 1, Pottery Ding, the lip diameter is 25cm, height is 15.5cm</p> <p>M39: 1, Pottery Single-handed Jar, the lip diameter is 8cm, belly diameter is 10cm, height is 7.5cm</p>

Fig. 5.1.3.7-3

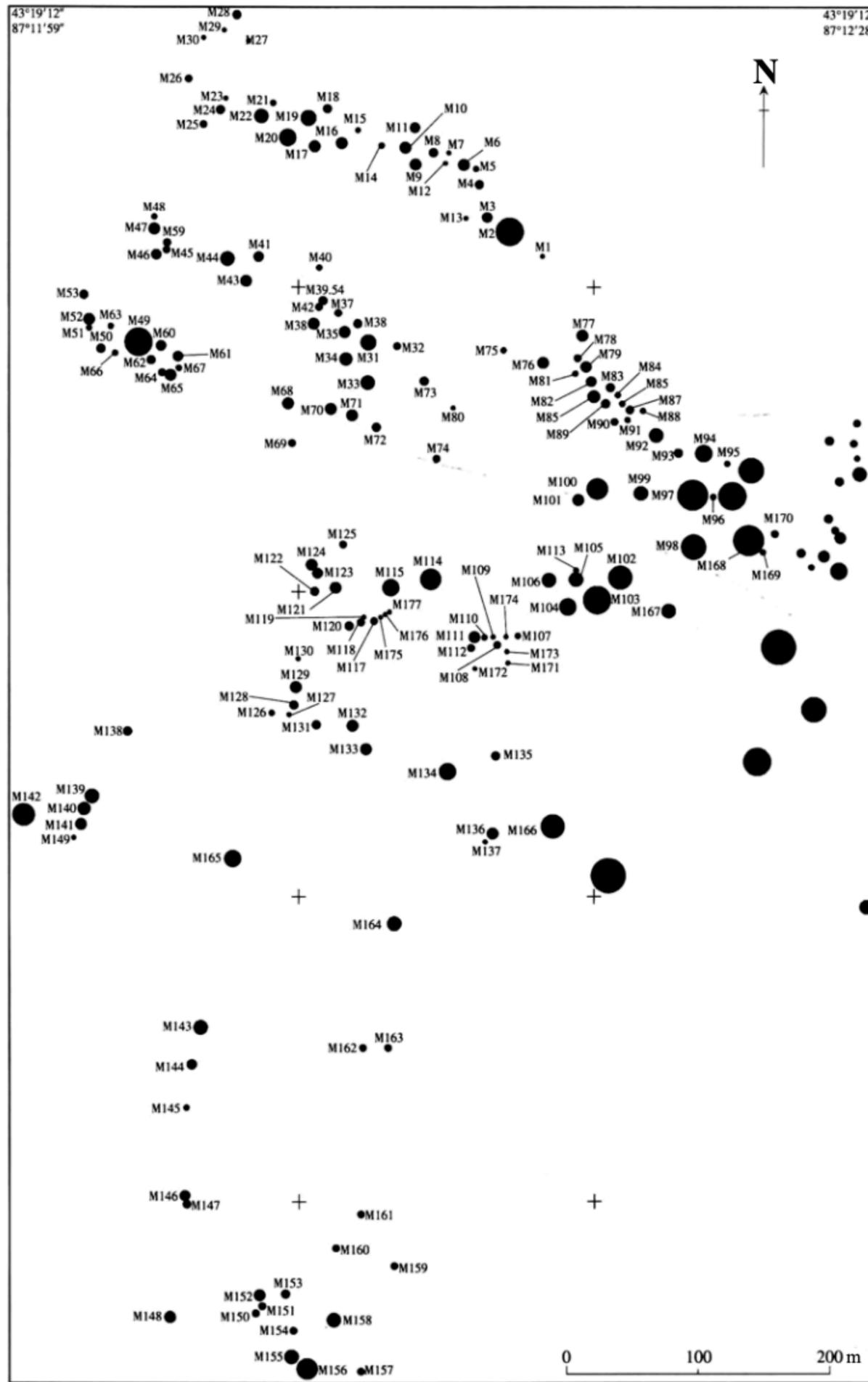


Fig. 5.2.1-1

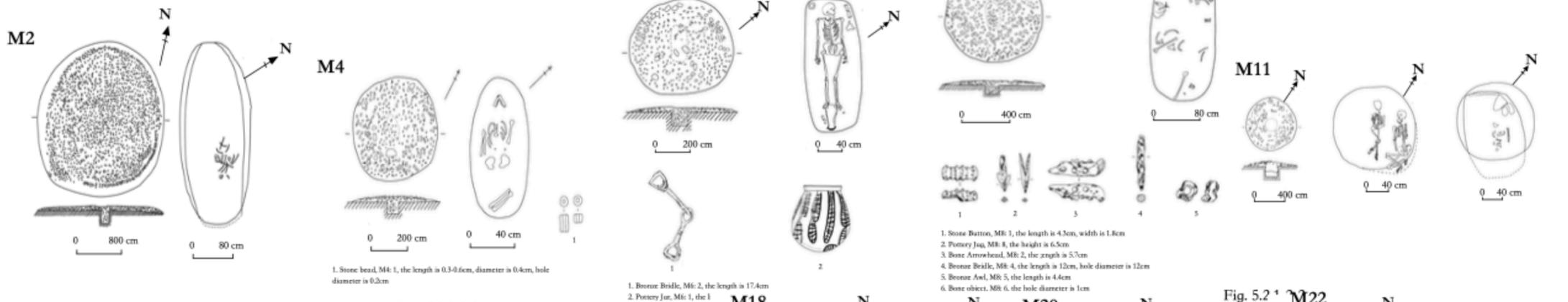
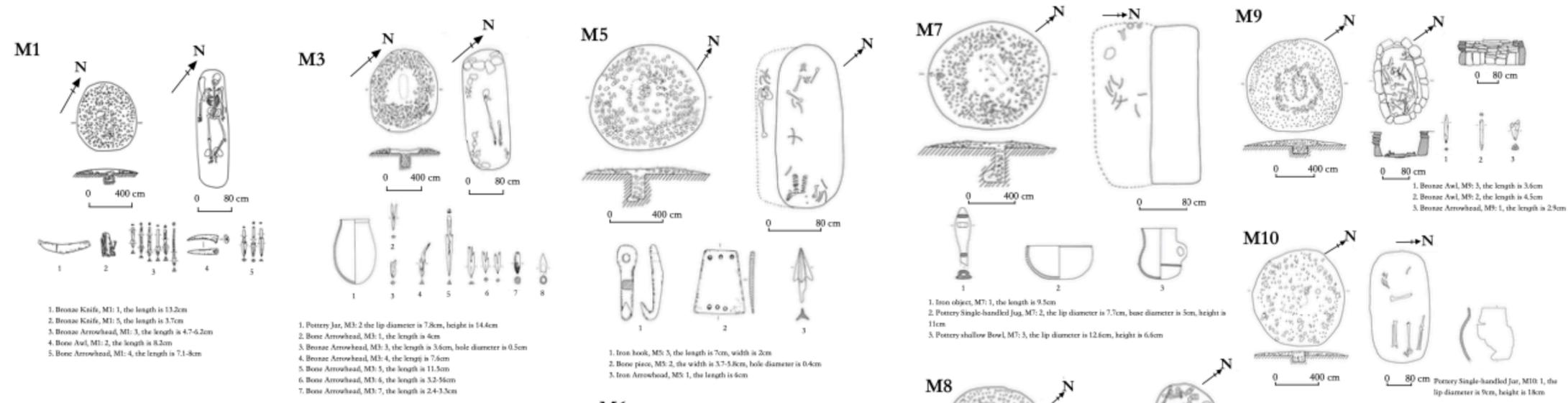


Fig. 5.2.1-2-1

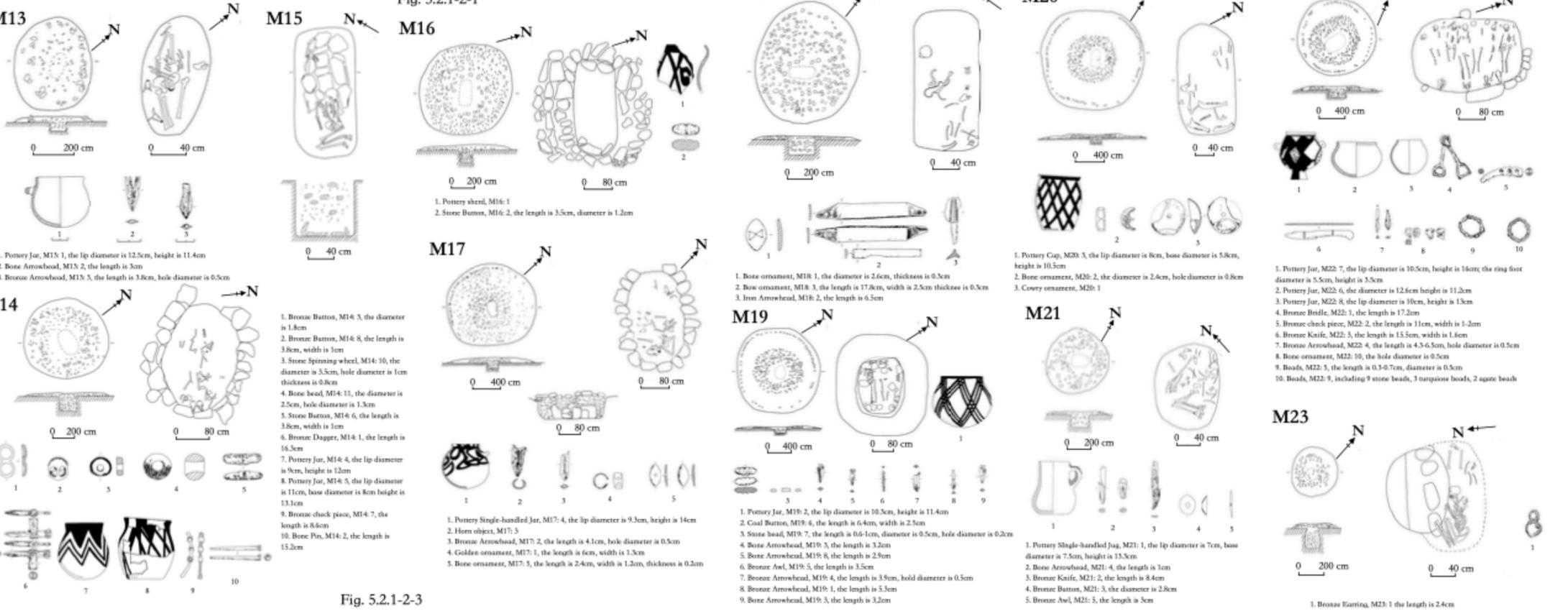


Fig. 5.2.1-2-3

Fig. 5.2.1-2-4

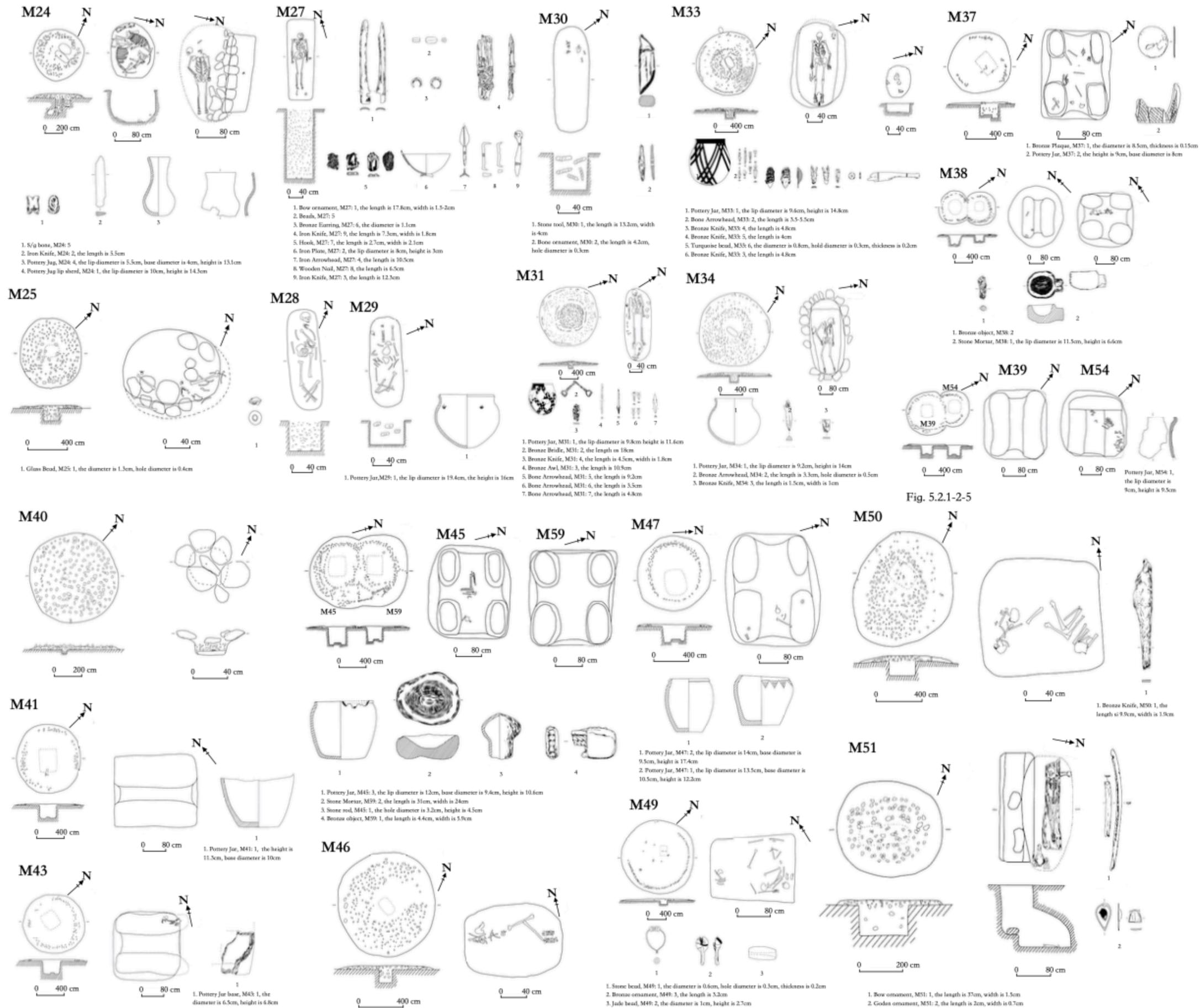


Fig. 5.2.1-2-5

Fig. 5.2.1-2-6

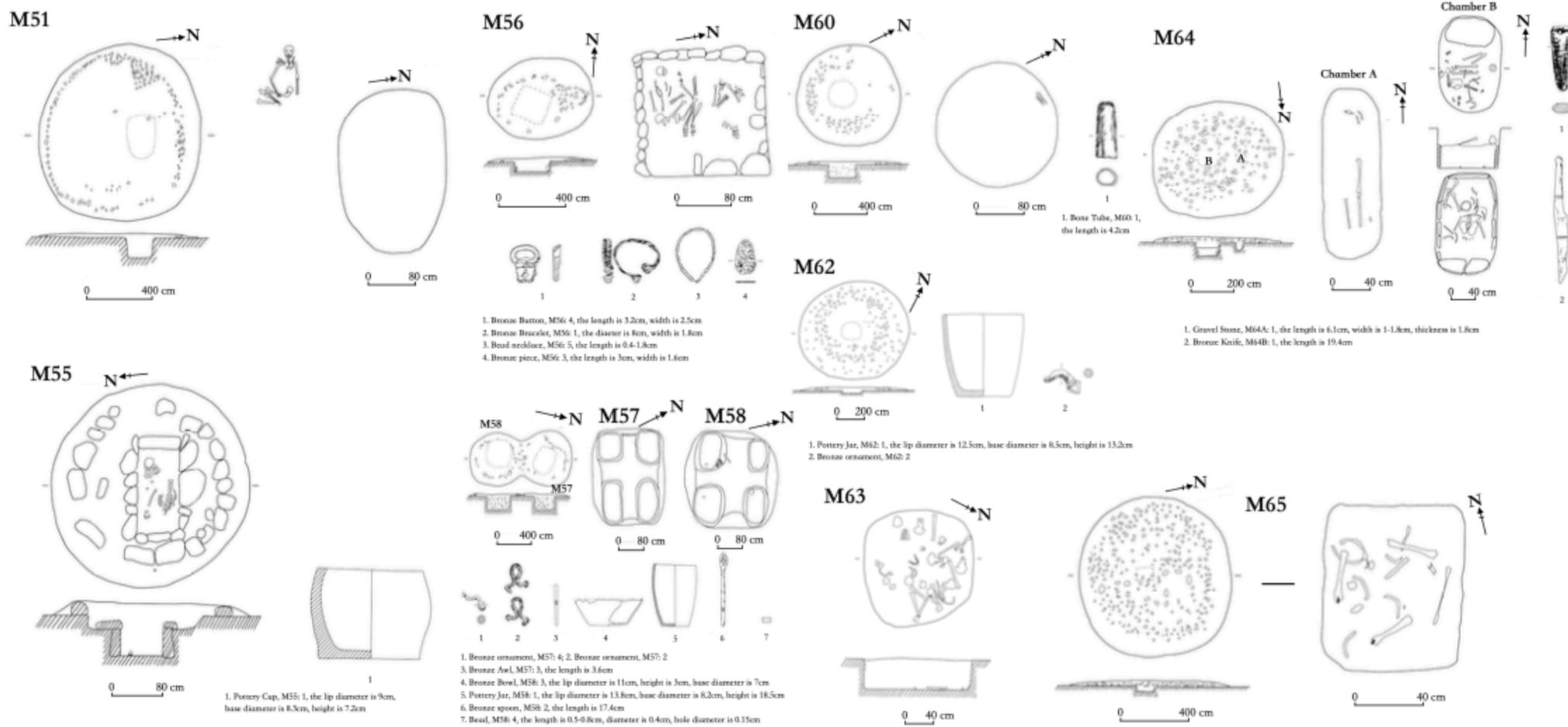


Fig. 5.2.1-2-7

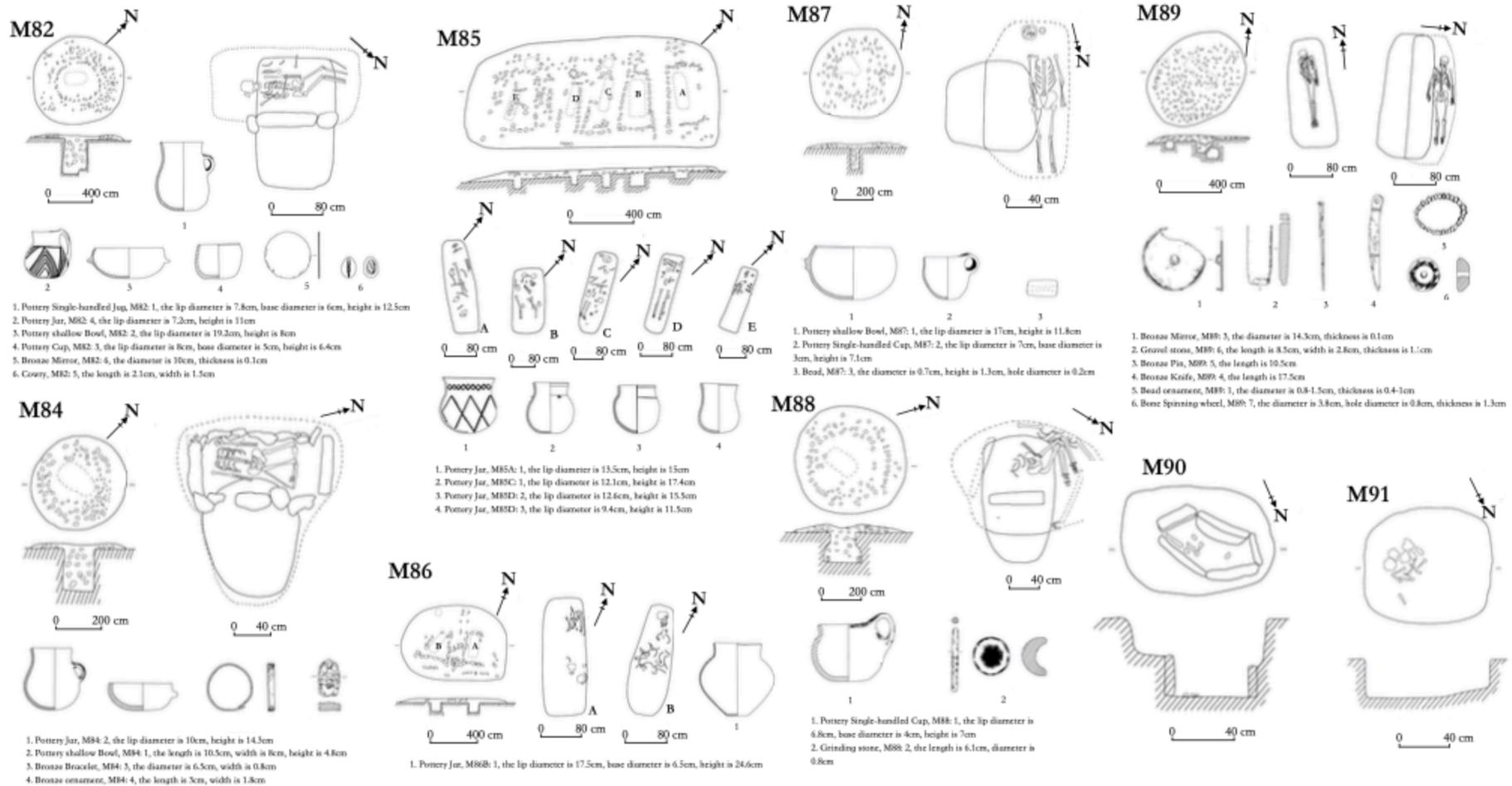


Fig. 5.2.1-2-10

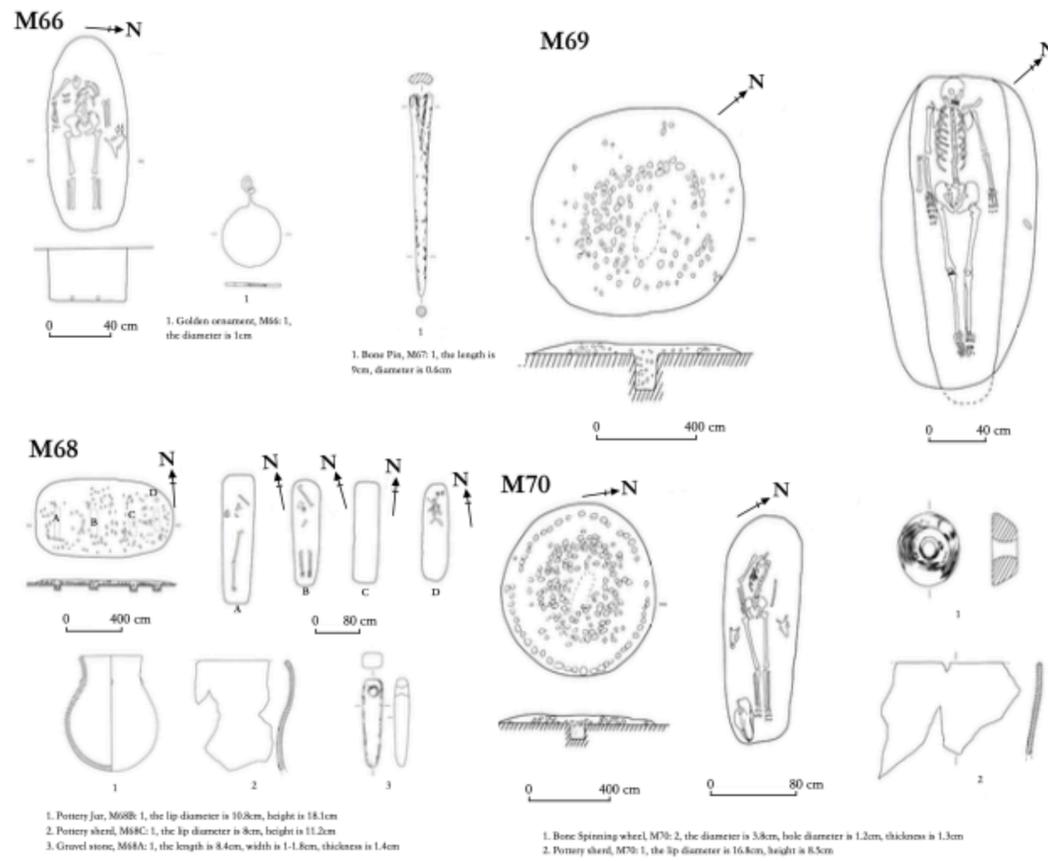


Fig. 5.2.1-2-8

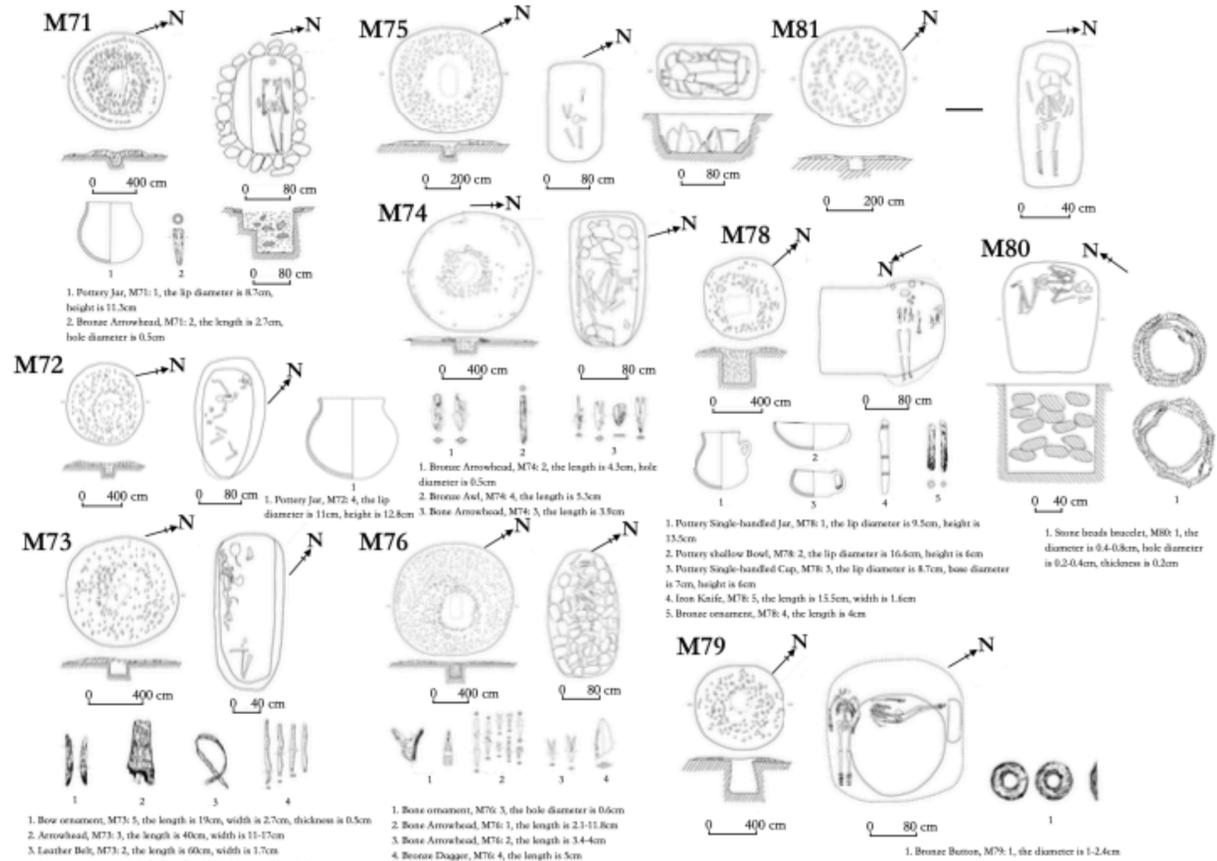


Fig. 5.2.1-2-9

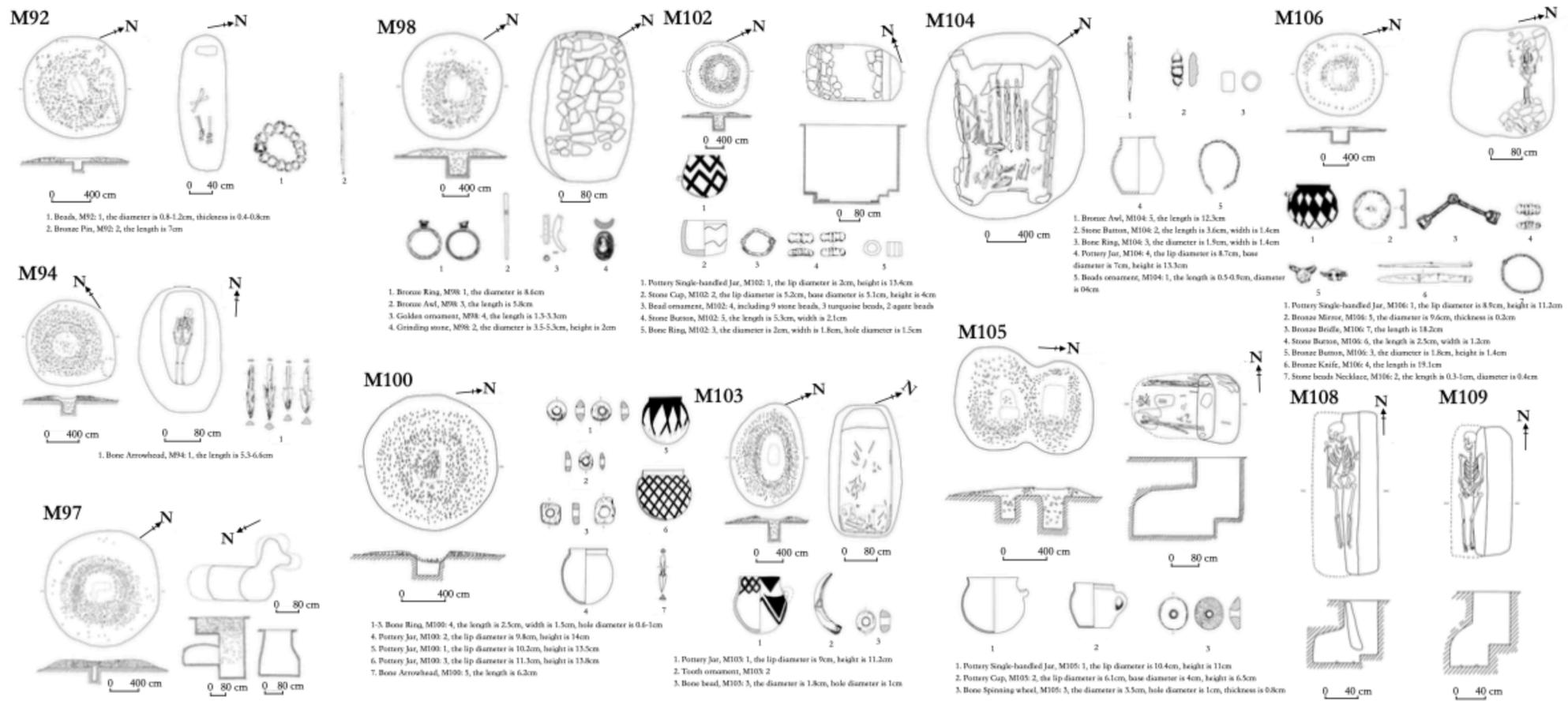


Fig. 5.2.1-2-11

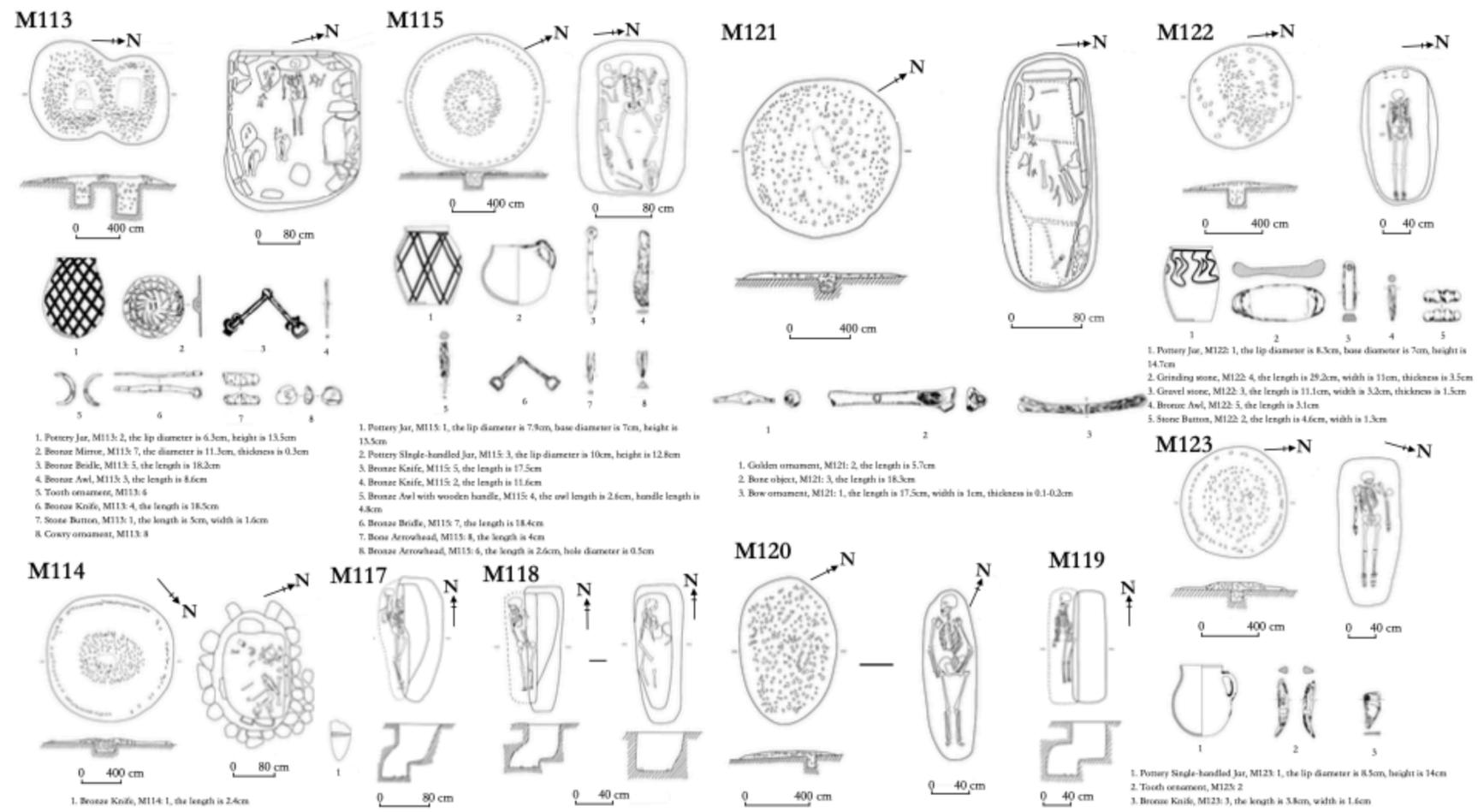


Fig. 5.2.1-2-12

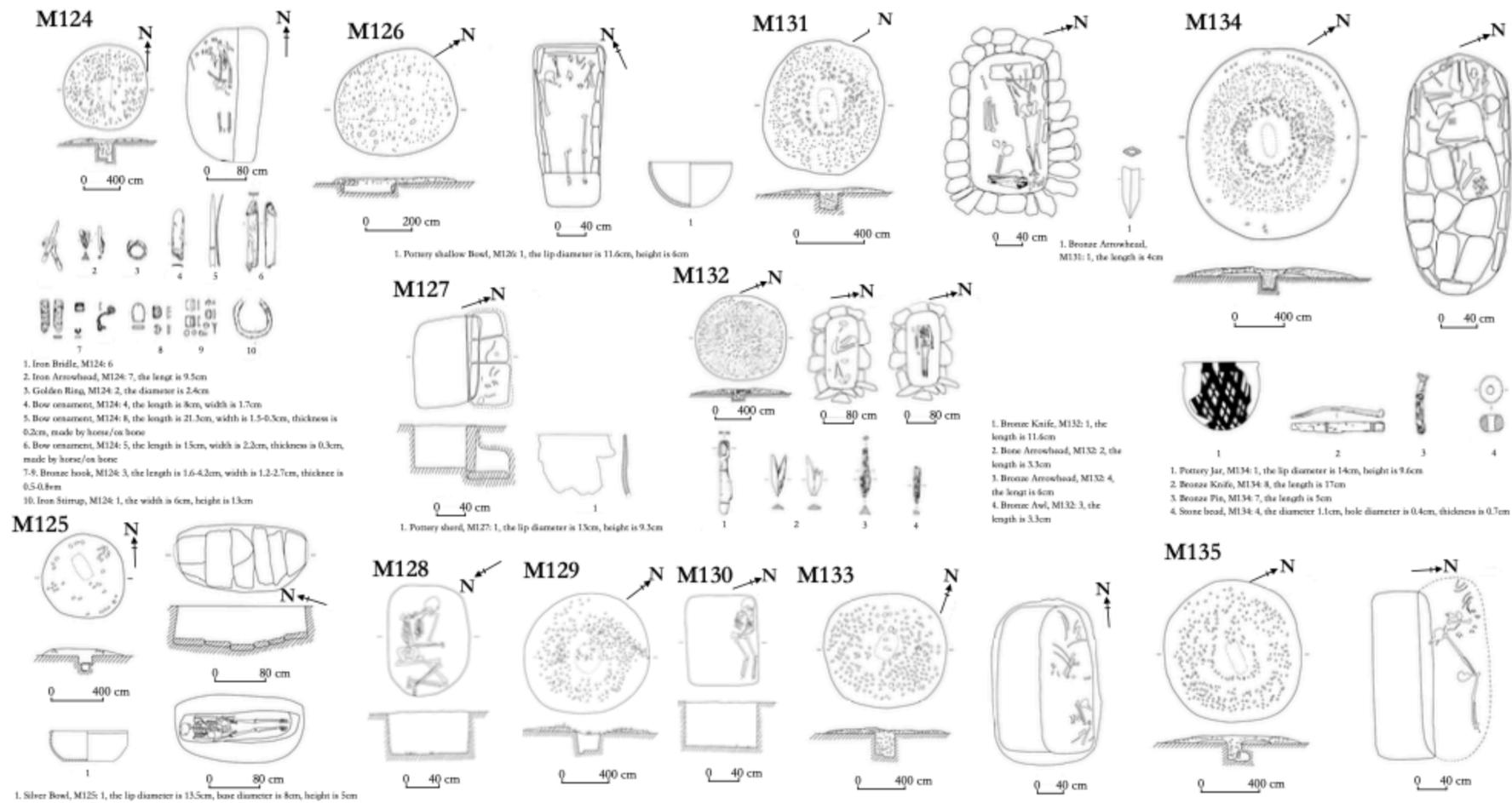


Fig. 5.2.1-2-13

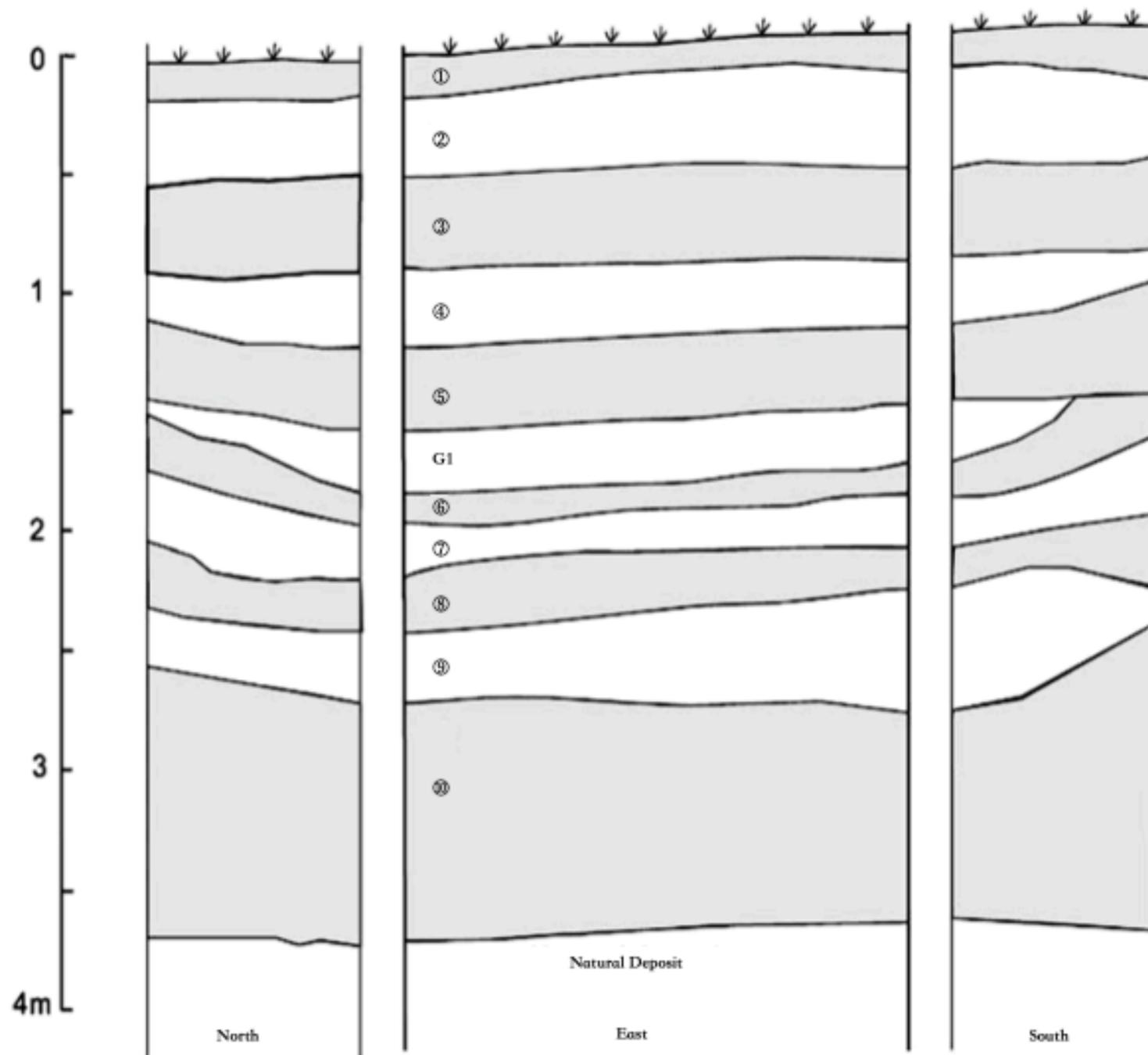


Fig. 5.2.2-1 (adopedted from Jia, et al., 2011, Fig. 5)

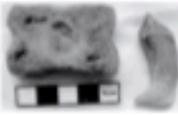
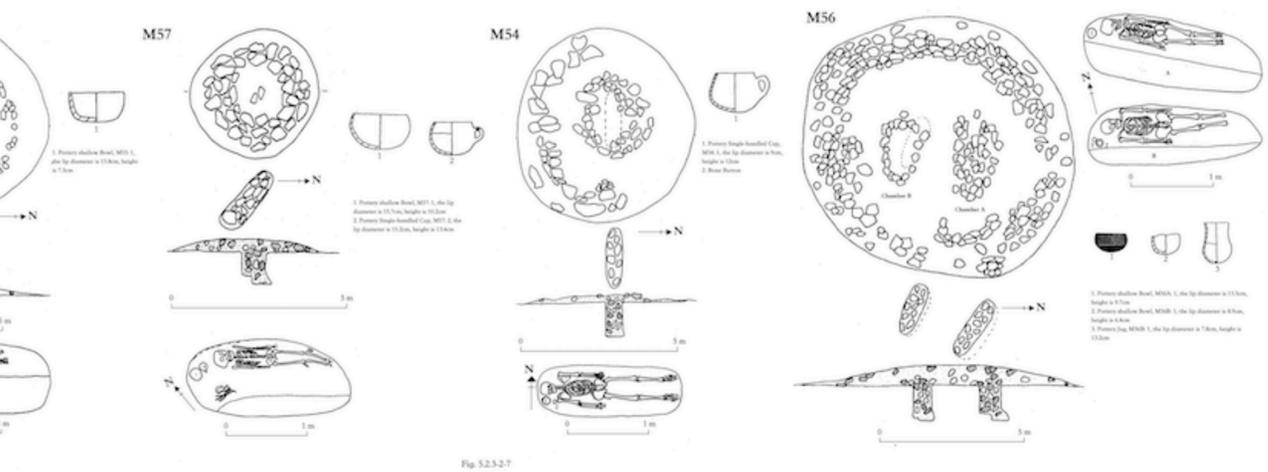
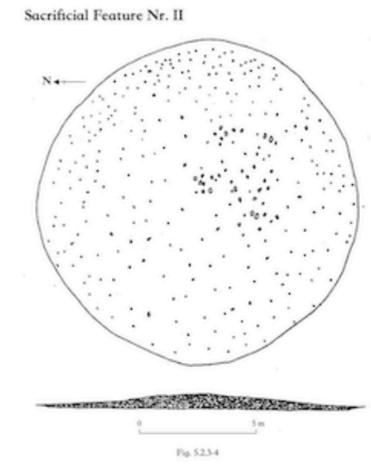
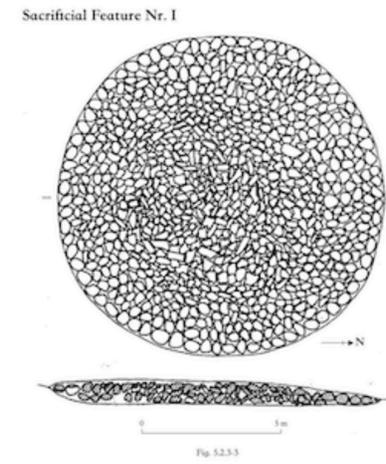
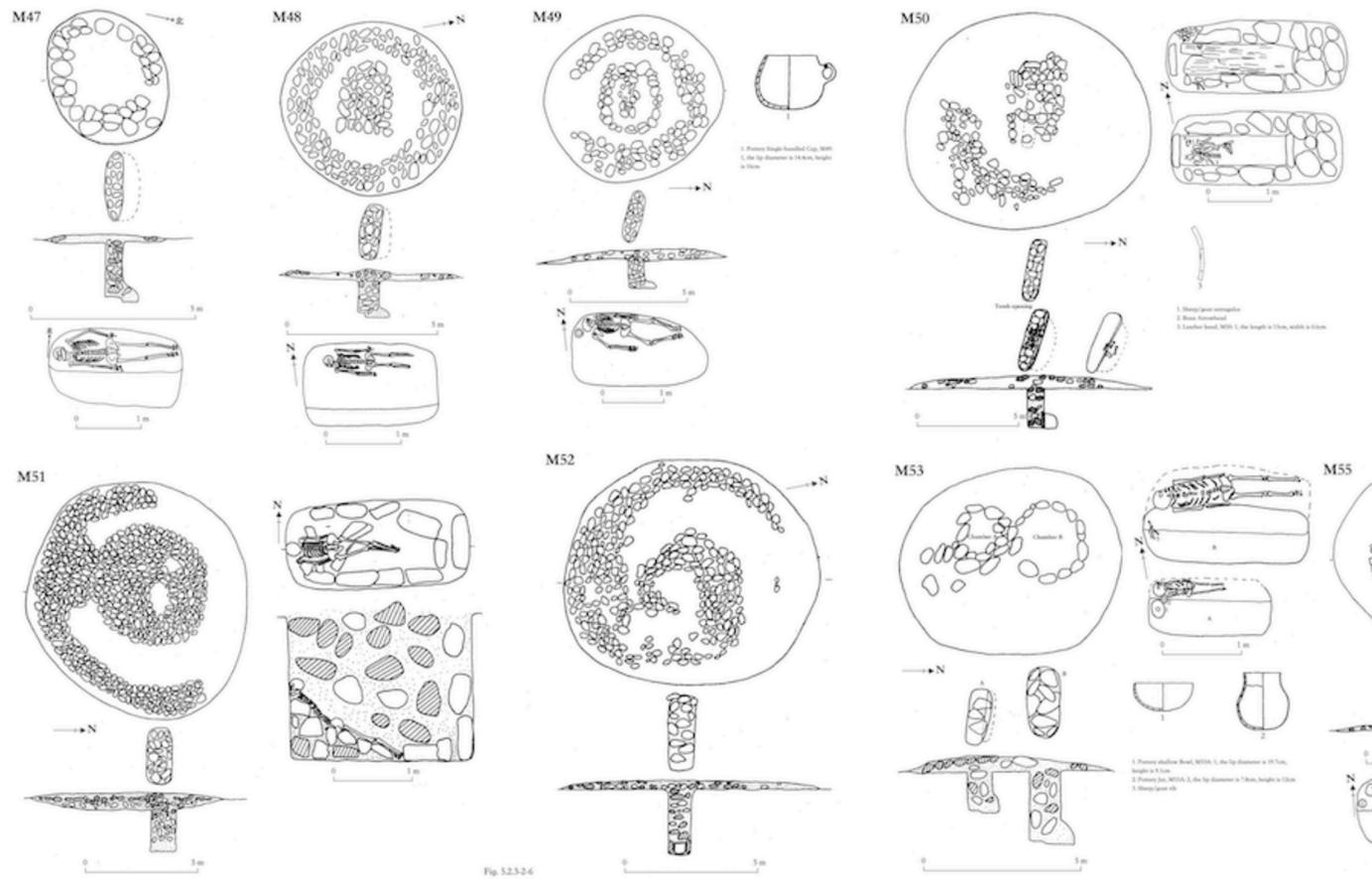
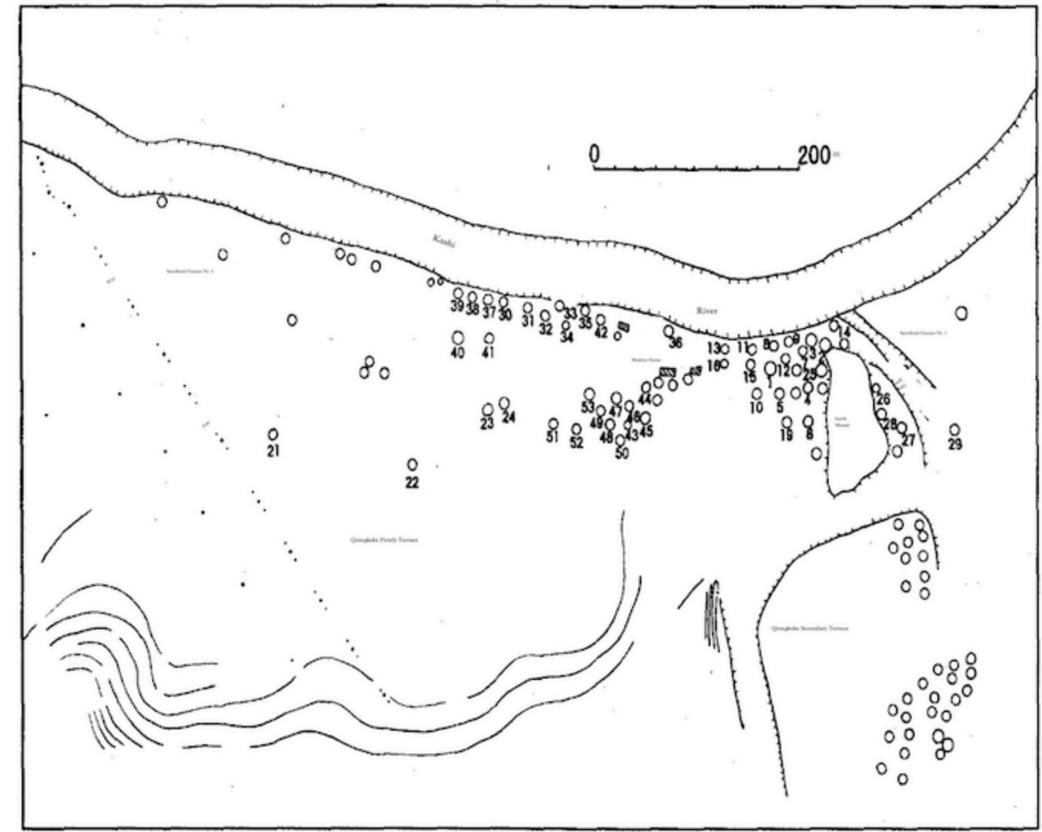
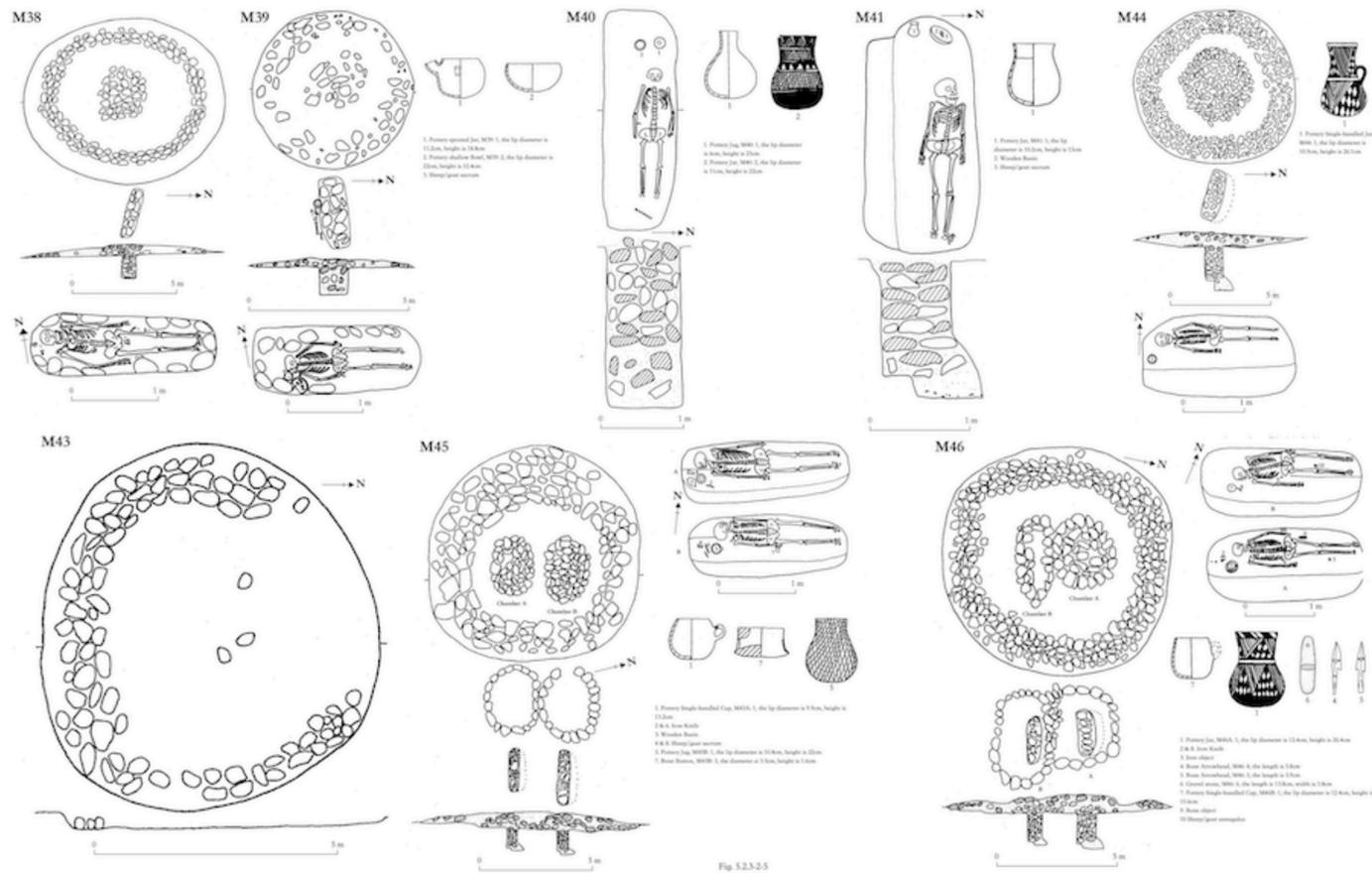
Layer ①	 Bone Tools, JQLYTI ①: 1	 Stone Hoe, JQLYTI ①: 3	
Layer ④	 Animal Bone, JQLYTI ④: 1	Layer ⑤	 Lithic Tool, JQLYTI ⑤: 1
Layer ⑨	 Pottery Cap, JQLYTI ⑨: 1	 Pottery Rim, JQLYTI ⑨: 2	 Millstone, JQLYTI ⑨: 4
Layer ⑩	 Pottery Double-handled Jar, JQLYTI ⑩: 1	 Pottery Sherd, JQLYTI ⑩: 12	 Pottery Sherd, JQLYTI ⑩: 5
	 Pottery Rim with red coating, JQLYTI ⑩: 3	 Pottery Sherd, JQLYTI ⑩: 8	
	 Pottery Sherd, JQLYTI ⑩: 10	 Pottery Rim, JQLYTI ⑩: 6	 Pottery Rim, JQLYTI ⑩: 4
	 Pottery Sherd with applied veins, JQLYTI ⑩: 9	 Pottery Rim with applied veins, JQLYTI ⑩: 8	
Other Collections	 Pottery Double-handled Jar, JQLY: C1	 Beaver Piece, JQLYC: 1-4	

Fig. 5.2.2-2



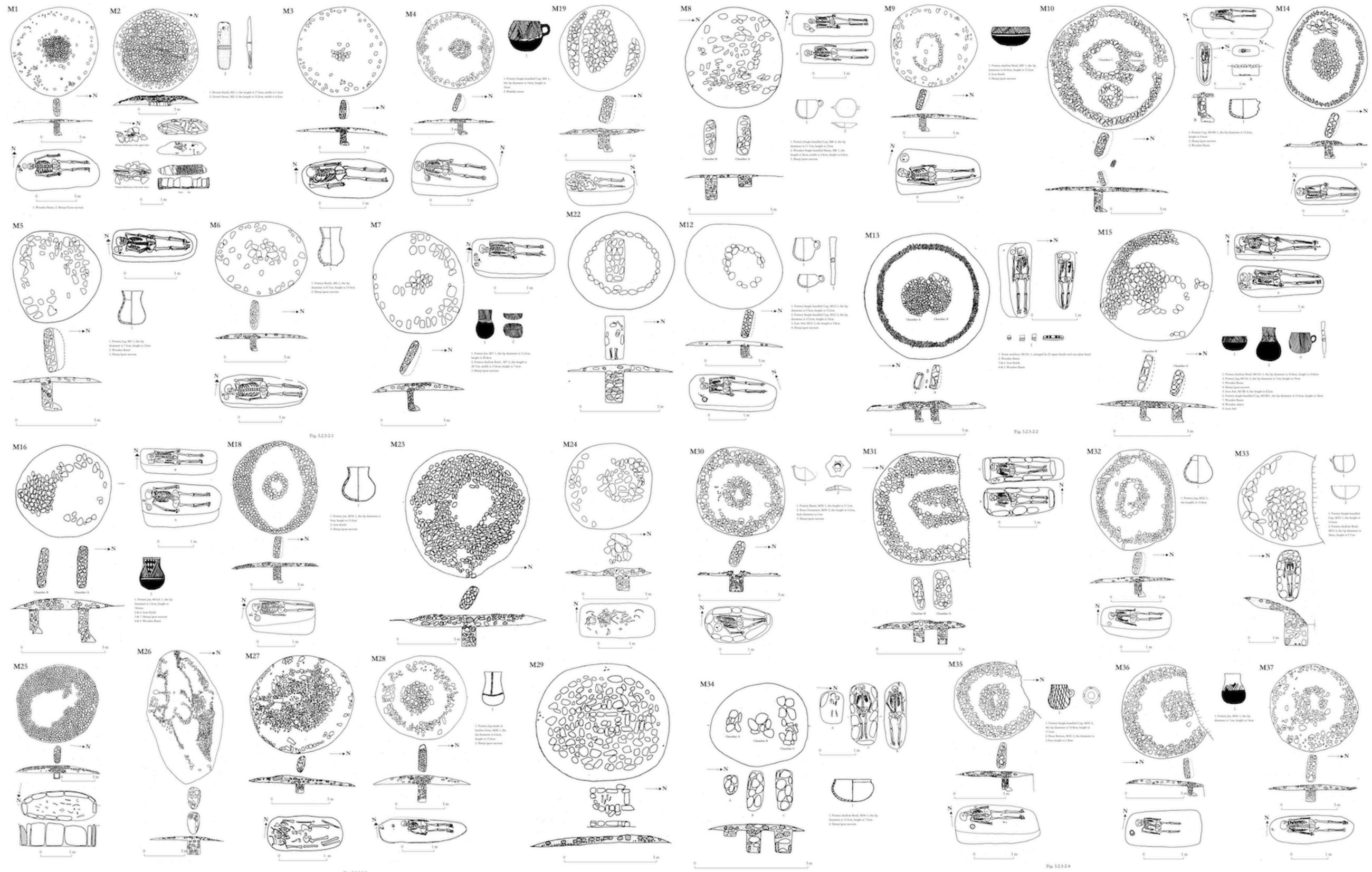


Fig. 52321

Fig. 52322

Fig. 52323

Fig. 52324

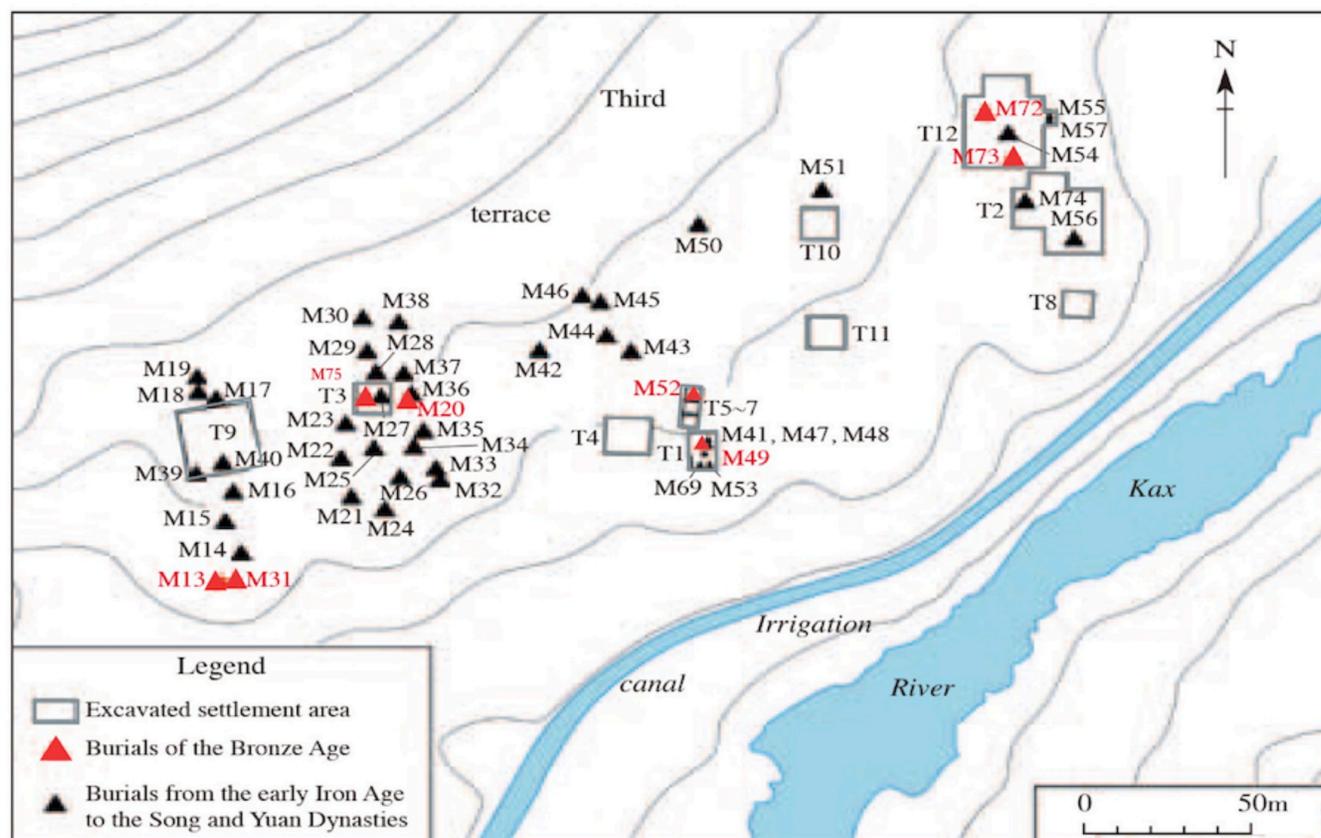


Fig. 5.2.4-1



Fig. 5.2.4-2



Fig. 5.2.4-8



Fig. 5.2.4-20



Fig. 5.2.4-18



Fig. 5.2.4-19



Fig. 5.2.4-17

M49: 1, Bronze Mirror, the diameter is 9.4cm, thickness is 0.2cm



Fig. 5.2.4-14



Fig. 5.2.4-15



Fig. 5.2.4-16



1. Pottery Jar, 2019NGT1815③: 1
2. Stone Pestle, 2019NGT1617②: 1
3. Bronze Chisel, 2019NGT1914②: 1

Fig. 5.2.4-21



Fig. 5.2.4-3



Fig. 5.2.4-4



F2: 10



H55: 1



Fig. 5.2.4-5



Fig. 5.2.4-6



F2: 11

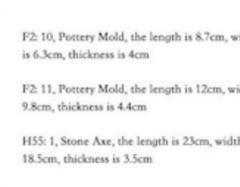


Fig. 5.2.4-7



Fig. 5.2.4-10



Fig. 5.2.4-13



F6: 9 & F5: 1



F6: 26



F6: 17



Fig. 5.2.4-11



Fig. 5.2.4-12



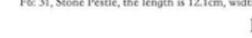
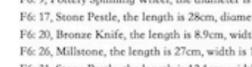
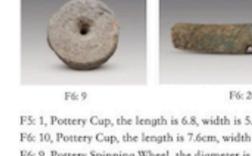
F6: 9



F6: 20

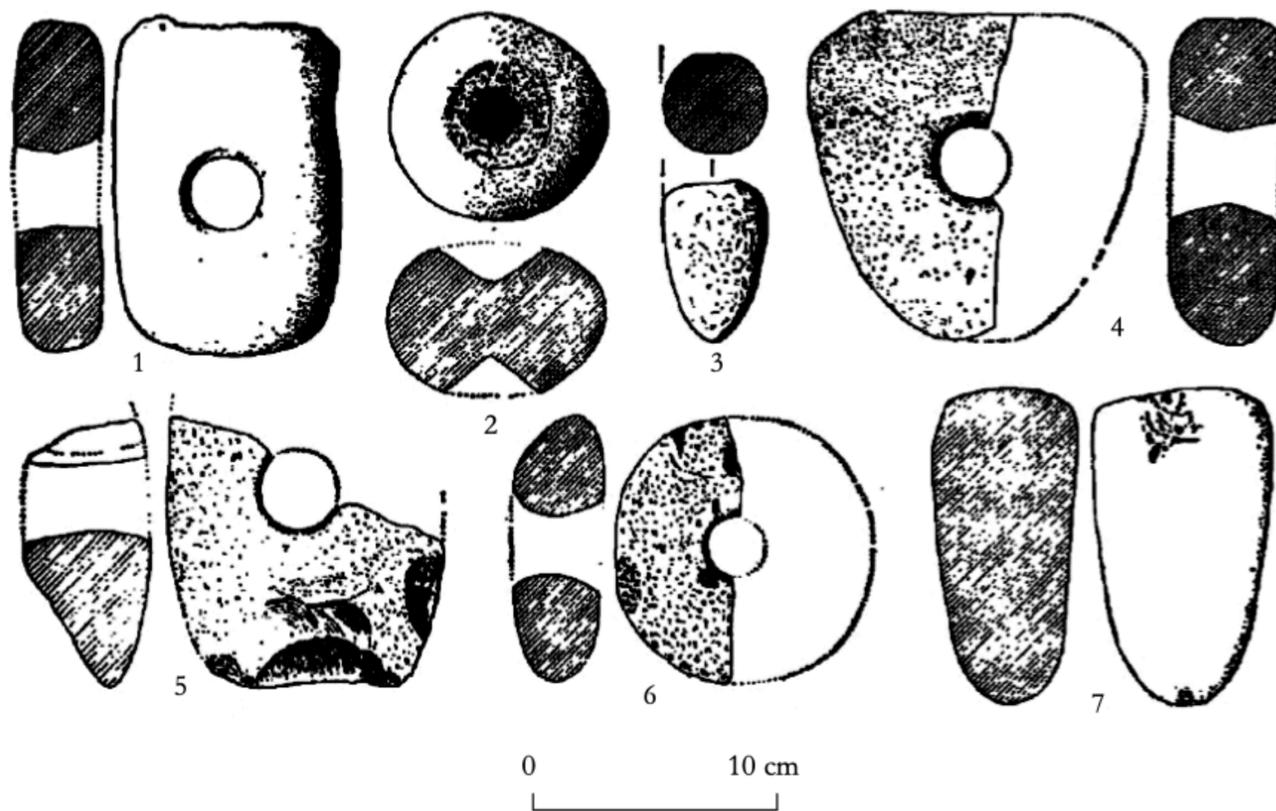


F6: 17



F5: 1, Pottery Cup, the length is 6.8, width is 5.1cm, height is 2.5cm
F6: 10, Pottery Cup, the length is 7.6cm, width is 5.1cm, height is 2.1cm
F6: 9, Pottery Spinning Wheel, the diameter is 4cm, thickness is 1.1cm, hole diameter is 0.8cm
F6: 17, Stone Pestle, the length is 28cm, diameter is 8cm
F6: 20, Bronze Knife, the length is 8.9cm, width is 2.9cm
F6: 26, Millstone, the length is 27cm, width is 10cm, thickness is 1cm
F6: 31, Stone Pestle, the length is 12.1cm, width is 4cm

Fig. 5.2.4-9



1 & 4 & 5. Stone Axe 2. Stone Mortar 3 & 7. Stone Pestle 6. Stone Circle

Fig. 5.2.5-1

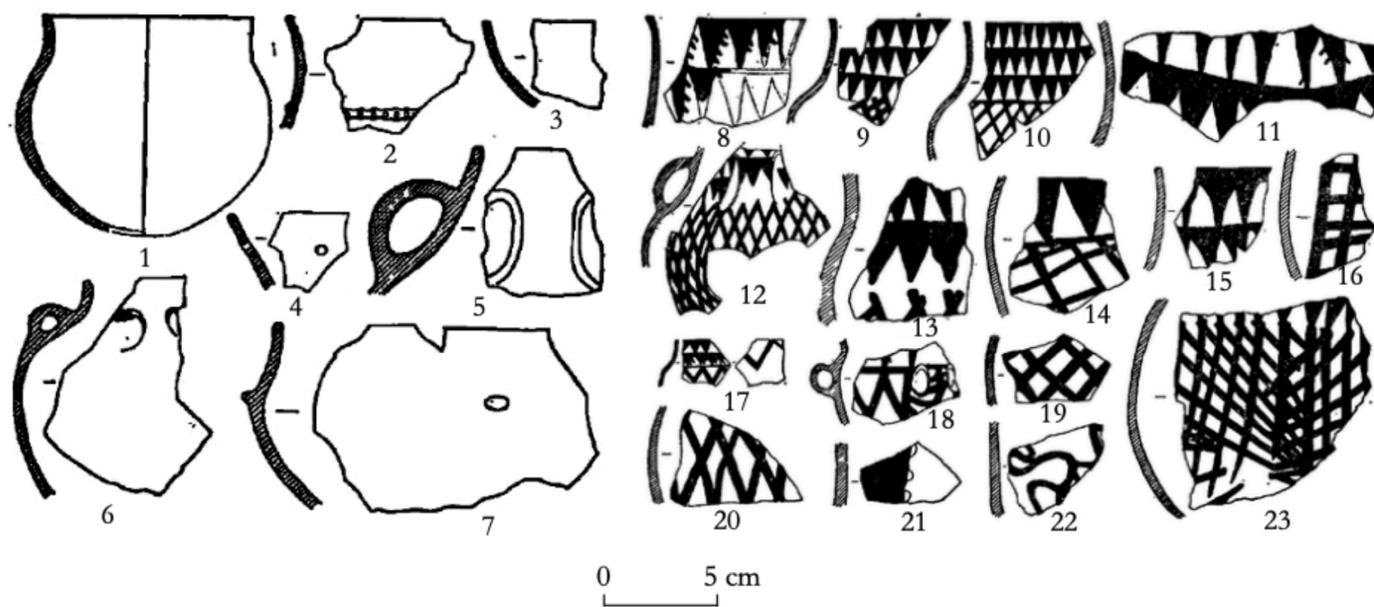


Fig. 5.2.5-2 Pottery sherds

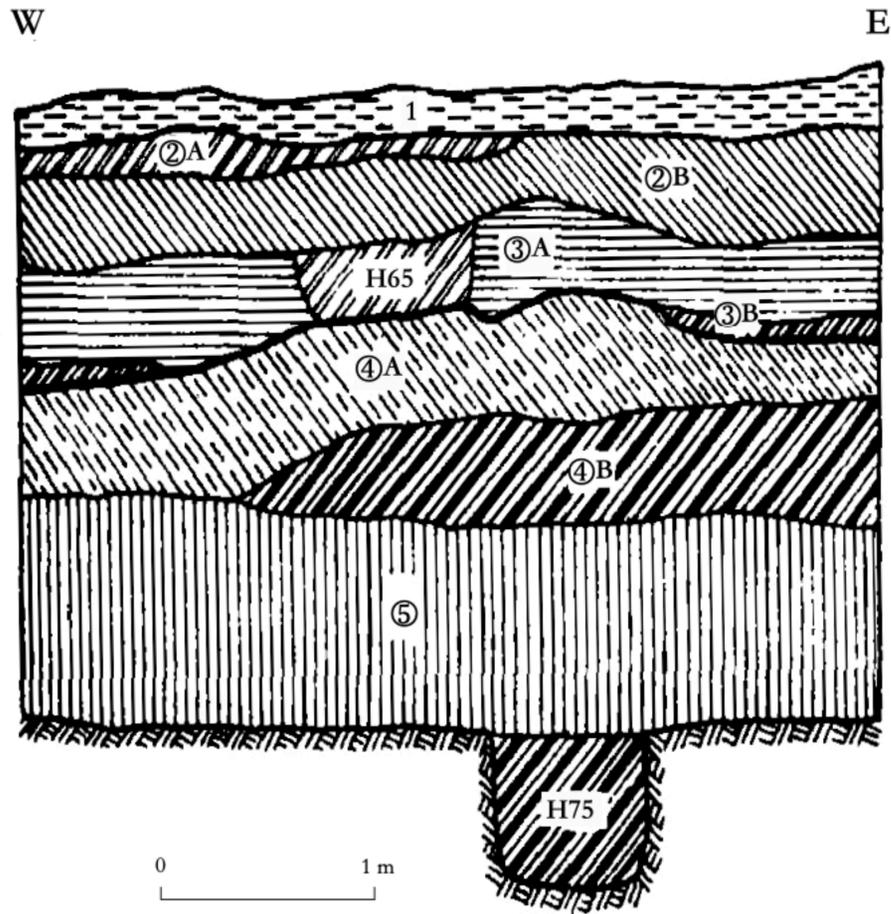


Fig. 5.2.6-1

<p>T 2</p>	 	<p>T 3</p>
<p>T 5</p>	 	<p>T 6</p>
<p>T 1</p>	 	<p>T 4</p>

Fig. 5.2.6-8

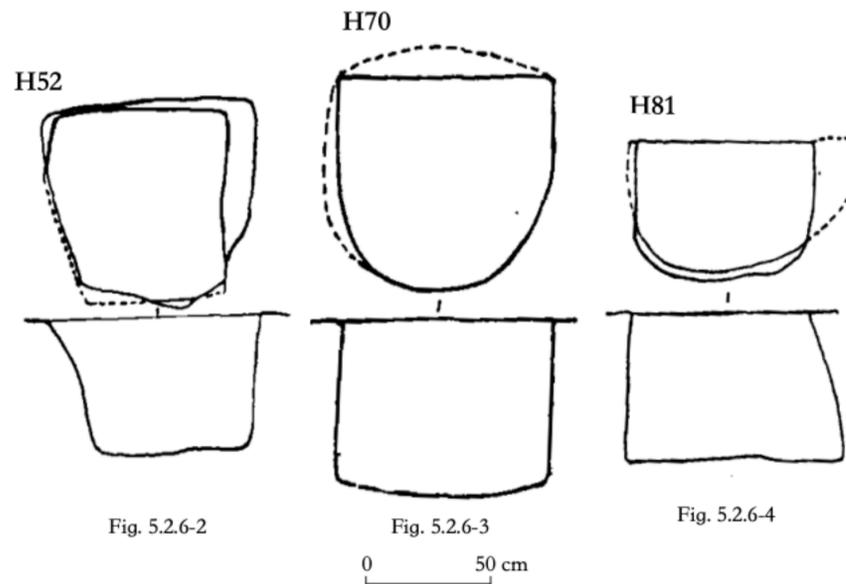


Fig. 5.2.6-2

Fig. 5.2.6-3

Fig. 5.2.6-4

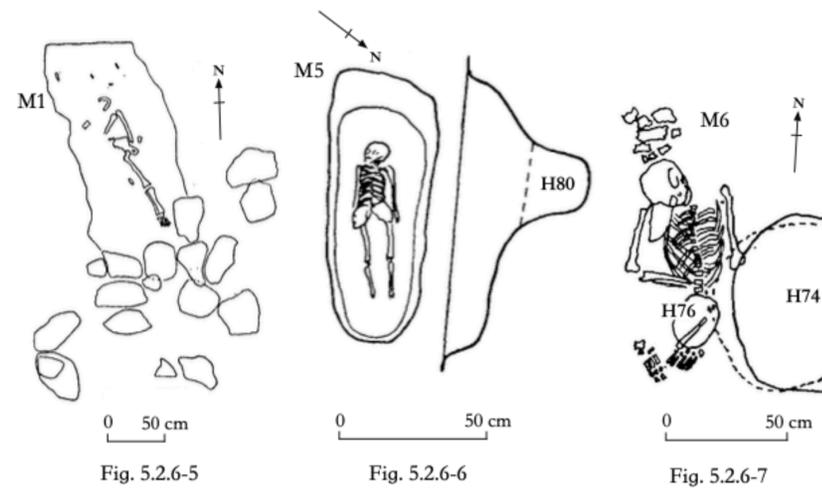


Fig. 5.2.6-5

Fig. 5.2.6-6

Fig. 5.2.6-7

87M2



Fig. 5.27.1

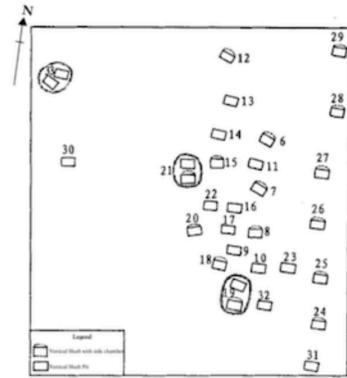


Fig. 5.27.3

87M3

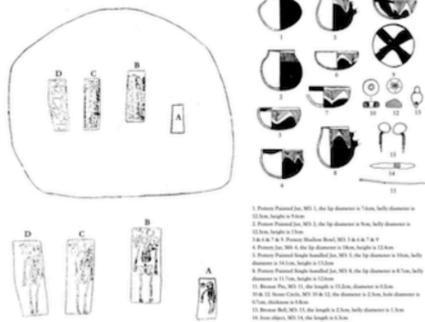
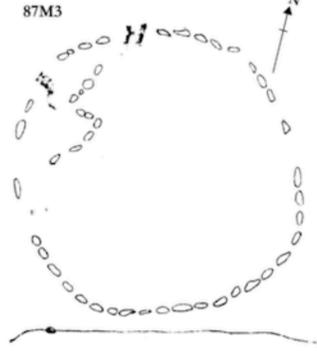
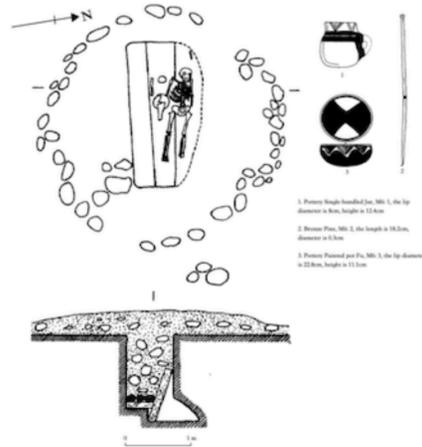


Fig. 5.27.2

M3	 Pottery Spinning Wheel, M3 1, the diameter is 3.5cm, hole diameter is 0.5cm, thickness is 0.5cm.	 Stone Adz, M3 2, the length is 7cm, width is 1.7cm, thickness is 0.5cm.	M17	 Pottery Jug, M17 1, the tip diameter is 7.5cm, height is 17cm.	 Pottery pot, M17 2, the tip diameter is 10cm, height is 12cm.
M8	 Pottery Single-handled Jar, M8 1, the tip diameter is 10cm, height is 10cm.	 Pottery Pottery jar, M8 2, the tip diameter is 10cm, height is 7cm.	M20	 Round Stone, M20 1, the diameter is 4.5cm, thickness is 1.5cm.	 Iron Knife, M20 2, the length is 11cm, width is 1.5cm, thickness is 0.5cm.
M12	 Pottery Jug, M12 1, the tip diameter is 10.5cm, height is 18cm.	 Pottery pot, M12 2, the tip diameter is 10.5cm, height is 10cm.	M32	 Pottery Painted Bowl, M32 1, the tip diameter is 9.5cm, height is 7cm.	 Pottery Painted Jar, M32 2, the tip diameter is 27cm, height is 9.5cm.
M14	 Pottery Painted jar, M14 1, the tip diameter is 10cm, height is 14cm.	 Pottery Jug, M14 2, the tip diameter is 9.5cm, height is 14cm.			
Others	 Pottery Jug, M15 1, the tip diameter is 8.5cm, height is 15cm.	 Pottery Jug, M16 1, the tip diameter is 8.5cm, height is 15cm.	 Pottery Jug, M17 1, the tip diameter is 9.5cm, height is 15cm.	 Pottery Jug, M18 1, the tip diameter is 9.5cm, height is 11cm.	 Pottery Jug, M19 1, the tip diameter is 8.5cm, height is 11cm.

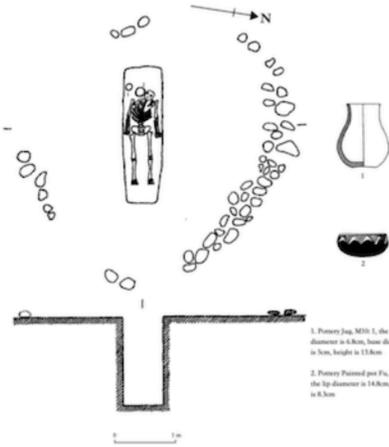
Fig. 5.27.4-2

90M6



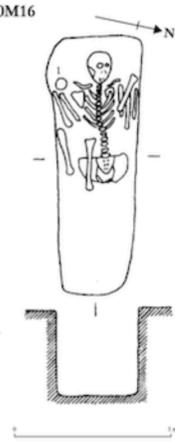
1. Pottery Single-handled Jar, M6 1, the tip diameter is 8cm, height is 12cm.
2. Round Stone, M6 2, the length is 10.5cm, diameter is 4.5cm.
3. Pottery Painted jar, M6 3, the tip diameter is 22cm, height is 11cm.

90M10



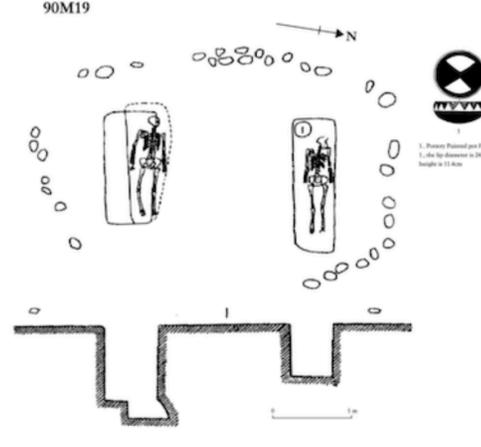
1. Pottery Jug, M10 1, the diameter is 6.5cm, base dia is 5cm, height is 13cm.
2. Pottery Painted jar, M10 2, the tip diameter is 14.5cm, height is 8.5cm.

90M16



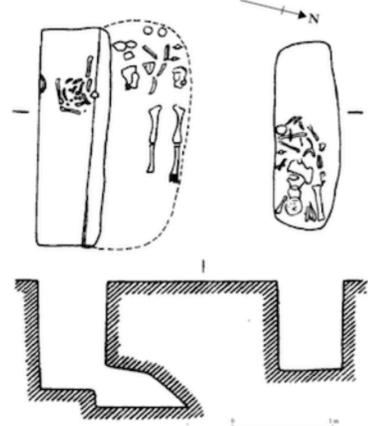
1. Pottery Jug, M16 1, the diameter is 9.5cm, height 13.5cm.

90M19

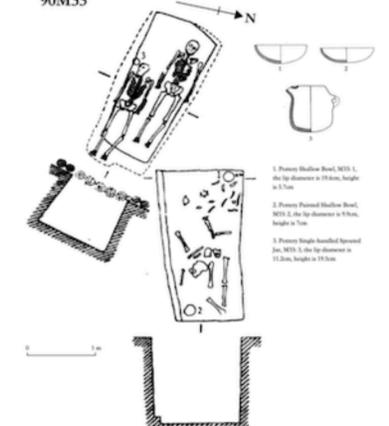


1. Pottery Painted jar, M19 1, the tip diameter is 10.5cm, height is 11cm.

90M21

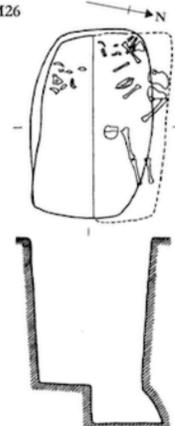


90M33



1. Pottery Shallow Bowl, M33 1, the tip diameter is 10.5cm, height is 5.7cm.
2. Pottery Painted Shallow Bowl, M33 2, the tip diameter is 9.5cm, height is 7cm.
3. Pottery Single-handled Jar, M33 3, the tip diameter is 11.5cm, height is 19.5cm.

90M26



90M31



90M30

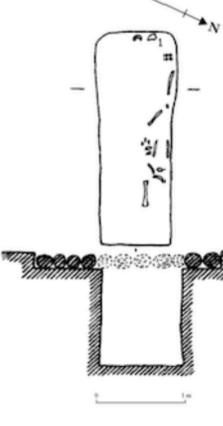


Fig. 5.27.4-1

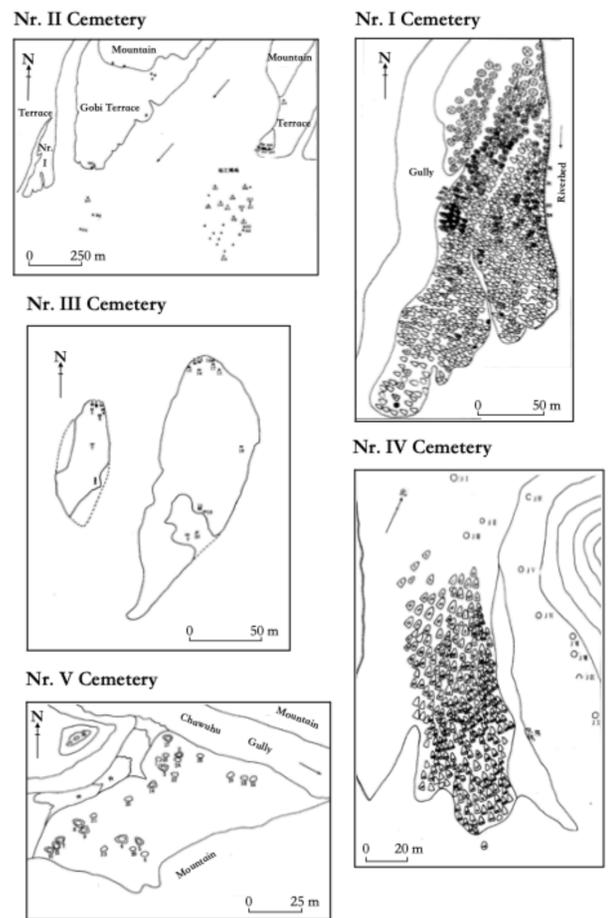


Fig. 5.2.8-1

VM10	VM10: 2, Pottery Single-handled Cup, the lip diameter is 9.6cm, height is 6.4cm	VM10: 3, Pottery Single-handled Cup, the lip diameter is 9cm, base diameter is 6cm, height is 9cm	VM10: 4, Bronze Bridle, the length is 9.2cm
VM12	VM12: 1, Bronze Knife, the length is 4.2cm, width is 1.1cm	VM12: 2, Bronze Awl, the length is 0.5cm	VM12: 4, Pottery Single-handled Cup, the lip diameter is 11.4cm, base diameter is 7cm, height is 9.4cm
VM21	VM21: 2, Pottery Double-handled Jar, the lip diameter is 7.2cm, height is 10cm	VM21: 1, Pottery spouted Jar, the lip diameter is 13.2-17.8cm, base diameter is 6.8cm, height is 20.4cm	
Others	VM16: 1, Pottery Single-handled Jar, the lip diameter is 10.8cm, height is 14.4cm	VM18: 1, Pottery Single-handled Jar, the lip diameter is 5cm, height is 11.8cm	VM20: 1, Pottery Single-handled Cup, the lip diameter is 8.7cm, height is 6.6cm
	VM22: 1, Pottery Double-handled pot Fu, the lip diameter is 18cm, base diameter is 4.8cm, height is 14.4cm	VM24: 1, Pottery Jar, the lip diameter is 11.7-15cm, height is 13.8cm	

Fig. 5.2.8-2

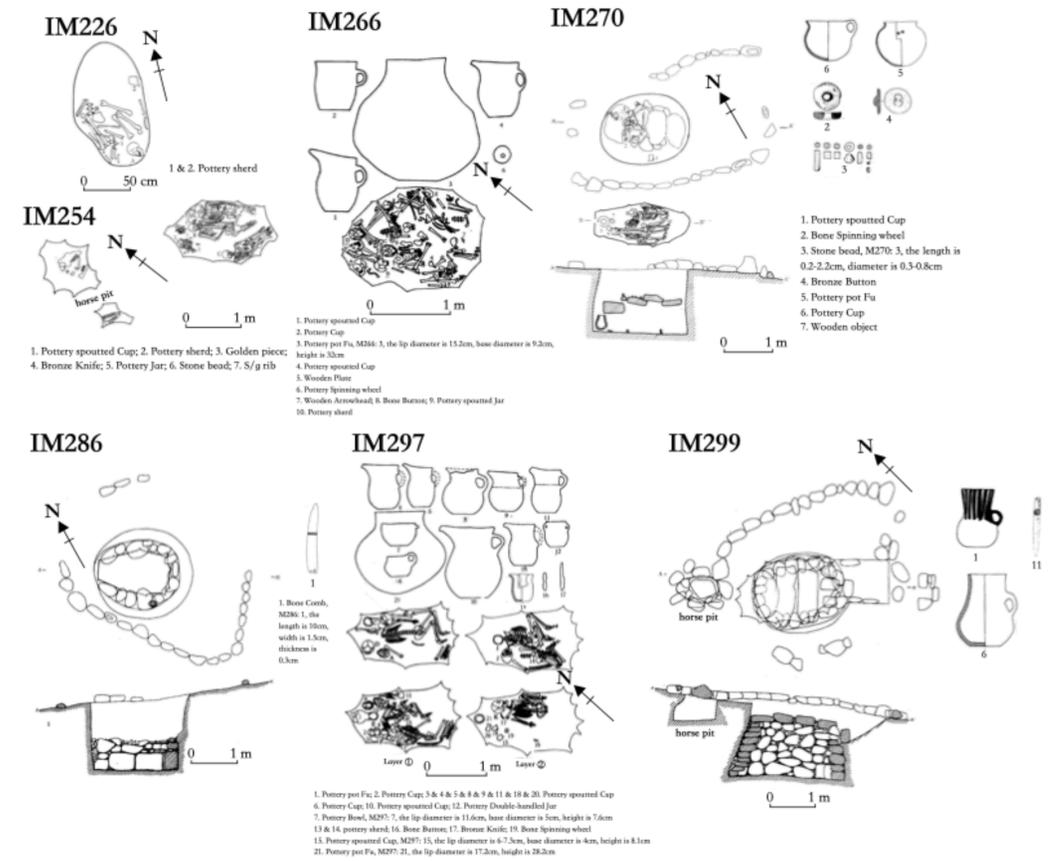


Fig. 5.2.8-2-3

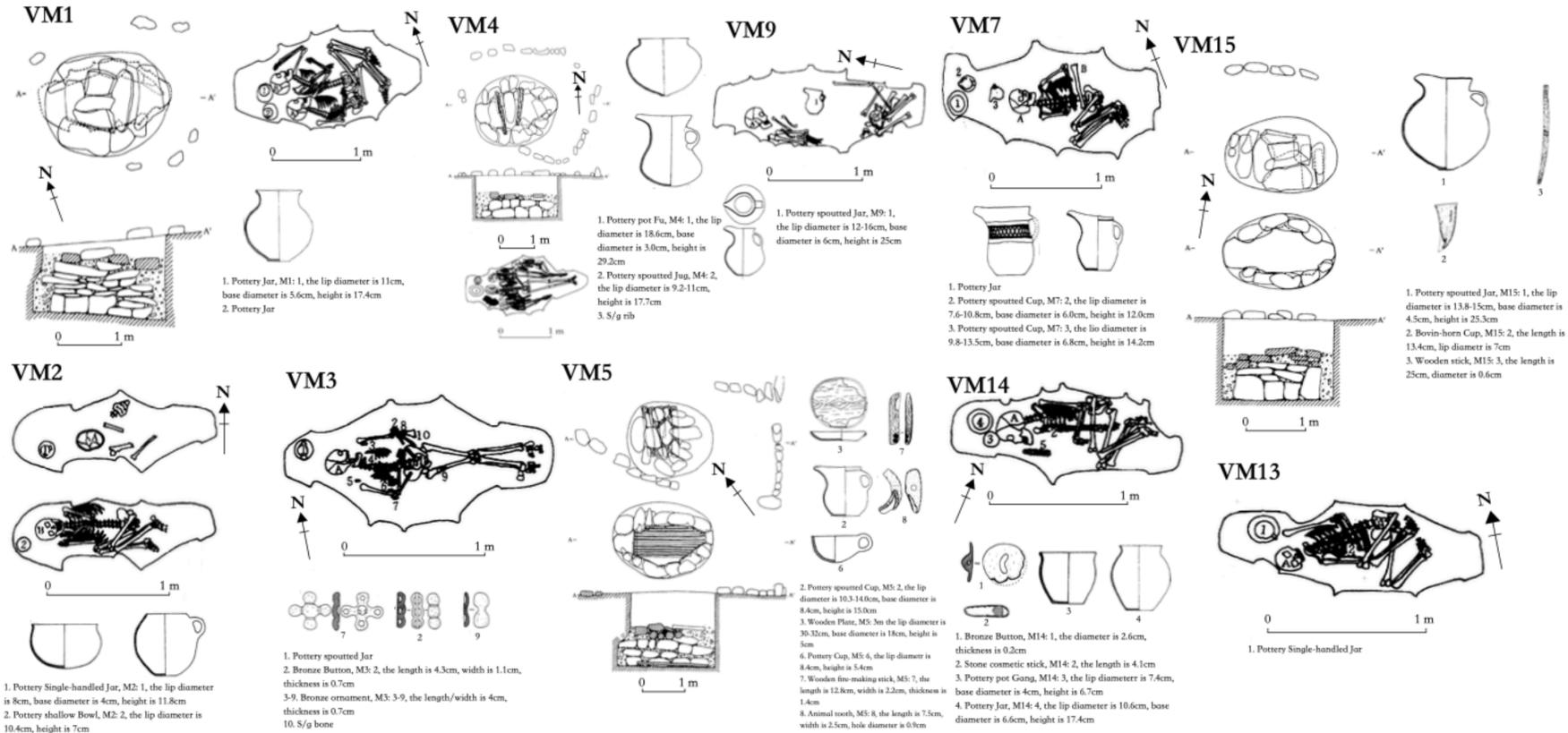


Fig. 5.2.8-6-1

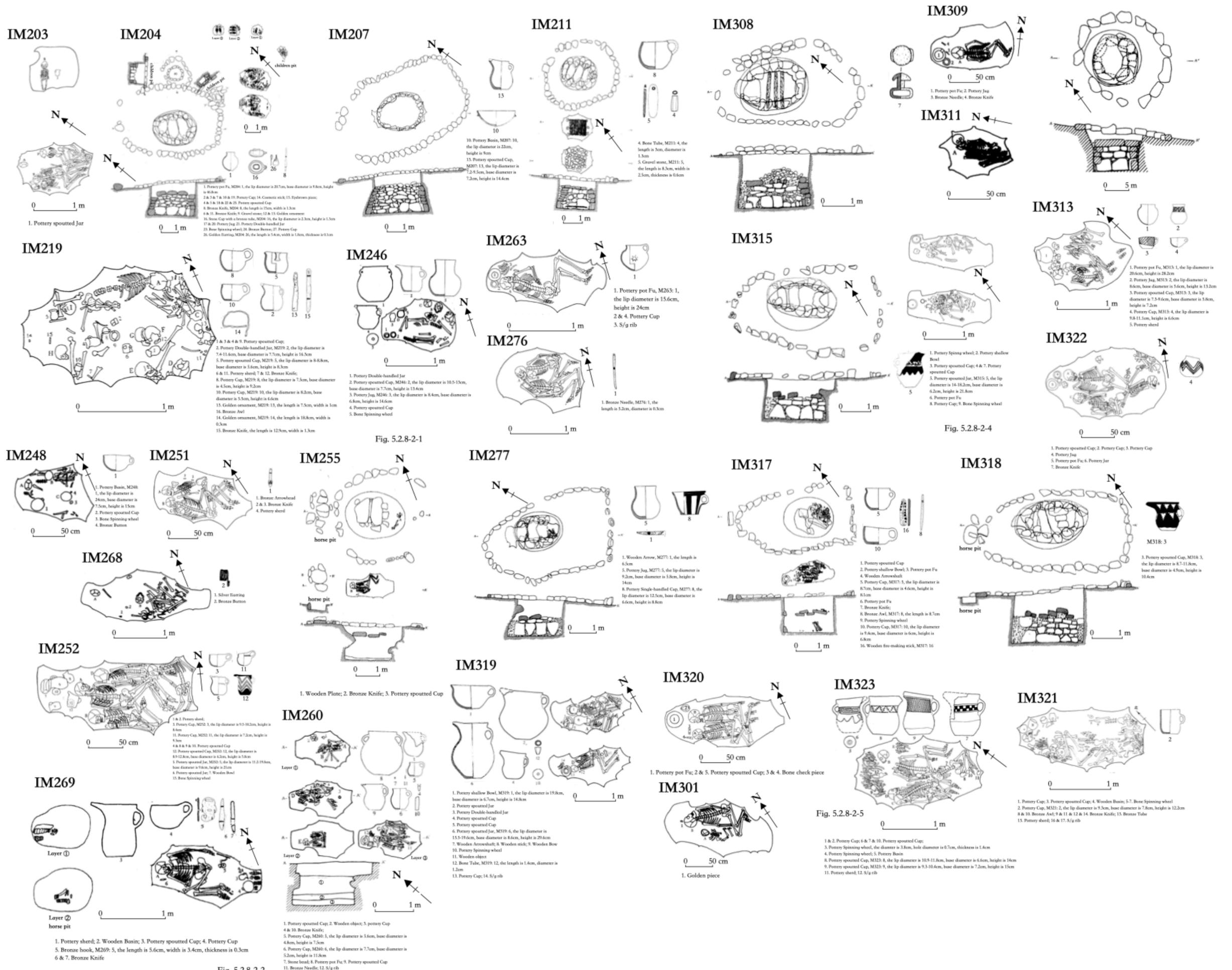


Fig. 5.2.8-2-5

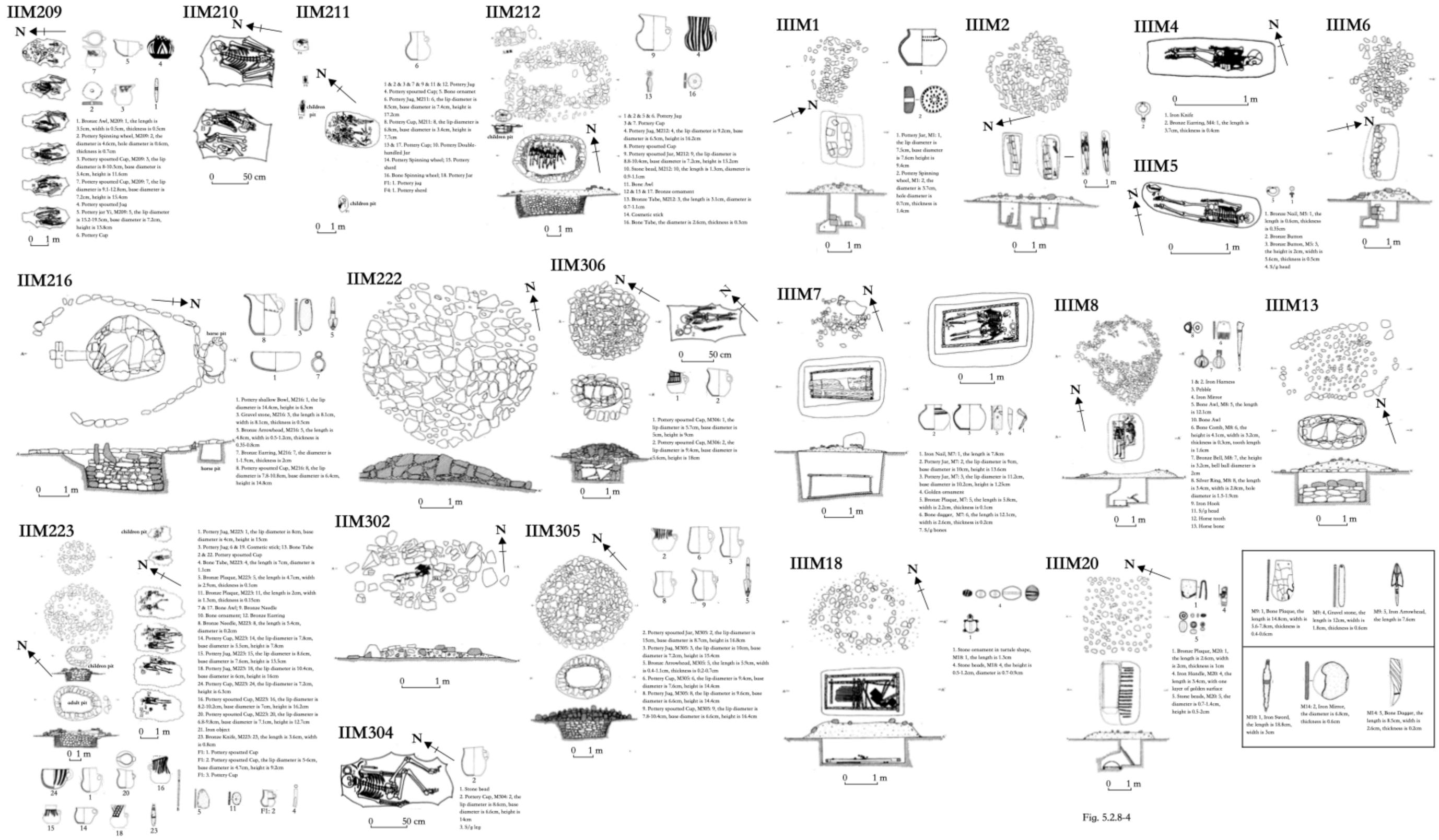


Fig. 5.2.8-3

Fig. 5.2.8-4

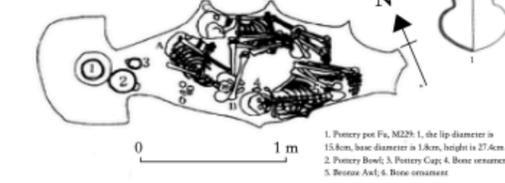
Nr. IV JI



Nr. IV Cemetery Horse Pits

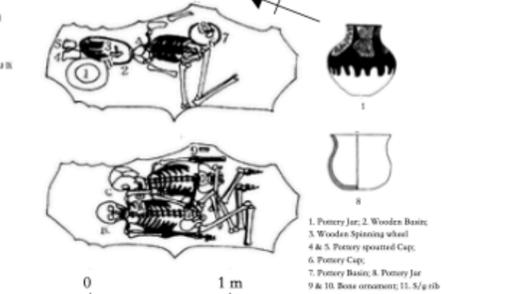


IVM229



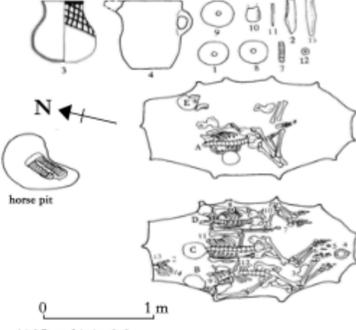
1. Pottery pot Fu, M229-1, the lip diameter is 15.8cm, base diameter is 1.8cm, height is 27.4cm
2. Pottery Bowl; 3. Pottery Cup; 4. Bone ornament
5. Bronze Awl; 6. Bone ornament

IVM43



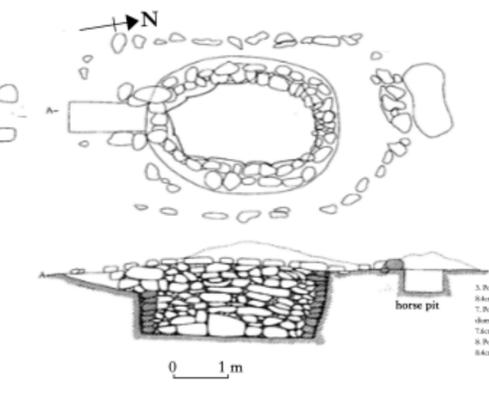
1. Pottery Jar; 2. Wooden Basin
3. Wooden Spinning wheel
- 4 & 5. Pottery spooned Cup
6. Pottery Cup
7. Pottery Basin; 8. Pottery Jar
- 9 & 10. Bone ornament; 11. S/g rib

IVM2



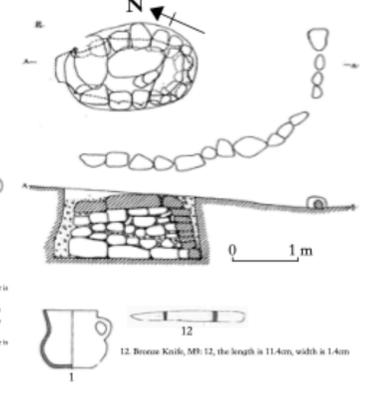
- 1 & 8. Pottery Spinning wheel
- 2 & 13. Bronze Knife
3. Pottery Jar, M2-3, the lip diameter is 7.9cm, base diameter is 6.2cm, height is 14cm
4. Pottery spooned Jar; 5. Golden nail
6. Bronze Awl; 7. Bronze Tube; 10. Bronze ornament
9. Pottery Spinning wheel, M2-9, the diameter is 4.4cm, hole diameter is 0.8cm, height is 0.5cm
11. Bronze Needle; 12. Stone bead; 14. S/g rib

IVM6



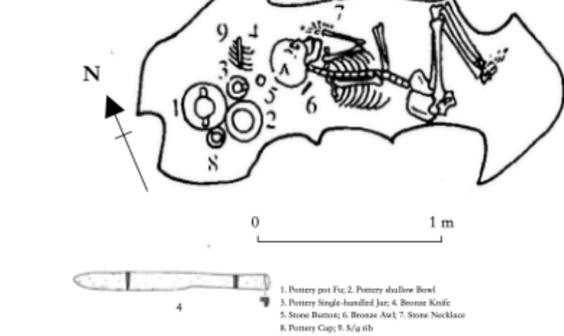
5. Pottery Cup, M6-5, the lip diameter is 8.4cm, height is 7.2cm
7. Pottery spooned Cup, M6-7, the lip diameter is 8.2.5cm, base diameter is 7.4cm, height is 15.5cm
8. Bronze Cup, M6-8, the lip diameter is 8.4cm, height is 7.2cm

IVM9



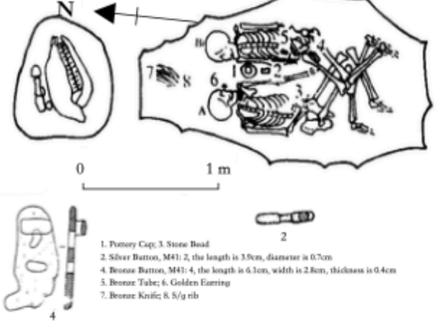
12. Bronze Knife, M9-12, the length is 11.4cm, width is 1.4cm

IVM78



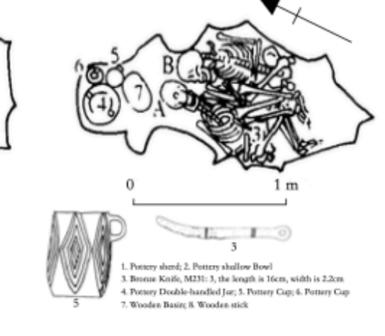
1. Pottery pot Fu; 2. Pottery shallow Bowl
3. Pottery Single-handled Jar; 4. Bronze Knife
5. Stone Button; 6. Bronze Awl; 7. Stone Necklax
8. Pottery Cup; 9. S/g rib

IVM41



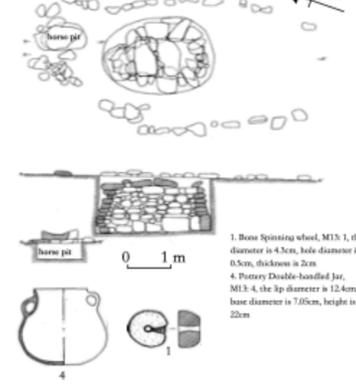
1. Pottery Cup; 3. Stone Bead
2. Silver Button, M41-2, the length is 3.9cm, diameter is 0.7cm
4. Bronze Button, M41-4, the length is 6.1cm, width is 2.8cm, thickness is 0.4cm
5. Bronze Tube; 6. Golden Earring
7. Bronze Knife; 8. S/g rib

IVM231



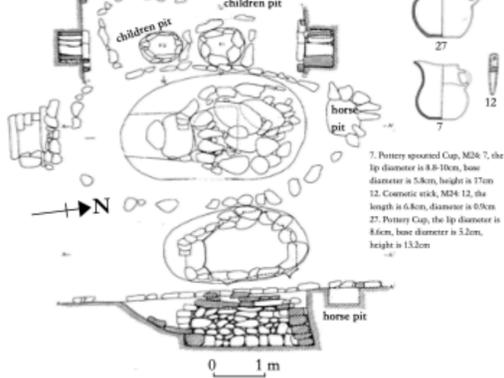
1. Pottery shard; 2. Pottery shallow Bowl
3. Bronze Knife, M231-3, the length is 16cm, width is 2.2cm
4. Pottery Double-handled Jar; 5. Pottery Cup; 6. Pottery Cup
7. Wooden Basin; 8. Wooden stick

IVM13



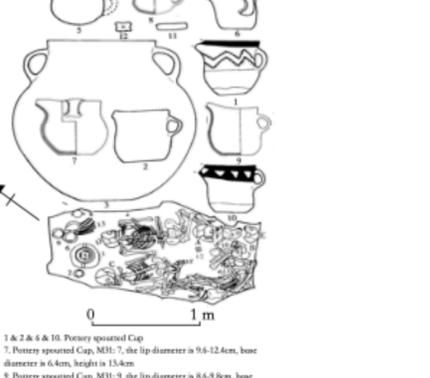
1. Bone Spinning wheel, M13-1, the diameter is 4.3cm, hole diameter is 0.5cm, thickness is 2cm
4. Pottery Double-handled Jar, M13-4, the lip diameter is 12.4cm, base diameter is 7.05cm, height is 22cm

IVM24



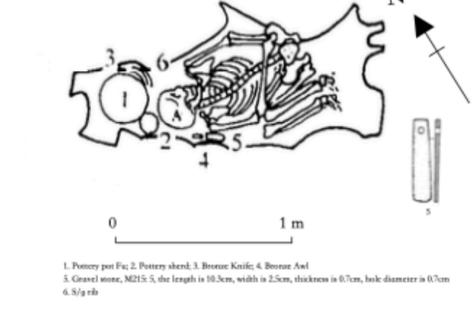
7. Pottery spooned Cup, M24-7, the lip diameter is 8.8-10cm, base diameter is 5.8cm, height is 17cm
12. Cosmetic stick, M24-12, the length is 6.4cm, diameter is 0.9cm
27. Pottery Cup, the lip diameter is 8.6cm, base diameter is 5.2cm, height is 15.2cm

IVM31



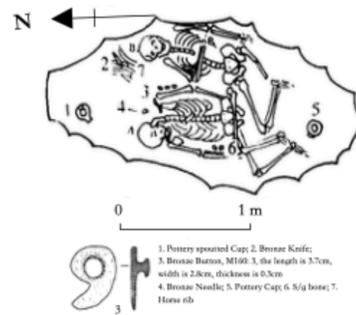
- 1 & 2 & 8 & 10. Pottery spooned Cup
7. Pottery spooned Cup, M31-7, the lip diameter is 9.6-12.4cm, base diameter is 6.4cm, height is 15.4cm
9. Pottery spooned Cup, M31-9, the lip diameter is 8.6-8.8cm, base diameter is 6.4cm, height is 12.8cm
3. Pottery Double-handled Jar; 4. Bronze Knife
5. Pottery Cup; 15. S/g rib
8. Pottery Cup, M31-8, the lip diameter is 6.3cm, base diameter is 3.6cm, height is 5.3cm
11. Grooved stone; 12. S/g bone

IVM215



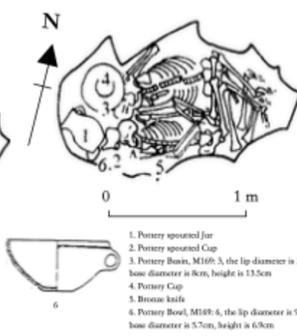
1. Pottery pot Fu; 2. Pottery shard; 3. Bronze Knife; 4. Bronze Awl
5. Grooved stone, M215-5, the length is 10.3cm, width is 2.5cm, thickness is 0.7cm, hole diameter is 0.7cm
6. S/g rib

IVM160



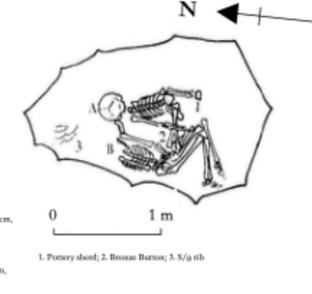
1. Pottery spooned Cup; 2. Bronze Knife
3. Bronze Button, M160-3, the length is 5.7cm, width is 2.2cm, thickness is 0.5cm
4. Bronze Needle; 5. Pottery Cup; 6. S/g bone; 7. Horse rib

IVM169



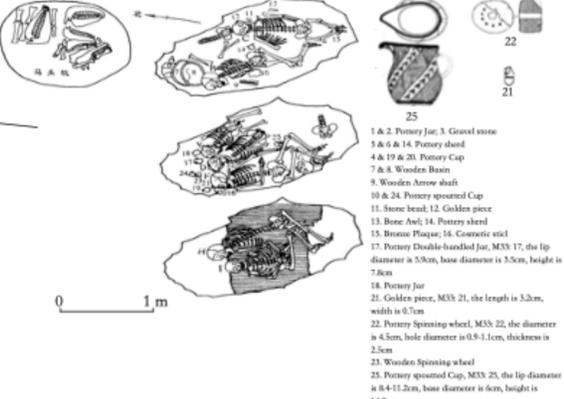
1. Pottery spooned Jar
2. Pottery spooned Cup
3. Pottery Basin, M169-3, the lip diameter is 34.8cm, base diameter is 8cm, height is 15.5cm
4. Pottery Cup
5. Bronze knife
6. Pottery Bowl, M169-6, the lip diameter is 9.1cm, base diameter is 5.7cm, height is 6.8cm

IVM191



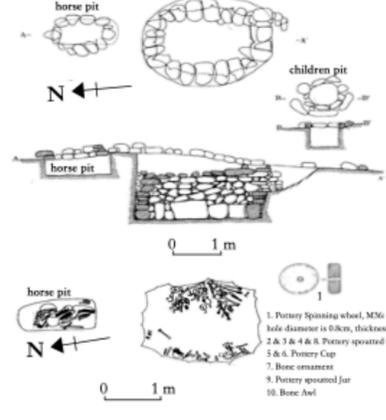
1. Pottery shard; 2. Bronze Button; 3. S/g rib

IVM33



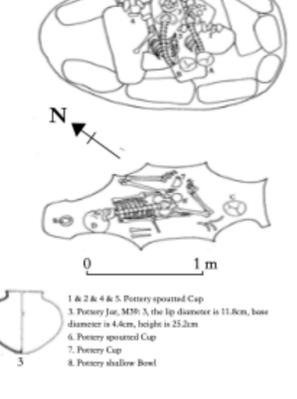
- 1 & 2. Pottery Jar; 3. Grooved stone
- 5 & 6 & 14. Pottery shard
- 4 & 19 & 20. Pottery Cup
- 7 & 8. Wooden Basin
9. Wooden Arrow shaft
- 10 & 24. Pottery spooned Cup
11. Stone bead; 12. Golden piece
13. Bone Awl; 14. Pottery shard
15. Bronze Pinax; 16. Cosmetic stick
17. Pottery Double-handled Jar, M33-17, the lip diameter is 5.8cm, base diameter is 3.5cm, height is 7.8cm
18. Pottery Jar
21. Golden piece, M33-21, the length is 5.2cm, width is 0.7cm
22. Pottery Spinning wheel, M33-22, the diameter is 4.5cm, hole diameter is 0.8-1.1cm, thickness is 2.5cm
23. Wooden Spinning wheel
25. Pottery spooned Cup, M33-25, the lip diameter is 8.4-12.2cm, base diameter is 5cm, height is 14.2cm

IVM36



1. Pottery Spinning wheel, M36-1, the diameter is 5.1cm, hole diameter is 0.8cm, thickness is 1.5cm
- 2 & 3 & 4 & 8. Pottery spooned Cup
7. Bone ornament
9. Pottery spooned Jar
10. Bone Awl

IVM39



- 1 & 2 & 4 & 5. Pottery spooned Cup
3. Pottery Jar, M39-3, the lip diameter is 11.8cm, base diameter is 4.8cm, height is 25.2cm
- 6 & 7 & 8 & 9. Pottery spooned Cup
7. Pottery Cup
8. Pottery shallow Bowl

Fig. 5.2.8-5-1

Fig. 5.2.8-5-2

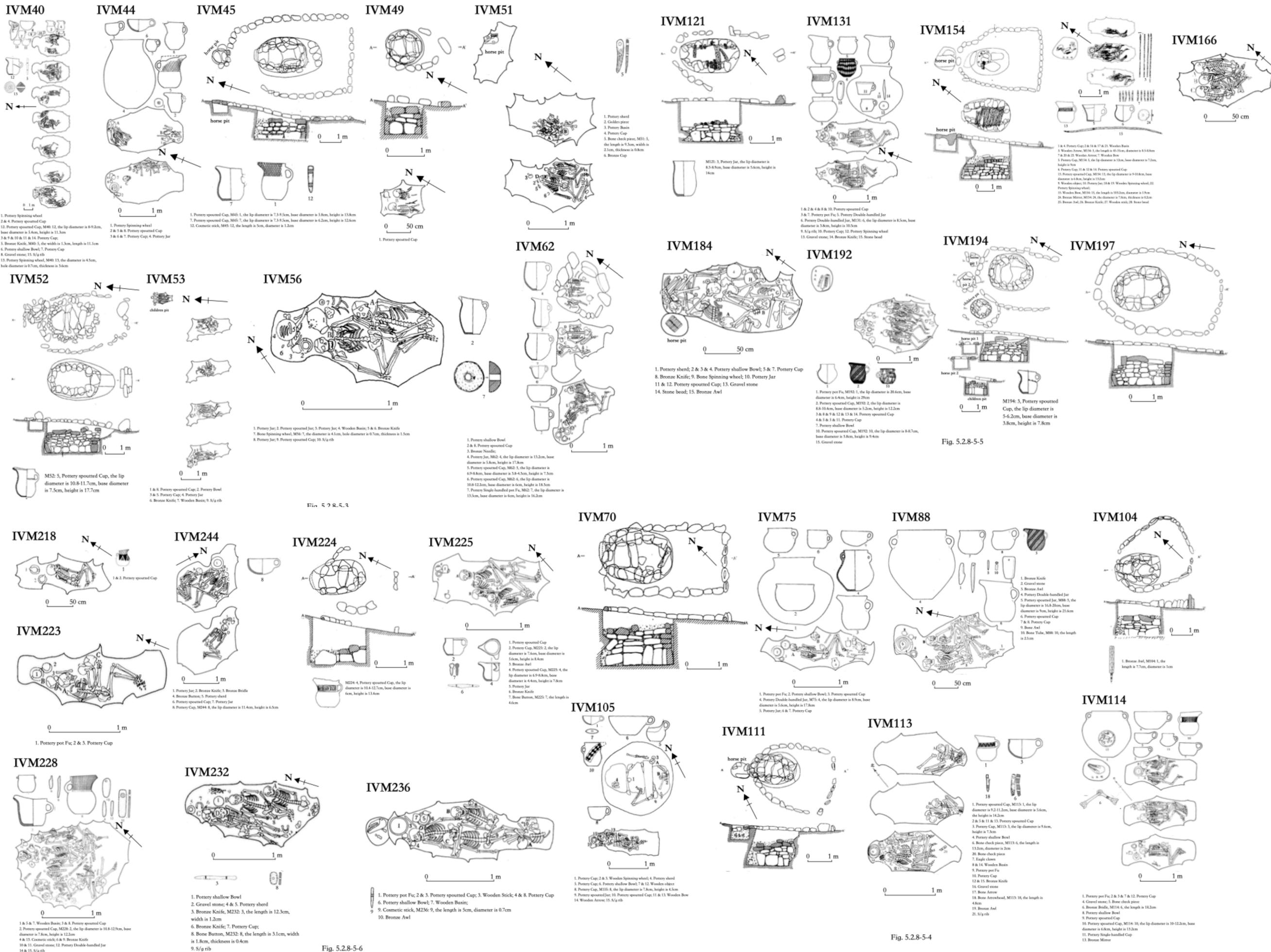


Fig. 5.2.8-5-5

Fig. 5.2.8-5-4

Fig. 5.2.8-5-6



Fig. 5.3.1-1

79LQ2M1

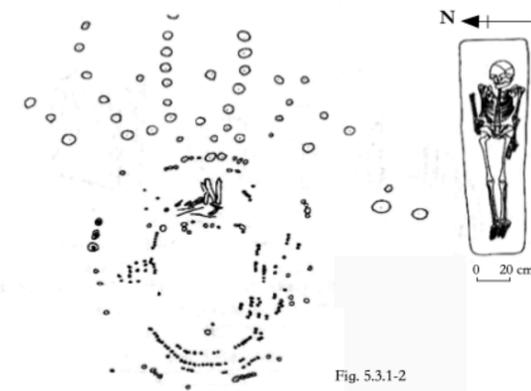
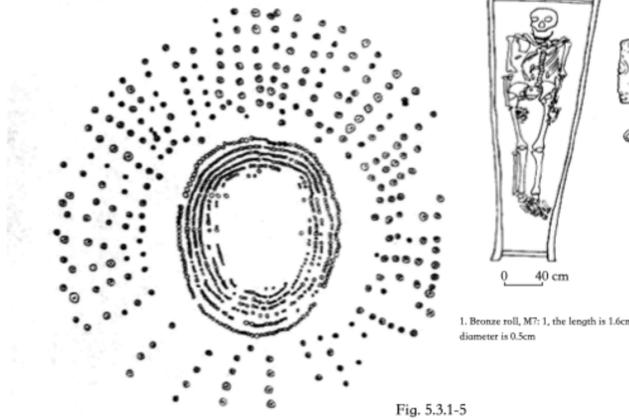


Fig. 5.3.1-2

79LQ2M7



1. Bronze roll, M7: 1, the length is 1.6cm, diameter is 0.5cm

Fig. 5.3.1-5

79LQ2M8

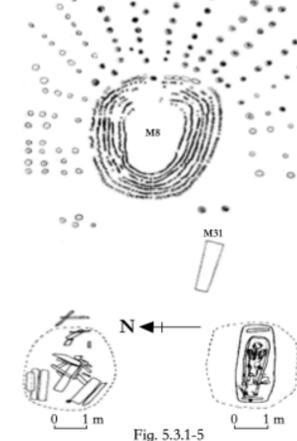


Fig. 5.3.1-5

79LQ2M9

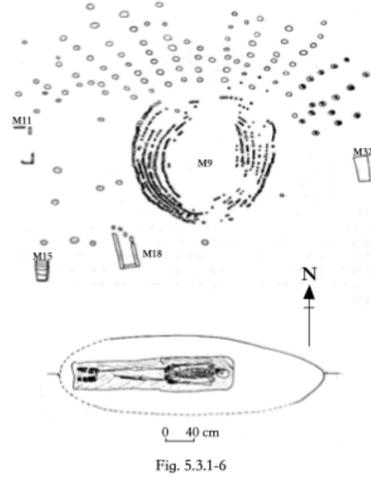
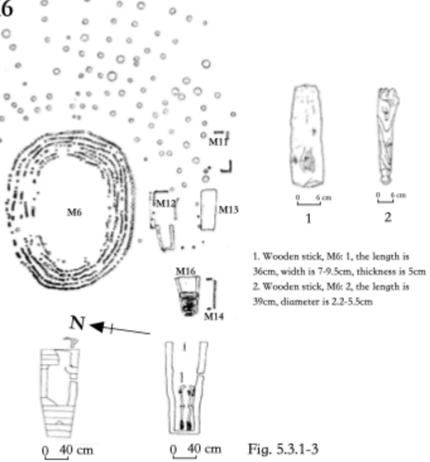


Fig. 5.3.1-6

79LQ2M6



1. Wooden stick, M6: 1, the length is 36cm, width is 7-9.5cm, thickness is 5cm
2. Wooden stick, M6: 2, the length is 39cm, diameter is 2.2-5.5cm

Fig. 5.3.1-3

79LQ2M10



3. Bone Awl, M10: 3, the length is 10.7cm
4. Bronze piece, M10: 4, the length is 2.5cm, width is 1.1-1.5cm, thickness is 0.4cm
5. Stone, M10: 5, the length is 7cm, width is 3cm, thickness is 1.8cm

Fig. 5.3.1-7

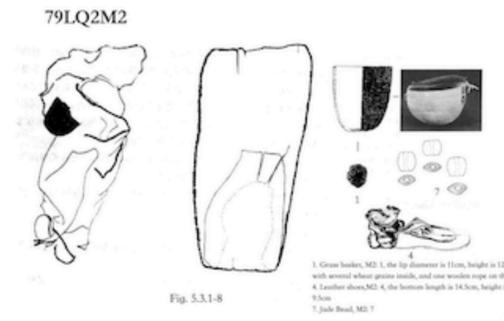


Fig. 5.31-8

1. Grass basket, M2-1, the lip diameter is 11cm, height is 12cm, with several wheat grains inside, and one wooden spike on the lip.
2. Leather shoe, M2-4, the bottom length is 14.5cm, height is 9.5cm.
3. Jade bead, M2-7.

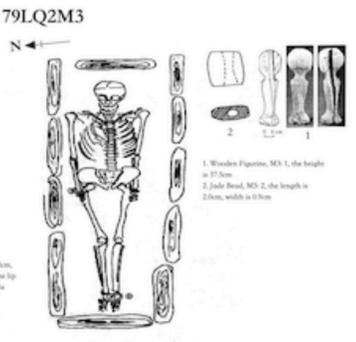
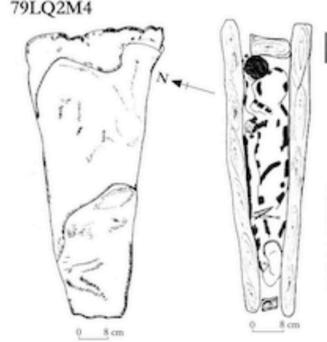


Fig. 5.31-9

1. Wooden figurine, M3-1, the height is 27.5cm.
2. Jade bead, M3-2, the length is 2.5cm, width is 0.5cm.



1. Ephantidus branch, M4-1.
2. Grass basket, M4-2, the lip diameter is 12.5cm, height is 14cm.
3. Grass basket, M4-3, the lip diameter is 7.5cm, height is 13cm, belly diameter is 9.5cm, with several wheat grains inside.
4. Chu bone, M4-4, the length is 20cm, width is 5cm.
5. Jade bead, M4-5, the length is 1.0-1.1cm, hole diameter is 0.5cm.
6. Leather shoe, M4-6, the heel thickness is 0.5cm.

Fig. 5.31-10



Fig. 5.31-11

1. Grass basket, M5-1, the lip diameter is 7cm, height is 15cm, covered by one fish-gilt piece, with one wooden spike on the lip.
2. Leather shoe, M5-2, the length is 15cm, width is 8cm, height is 6cm.
3. Jade bead, M5-3.
4. Leather pouch, M5-4, found inside the band, made by wooden piece.

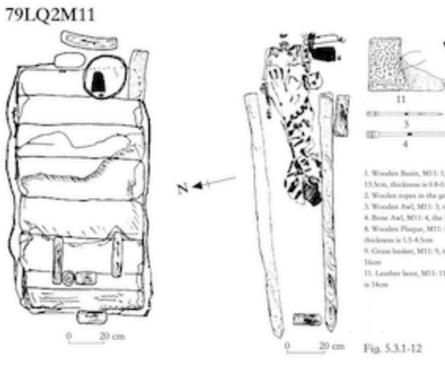


Fig. 5.31-12

1. Wooden basin, M11-1, the lip diameter is 20.7cm, height is 13.5cm, the base is 9.8x5.5cm.
2. Wooden spikes on the grass basket.
3. Wooden Axl, M11-3, the length is 7.2cm.
4. Bone Axl, M11-4, the length is 7.2cm.
5. Wooden Plaque, M11-5, the length is 22.5cm, width is 7cm, thickness is 0.4-0.5cm.
6. Grass basket, M11-6, the belly diameter is 8.5cm, height is 16cm.
10. Leather shoe, M11-10, the bottom length is 20.5cm, height is 14cm.

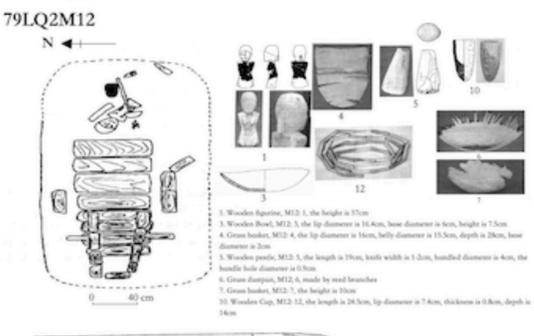


Fig. 5.31-13

1. Wooden figurine, M12-1, the height is 17cm.
2. Wooden bowl, M12-2, the lip diameter is 16.4cm, base diameter is 8cm, height is 7.5cm.
3. Grass basket, M12-3, the lip diameter is 15.5cm, belly diameter is 13.5cm, depth is 28cm, base diameter is 2cm.
4. Grass basket, M12-4, the lip diameter is 15.5cm, belly diameter is 13.5cm, depth is 28cm, base diameter is 2cm.
5. Wooden spade, M12-5, the length is 19cm, hole width is 1.2cm, handle diameter is 4cm, the handle hole diameter is 0.5cm.
6. Grass dagger, M12-6, made by wood branches.
7. Grass basket, M12-7, the height is 10cm.
10. Wooden Cup, M12-10, the length is 24.5cm, lip diameter is 7.4cm, thickness is 0.8cm, depth is 14cm.

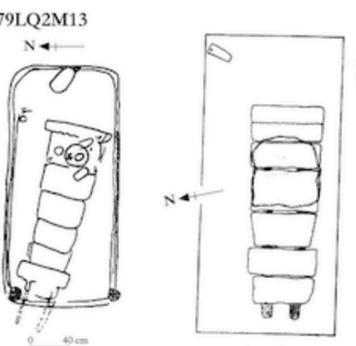


Fig. 5.31-14

1. Wooden bowl, M13-1, the lip diameter is 13.5cm, height is 11.7cm, thickness is 0.7-1cm.
2. Wooden paddle, M13-2, the length is 15cm, diameter is 9-13cm.
3. Wooden spoon, M13-3, the diameter is 4.7cm, thickness is 1-1.5cm.
4. Wooden Cup, M13-4, the length is 16.5cm, belly depth is 7.5cm, thickness is 0.8cm, diameter is 9.5-5cm.
5. Grass basket, M13-5, the height is 7cm.
6. Wooden Plaque, M13-6, the length is 39.5cm, width is 9.5cm, thickness is 0.2-2cm.
8. Bone horn Cup, M13-8, the lip diameter is 7.5cm, height is 16.5cm.

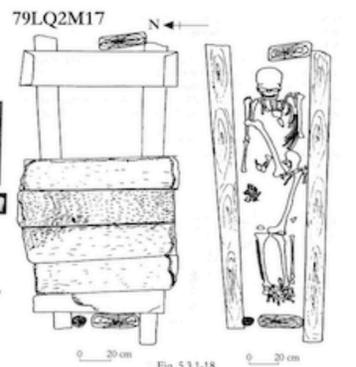


Fig. 5.31-18

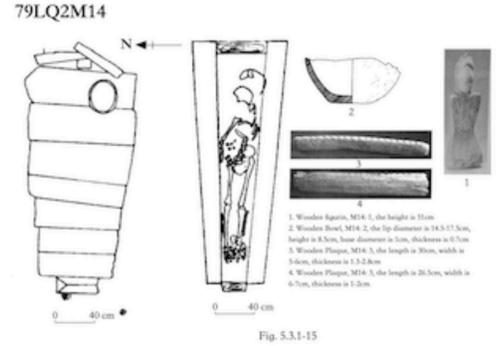


Fig. 5.31-15

1. Wooden figurine, M14-1, the height is 15cm.
2. Wooden bowl, M14-2, the lip diameter is 34.5x17.5cm, height is 8.5cm, base diameter is 5cm, thickness is 0.7cm.
3. Wooden Plaque, M14-3, the length is 30cm, width is 14cm, thickness is 1.2-2.2cm.
4. Wooden Plaque, M14-4, the length is 26.5cm, width is 6.7cm, thickness is 1.2cm.

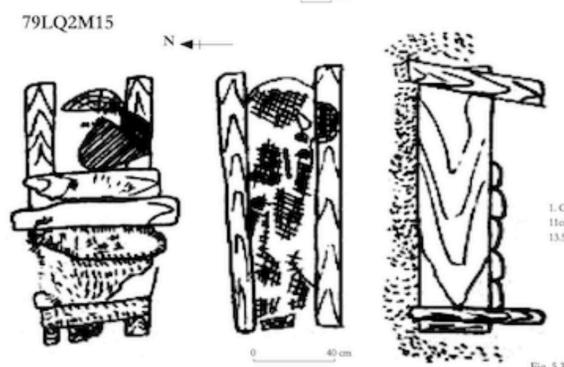


Fig. 5.31-16

1. Grass basket, M15-1, the lip diameter is 11cm, belly diameter is 12cm, height is 13.5cm, with several millet grains inside.

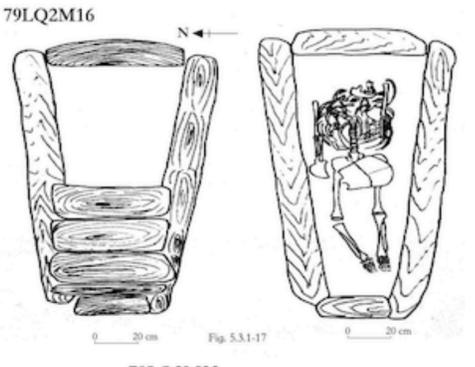


Fig. 5.31-17



Fig. 5.31-43

1. Grass basket, M42-1, the lip diameter is 13cm, height is 12cm.
2. Wooden Axl, M42-2, the length is 11.5cm.
3. Bone Axl, M42-3, the length is 9.6cm.

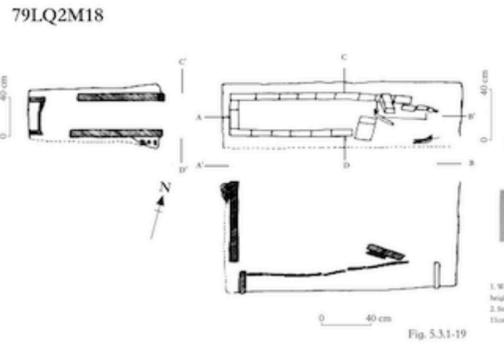


Fig. 5.31-19

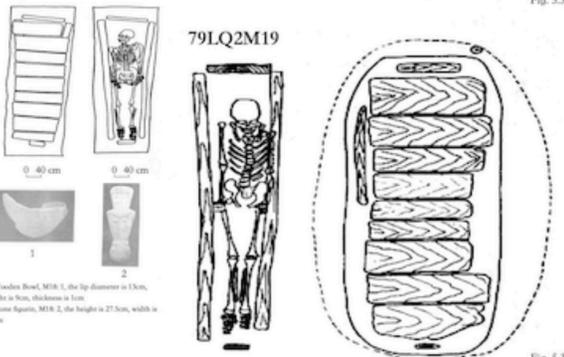


Fig. 5.31-20

1. Wooden bowl, M18-1, the lip diameter is 13cm, height is 9cm, thickness is 1cm.
2. Bone figurine, M18-2, the height is 27.5cm, width is 15cm.

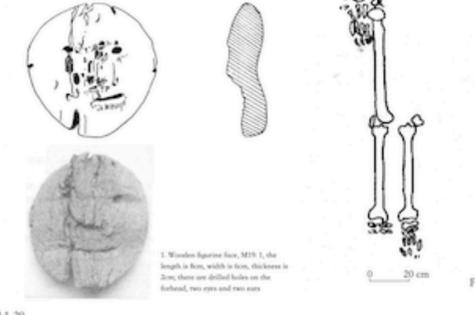


Fig. 5.31-23

1. Wooden figurine face, M19-1, the length is 8cm, width is 6cm, thickness is 2cm; there are drilled holes on the forehead, two eyes and two ears.

3. Jade bead, M22-1, the length is 1.4cm.

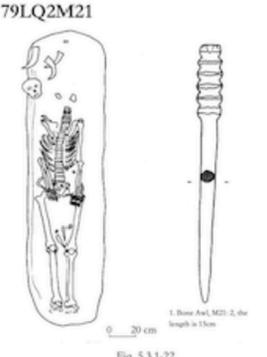


Fig. 5.31-22

1. Bone Axl, M21-2, the length is 13cm.

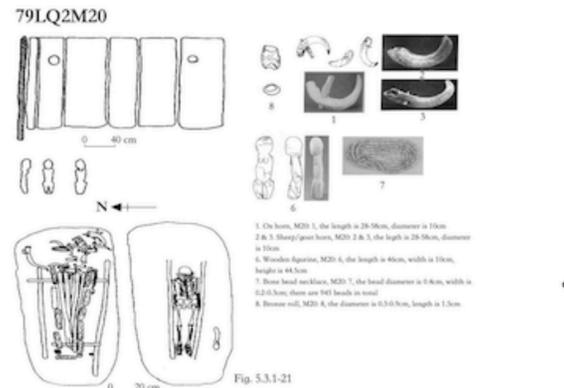


Fig. 5.31-21

1. Chu bone, M20-1, the length is 28.5cm, diameter is 10cm.
- 2 & 3. Sharp/great bone, M20-2 & 3, the length is 28.5cm, diameter is 10cm.
4. Wooden figurine face, M20-4, the length is 40cm, width is 15cm, height is 4.5cm.
5. Bone bead necklace, M20-5, the hole diameter is 0.6cm, width is 0.2-0.3cm; there are 945 beads in total.
8. Bone nail, M20-8, the diameter is 0.3-0.5cm, length is 1.5cm.

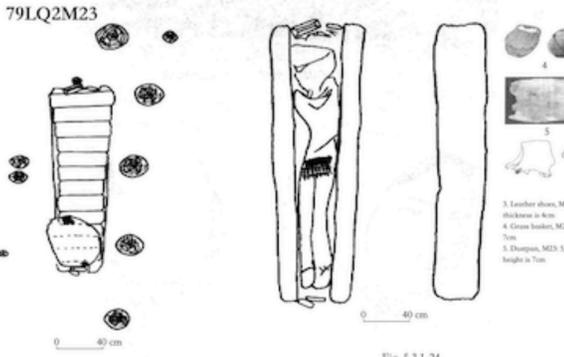


Fig. 5.31-24

3. Leather shoe, M23-3, the height is 15cm, width is 11cm, thickness is 4cm.
4. Grass basket, M23-4, the lip diameter is 3.5cm, height is 7cm.
5. Dagger, M23-5, the length is 49cm, width is 3.5cm, height is 7cm.

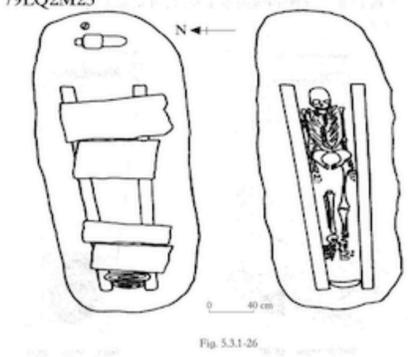


Fig. 5.31-26

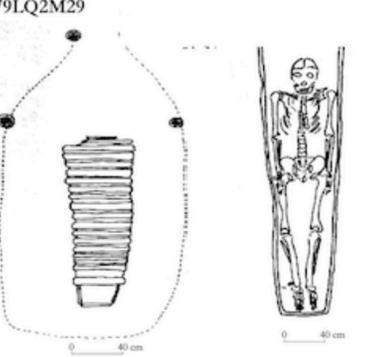
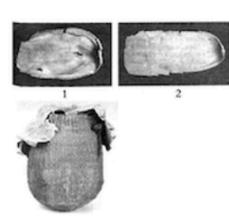
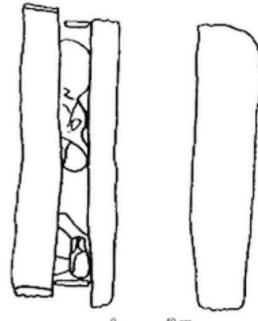
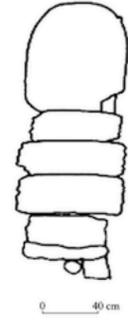


Fig. 5.31-30

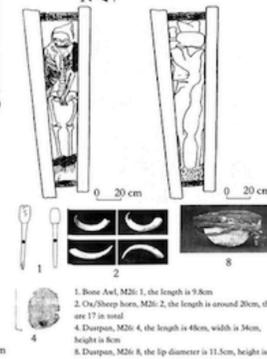
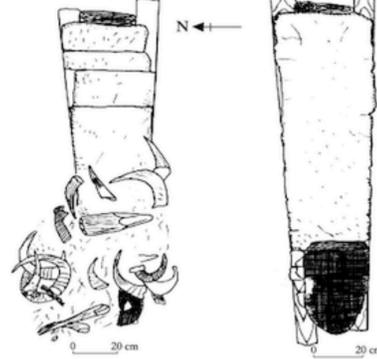
79LQ2M24



- 1. Sheep horn, M24: 1, the length is 51cm, width is 24-41cm, height is 9cm
- 2. Sheep horn, M24: 2, the length is 49.5cm, width is 31.5cm, height is 4cm

Fig. 5.3.1-25

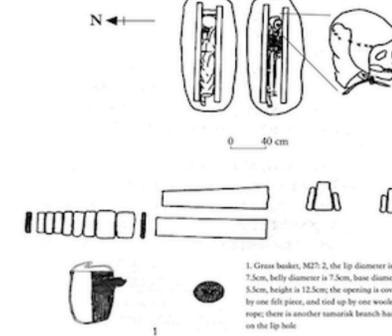
79LQ2M26



- 1. Bone Awl, M26: 1, the length is 9.8cm
- 2. Ox/Sheep horn, M26: 2, the length is around 20cm, there are 17 in total
- 4. Sheep horn, M26: 4, the length is 48cm, width is 34cm, height is 8cm
- 8. Sheep horn, M26: 8, the lip diameter is 11.5cm, height is 9cm

Fig. 5.3.1-27

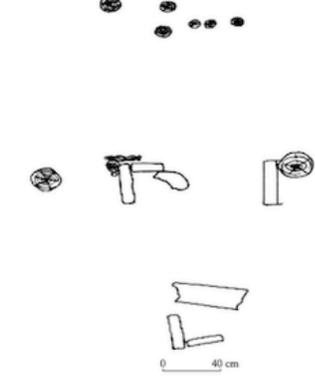
79LQ2M27



- 1. Grass basket, M27: 2, the lip diameter is 7.5cm, belly diameter is 7.5cm, height is 12.5cm; the opening is covered by one felt piece, and tied up by one wooden rope; there is another sumarak branch handle on the lip hole

Fig. 5.3.1-28

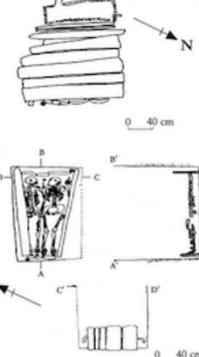
79LQ2M28



- 1. Grass basket, M28: 1, the belly diameter is 20cm, height is 28cm
- 5. Bone Awl, M28: 5, the length is 12.9cm
- 7. Bone bead bracelet, M28: 7, the jade bead length is 2.0-3.1cm

Fig. 5.3.1-29

79LQ2M30



- 2. Bone Awl, M30: 2, the length is 6.5cm
- 4. Bone Awl, M30: 4, the length is 10.2cm
- 5. Bone Awl, M30: 5, the length is 3.6cm, width is 1.5cm

Fig. 5.3.1-31

79LQ2M31

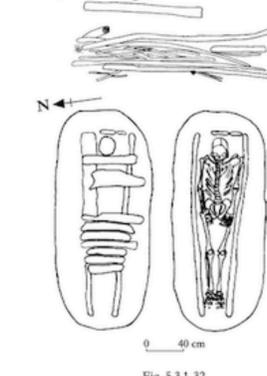


Fig. 5.3.1-32

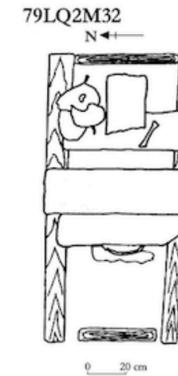


Fig. 5.3.1-33

79LQ2M34

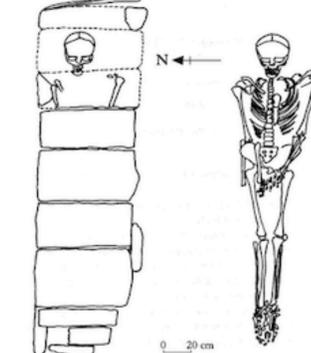
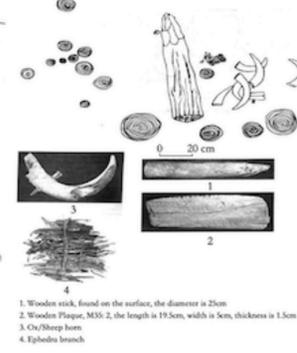
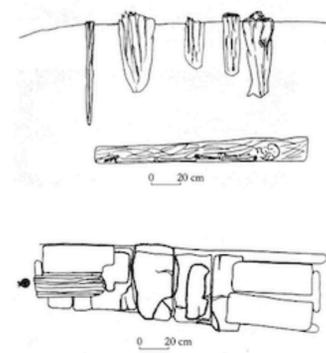


Fig. 5.3.1-35

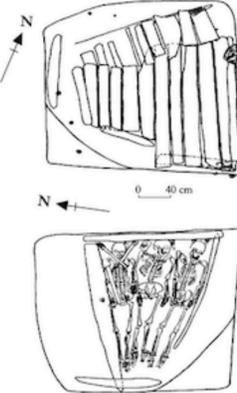
79LQ2M35



- 1. Wooden stick, found on the surface, the diameter is 25cm
- 2. Wooden Plaque, M35: 2, the length is 19.5cm, width is 5cm, thickness is 1.5cm
- 3. Ox/Sheep horn
- 4. Ephedra branch

Fig. 5.3.1-36

79LQ2M41



- 1. Grass basket, M41: 1, the lip diameter is 12cm, base diameter is 7cm, height is 20cm
- 2. Wooden Object, the length is 45cm, width is 23.5cm, thickness is 1.8cm
- 3. Beads, M41: 3, the length is 1.2cm, diameter is 0.2-1.1cm, hole diameter is 0.2-0.6cm
- 4. Jade bead, M41: 4, the length is 1.2cm, width is 1.7cm
- 5. Bone Awl, M41: 5, the length is 7.5cm
- 6. Grass basket, M41: 6, the lip diameter is 10cm, belly diameter is 11.7cm, height is 14.5cm
- 8. Grass basket, M41: 7, the height is 10cm
- 9. Wooden object, M41: 9, the length is 53.5cm, width is 2.8cm
- 10. Grass basket material, M41: 10, the length is 20cm

Fig. 5.3.1-42

79LQ2M33

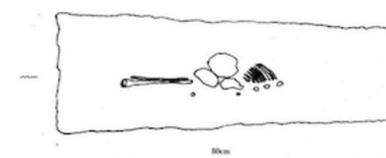


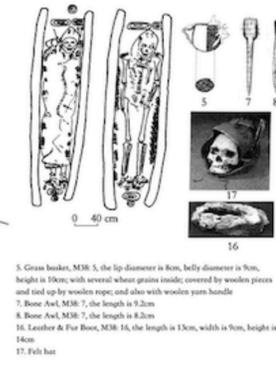
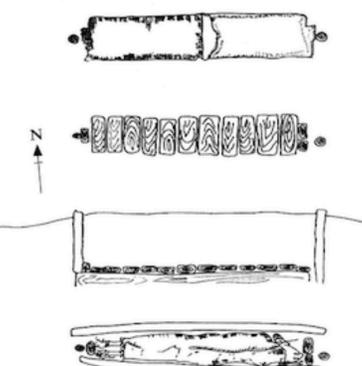
Fig. 5.3.1-34

79LQ2M36



Fig. 5.3.1-37

79LQ2M38



- 5. Grass basket, M38: 5, the lip diameter is 8cm, belly diameter is 9cm, height is 16cm; with several wheat grains inside, covered by wooden pieces and tied up by wooden rope; and also with wooden yam handle
- 7. Bone Awl, M38: 7, the length is 9.2cm
- 8. Bone Awl, M38: 8, the length is 8.2cm
- 16. Leather & Fur Boot, M38: 16, the length is 13cm, width is 9cm, height is 14cm
- 17. Felt hat

Fig. 5.3.1-39

79LQ2M39

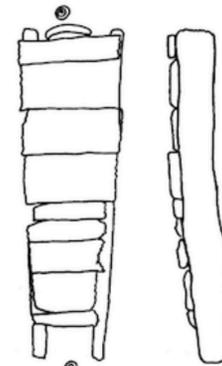
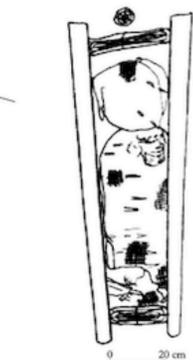
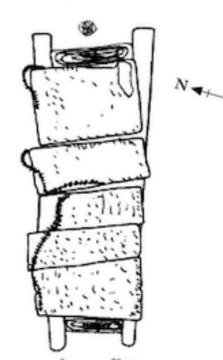


Fig. 5.3.1-40

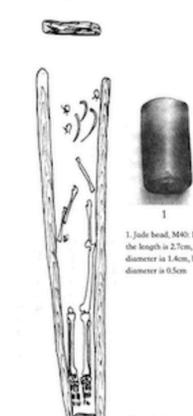
79LQ2M37



- 1. Grass basket, M37: 1, the height is 16cm

Fig. 5.3.1-38

79LQ2M40



- 1. Jade bead, M40: 1, the length is 2.7cm, diameter is 1.4cm, hole diameter is 0.5cm

Fig. 5.3.1-41

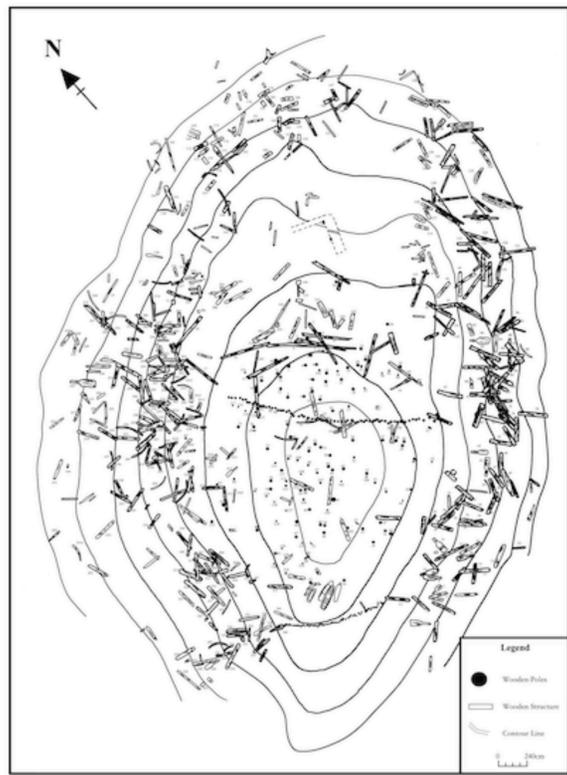


Fig. 5.3.2-1

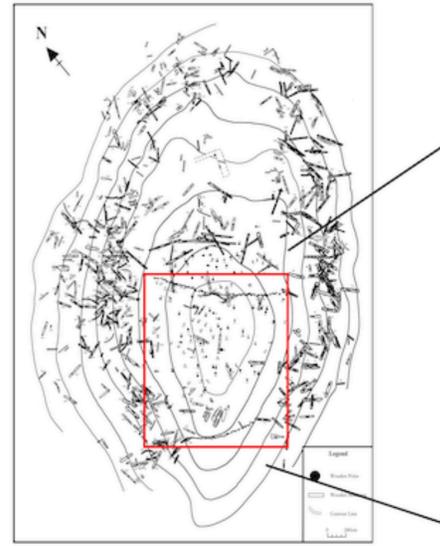


Fig. 5.3.2-5

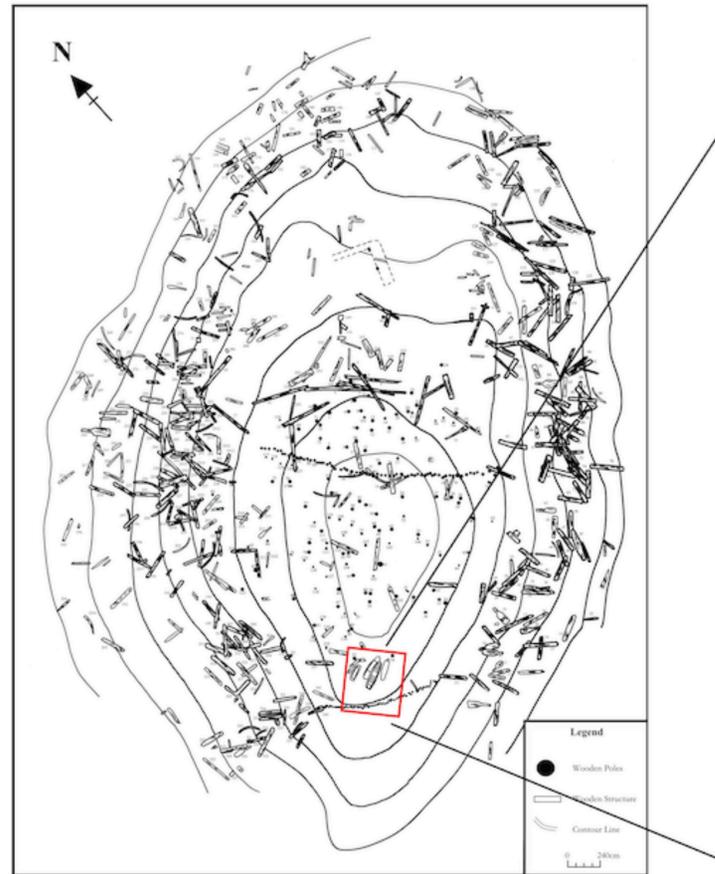
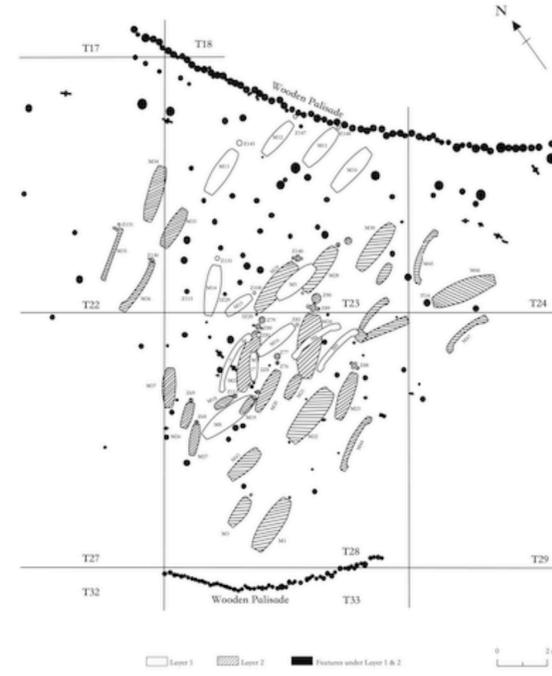
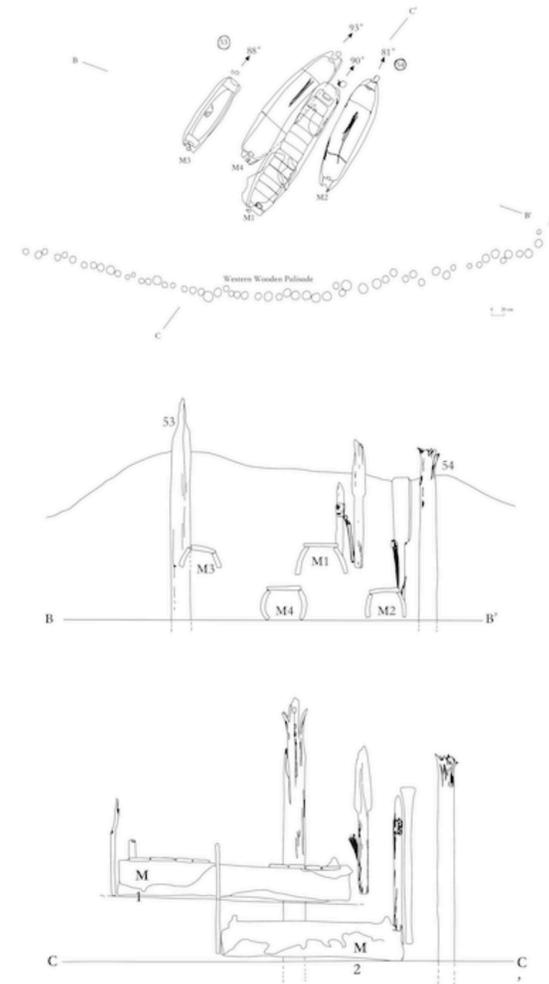


Fig. 5.3.2-2



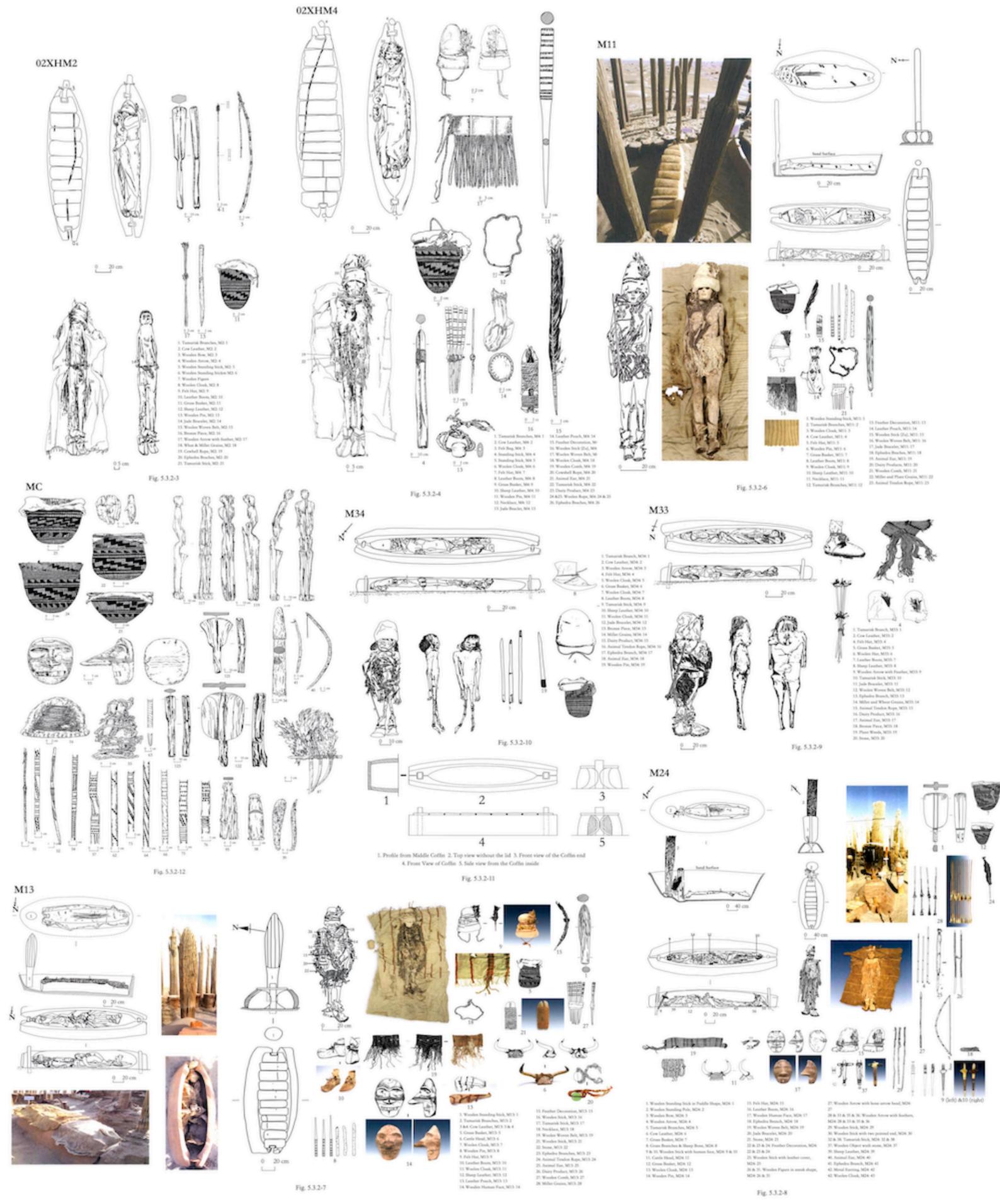




Fig. 5.3.3.1

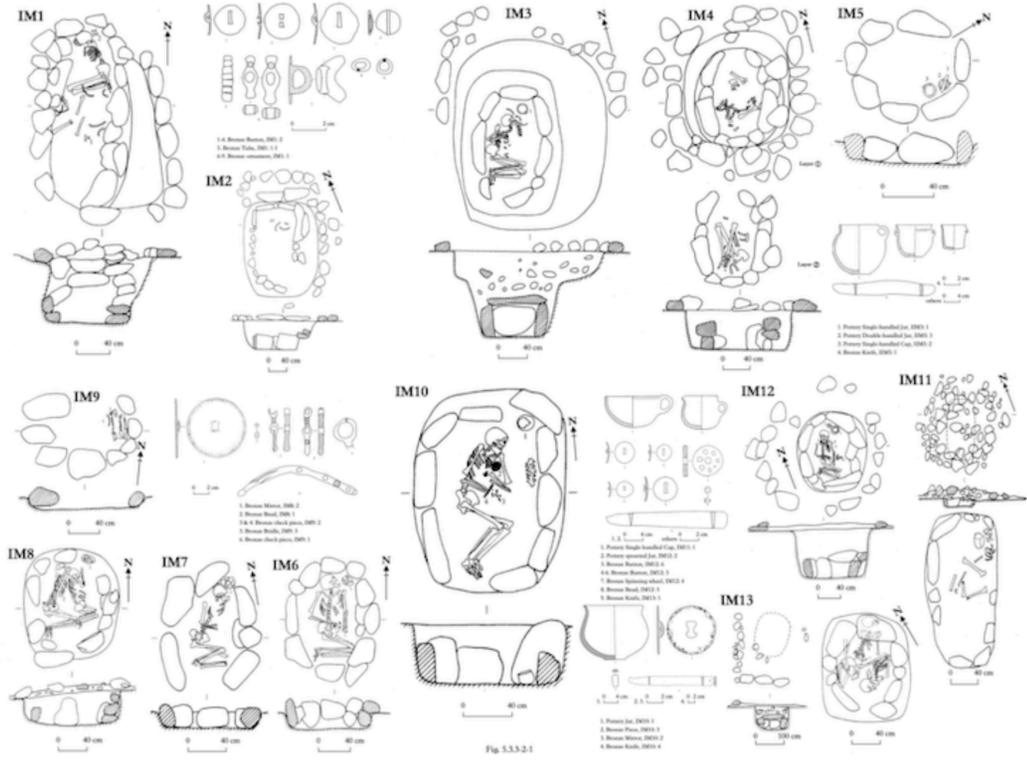


Fig. 5.3.3-1

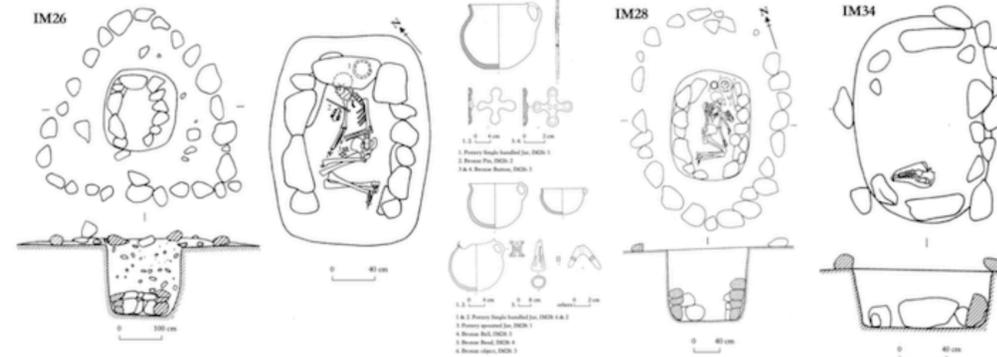


Fig. 5.3.3-1

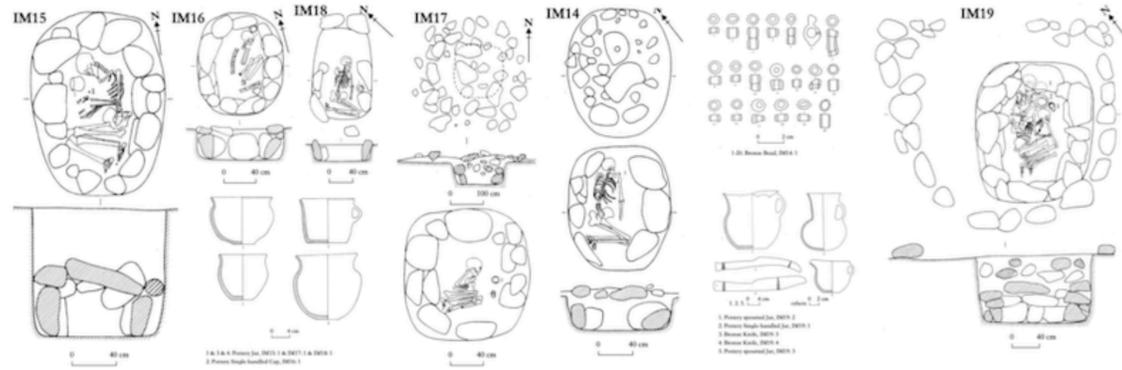


Fig. 5.3.3-1

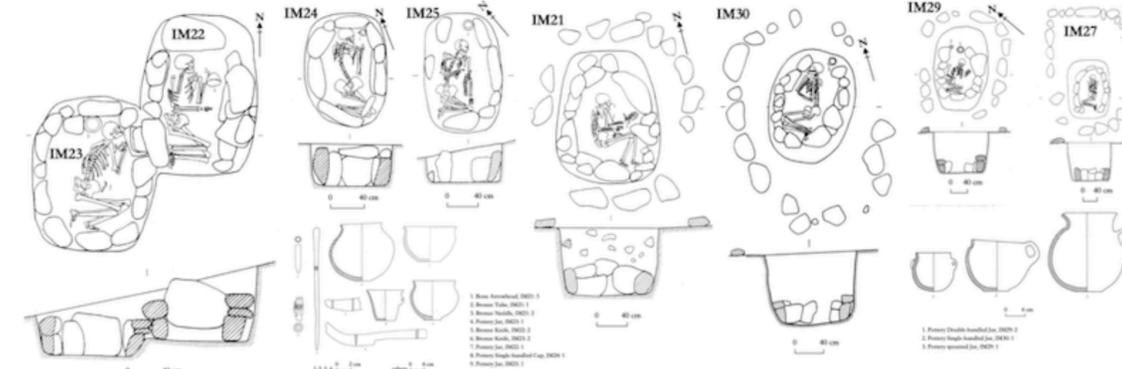


Fig. 5.3.3-2

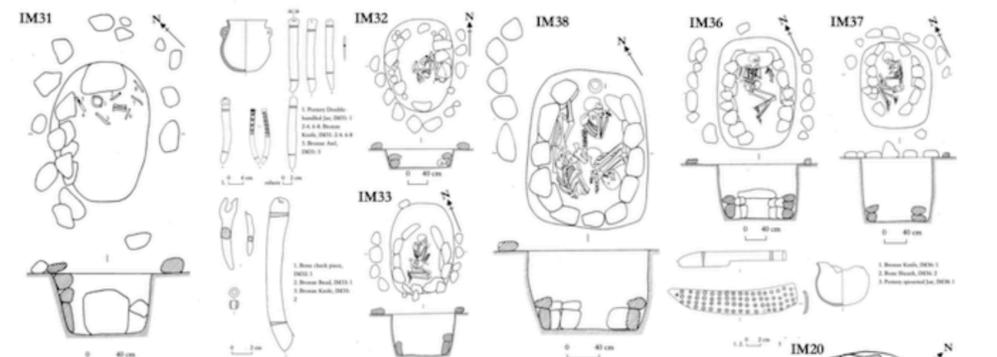


Fig. 5.3.3-2

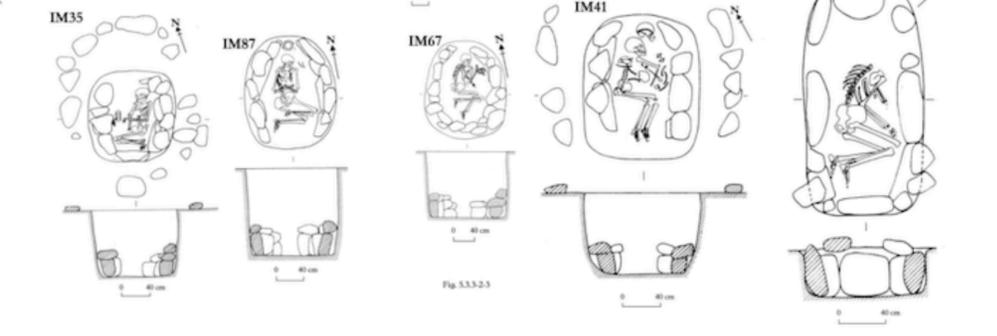
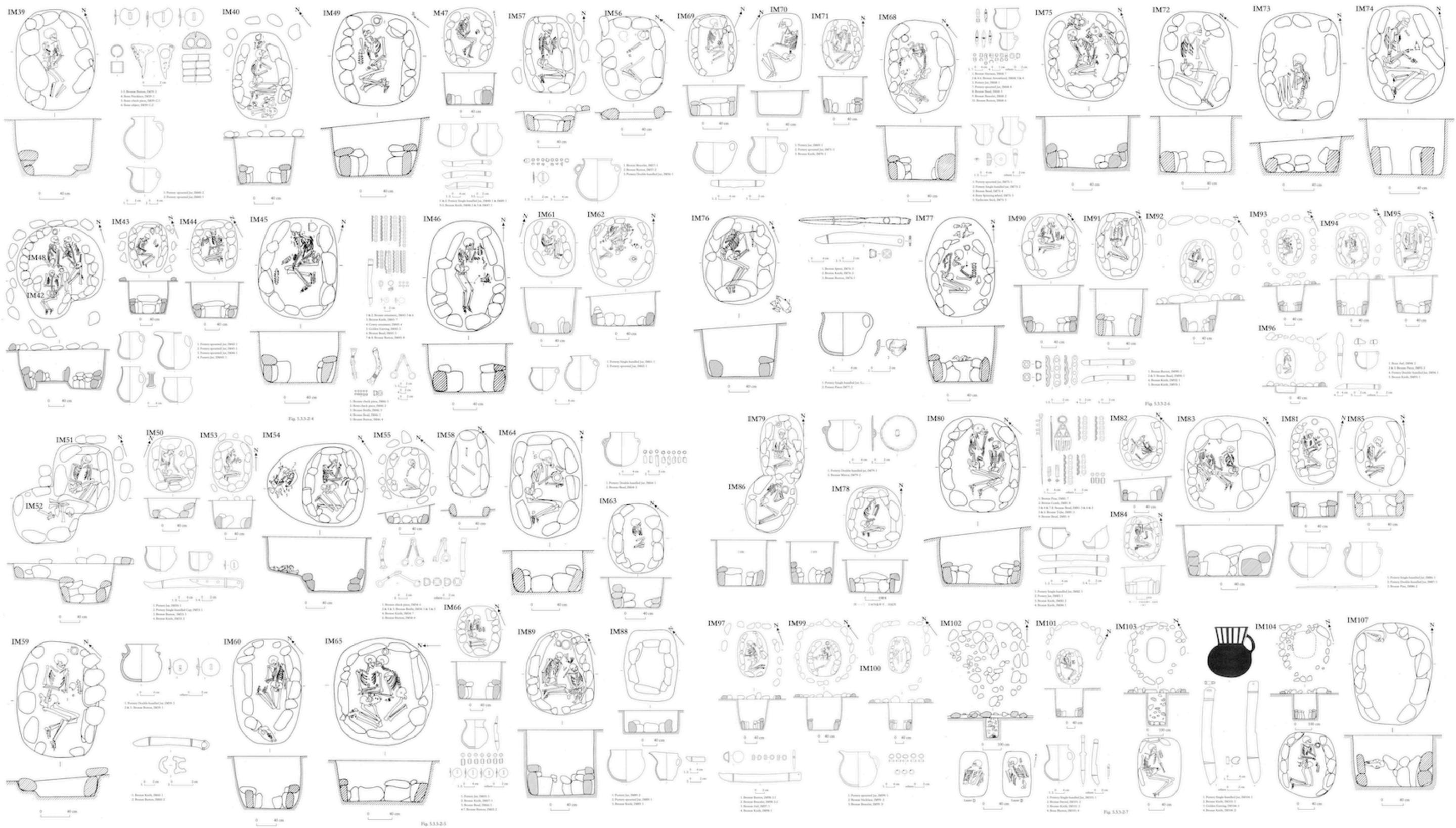
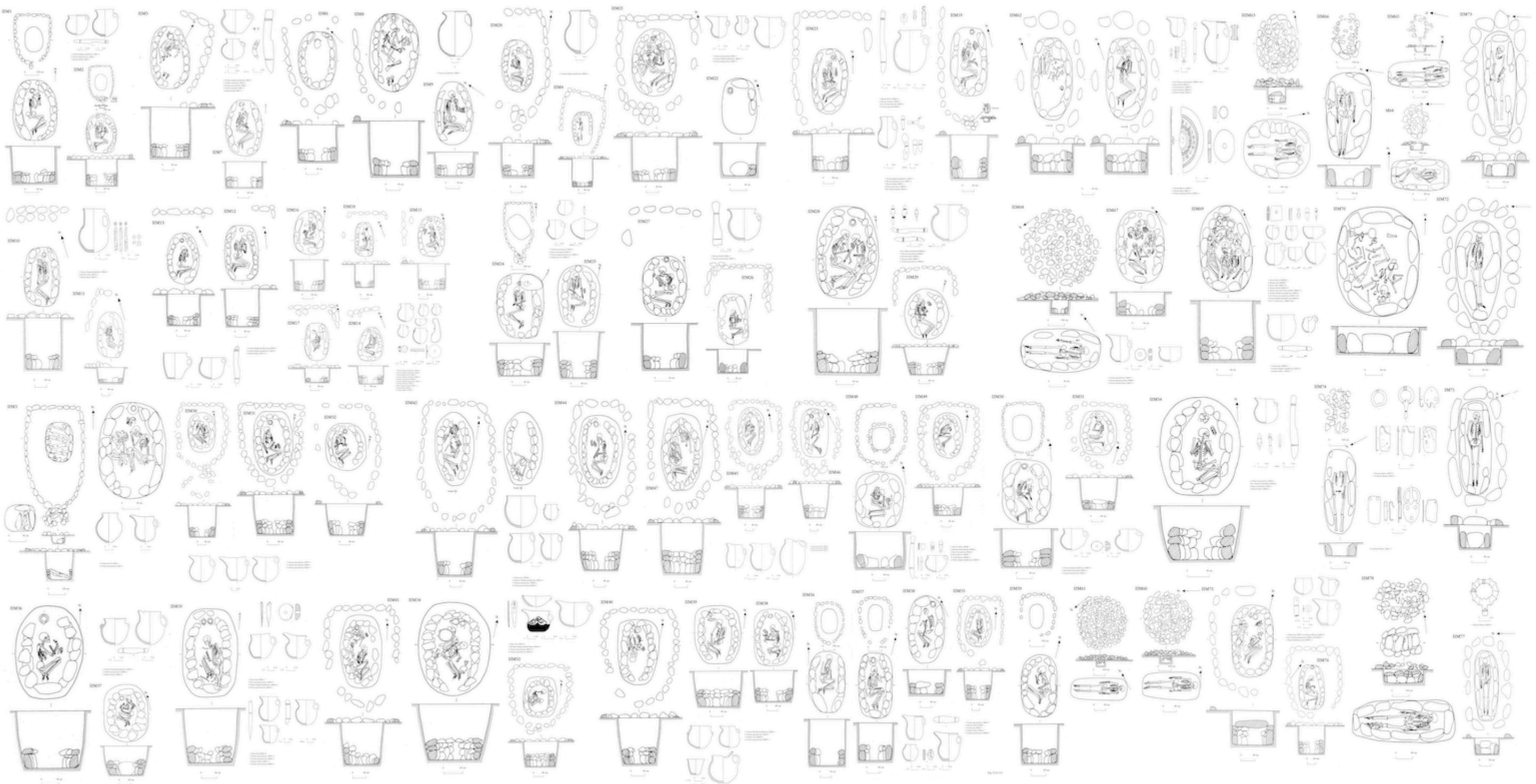


Fig. 5.3.3-2





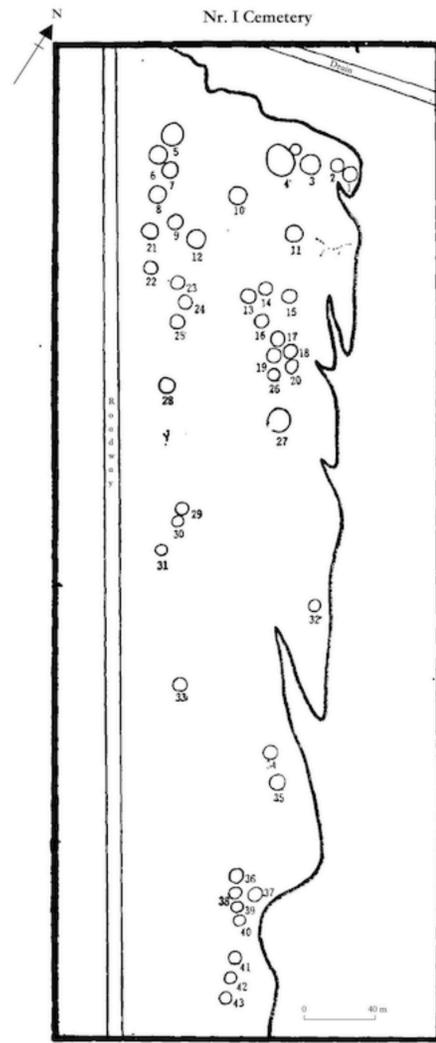
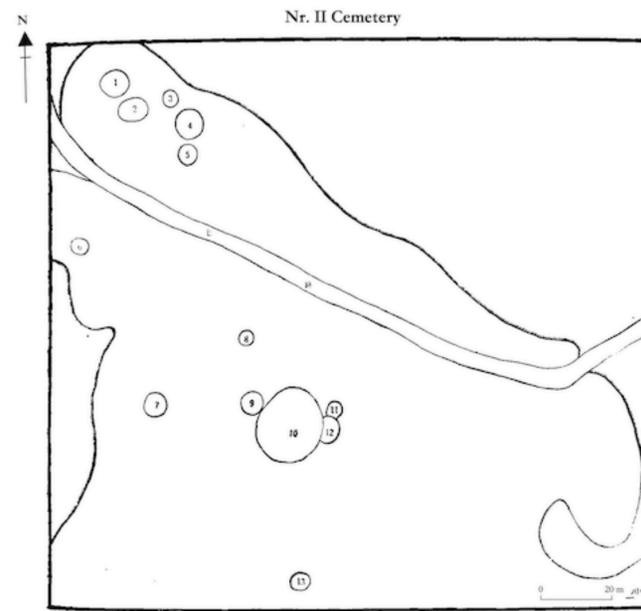


Fig. 5.3.4-1



Nr. II Cemetery

IM3

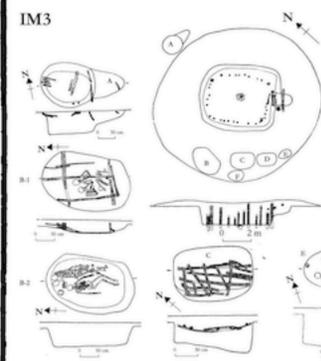
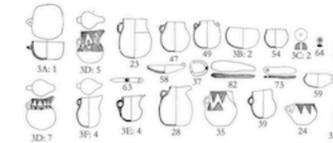


Fig. 5.3.4-13



- 3A:1
- 3D:5
- 3E:4
- 3F:4
- 3G:2
- 3H:1
- 3I:1
- 3J:1
- 3K:1
- 3L:1
- 3M:1
- 3N:1
- 3O:1
- 3P:1
- 3Q:1
- 3R:1
- 3S:1
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- 3U:1
- 3V:1
- 3W:1
- 3X:1
- 3Y:1
- 3Z:1

Fig. 5.3.4-3

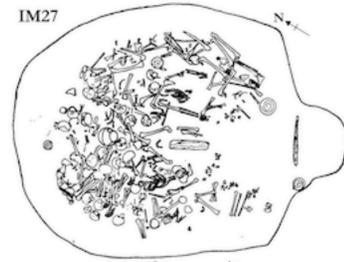


Fig. 5.3.4-10



- 27A:1
- 27A:2
- 27A:3
- 27A:4
- 27A:5
- 27A:6
- 27A:7
- 27A:8
- 27A:9
- 27A:10
- 27A:11
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- 27A:100

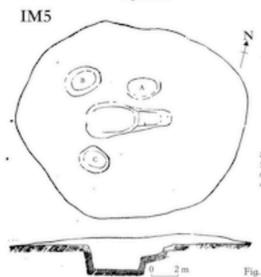


Fig. 5.3.4-4

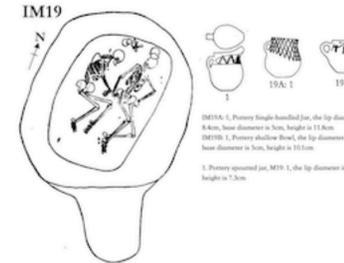
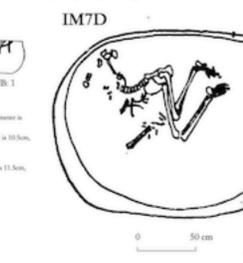


Fig. 5.3.4-9



- 19A:1
- 19B:1

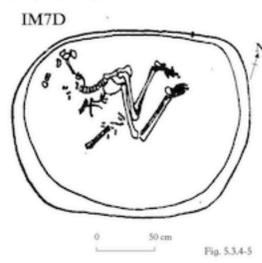
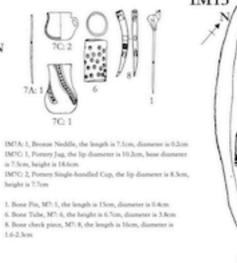


Fig. 5.3.4-5



- 7A:1
- 7B:1
- 7C:1
- 7D:1
- 7E:1
- 7F:1
- 7G:1
- 7H:1
- 7I:1
- 7J:1
- 7K:1
- 7L:1
- 7M:1
- 7N:1
- 7O:1
- 7P:1
- 7Q:1
- 7R:1
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- 7V:1
- 7W:1
- 7X:1
- 7Y:1
- 7Z:1

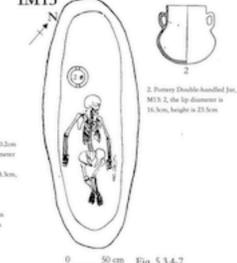
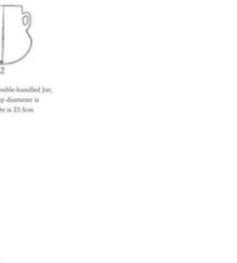


Fig. 5.3.4-7



- 13A:1
- 13B:1
- 13C:1
- 13D:1
- 13E:1
- 13F:1
- 13G:1
- 13H:1
- 13I:1
- 13J:1
- 13K:1
- 13L:1
- 13M:1
- 13N:1
- 13O:1
- 13P:1
- 13Q:1
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- 13V:1
- 13W:1
- 13X:1
- 13Y:1
- 13Z:1

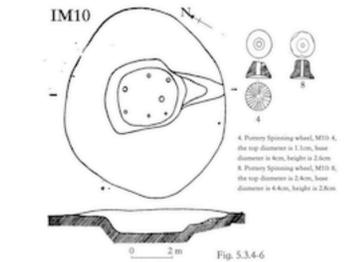
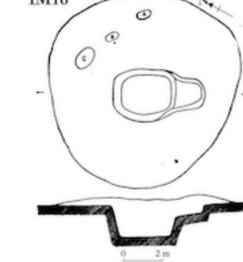


Fig. 5.3.4-6



- 10A:1
- 10B:1
- 10C:1
- 10D:1
- 10E:1
- 10F:1
- 10G:1
- 10H:1
- 10I:1
- 10J:1
- 10K:1
- 10L:1
- 10M:1
- 10N:1
- 10O:1
- 10P:1
- 10Q:1
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- 10V:1
- 10W:1
- 10X:1
- 10Y:1
- 10Z:1

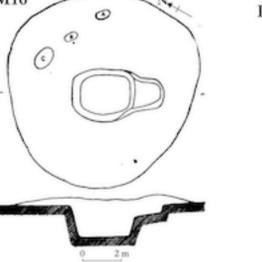
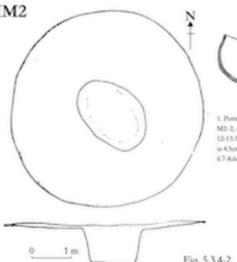


Fig. 5.3.4-8



- 16A:1
- 16B:1
- 16C:1
- 16D:1
- 16E:1
- 16F:1
- 16G:1
- 16H:1
- 16I:1
- 16J:1
- 16K:1
- 16L:1
- 16M:1
- 16N:1
- 16O:1
- 16P:1
- 16Q:1
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- 16W:1
- 16X:1
- 16Y:1
- 16Z:1

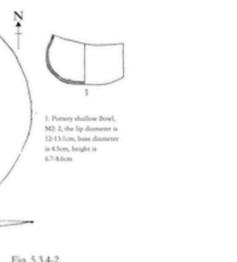


Fig. 5.3.4-2



- 2A:1
- 2B:1
- 2C:1
- 2D:1
- 2E:1
- 2F:1
- 2G:1
- 2H:1
- 2I:1
- 2J:1
- 2K:1
- 2L:1
- 2M:1
- 2N:1
- 2O:1
- 2P:1
- 2Q:1
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- 2Z:1

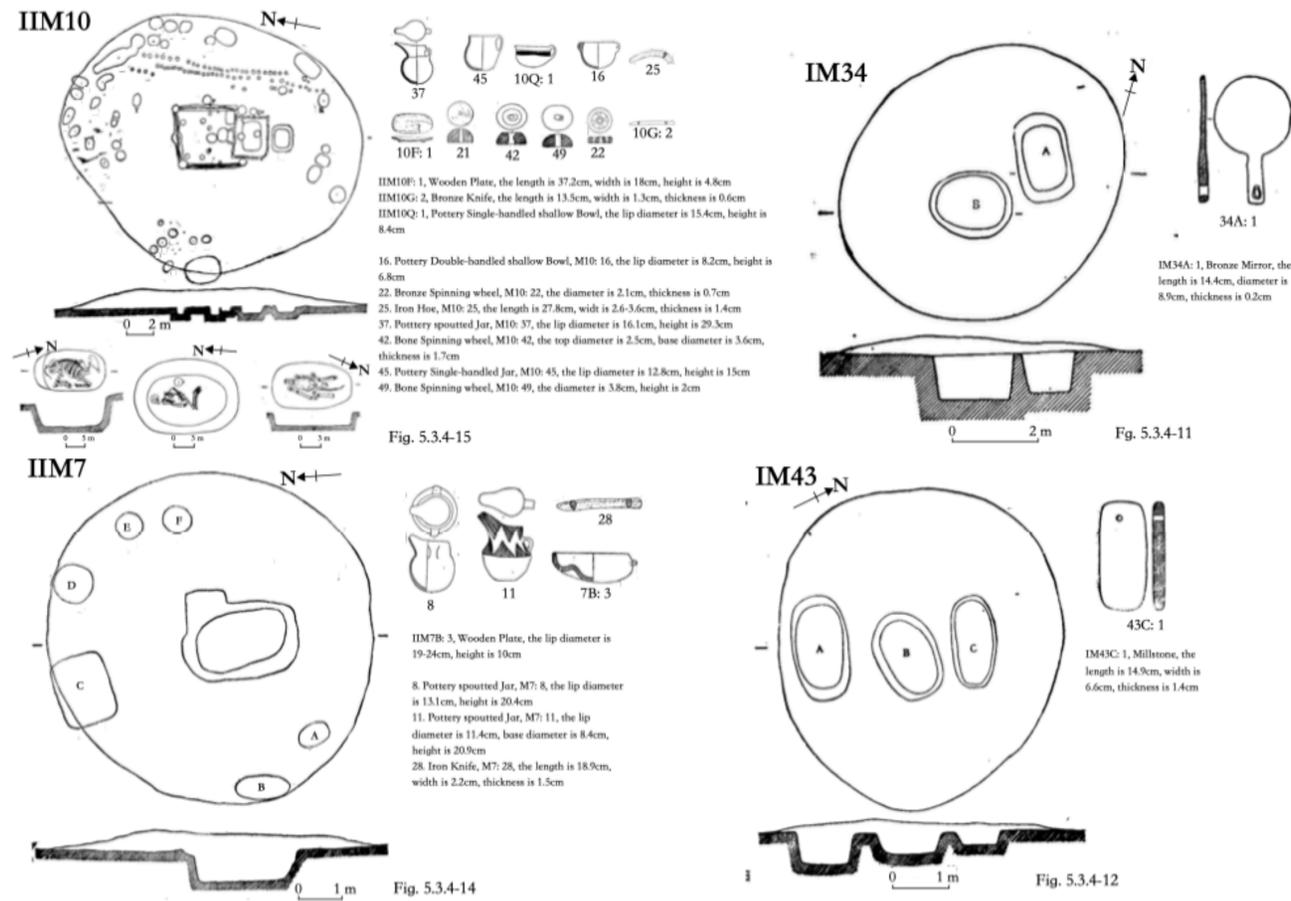


Fig. 5.3.4-15

Fig. 5.3.4-11

Fig. 5.3.4-14

Fig. 5.3.4-12

<p>IM2</p>	<p>Pottery spouted Jar, IM1: 23, the lip diameter is 8.7cm, base diameter is 5.7cm, height is 16.5cm</p> <p>Pottery Spinning Wheel, IM1: 3, the diameter is 3.7cm, thickness is 2.5cm, hole diameter is 0.6cm</p> <p>Pottery Single-handled Cup, IM1: 19, the lip diameter is 7.5cm, height is 7.5cm</p> <p>Millstone, IM1: 7, the length is 6.9cm, width is 1.8cm, thickness is 0.8cm, hole diameter is 0.35-0.7cm</p> <p>Bone Pin, IM1: 15, the length is 8.4cm, diameter is 0.8cm, hole diameter is 0.6cm</p> <p>Bronze Mirror, IM1: 31, the diameter is 1.5cm, thickness is 0.2cm</p> <p>Pottery Spinning Wheel, IM1: 2</p> <p>Stone Awl, IM1: 13, the length is 7cm, diameter is 0.6-0.9cm, hole diameter is 0.35cm</p> <p>Pottery Spinning Wheel, IM1: 25, the diameter is 4.1cm, thickness is 1.3cm, hole diameter is 0.6cm</p> <p>Bone Bead, IM1: 29, the height is 0.85-1.3cm, diameter is 0.35-0.55cm</p> <p>Black Stone Bead, IM1: 12, the height is 1cm, diameter is 0.7cm, hole diameter is 0.2cm</p>	<p>IM4</p> <p>IM4: 12, Bronze Mirror, the length is 14.3cm, diameter is 9.5cm, thickness is 0.2cm</p> <p>IM4: 20, Bronze Plaque, the diameter is 10.6cm, thickness is 0.28cm</p> <p>IM4: 4, Stone Awl, the length is 5cm, diameter is 1cm</p> <p>IM4: 5, Bone Awl, the length is 6.1cm, width is 0.4cm</p> <p>IM4: 3, Iron Knife, the length is 23.6cm, width is 2.2cm, thickness is 1.2cm</p> <p>IM4: 14, Bone Arrowhead, the length is 3.4cm, width is 2.0cm, thickness is 1.5cm</p> <p>IM4: 22, Bone Arrowhead, the length is 4.2cm, width is 1.8cm</p>
<p>IM17</p>	<p>Bone Awl, IM17: 27, the length is 18.7cm, diameter is 1.8-2.8cm</p> <p>Bone Spinning wheel, IM17: 14, the top diameter is 1.1cm, base diameter is 3.5cm, thickness is 1cm</p> <p>Bronze Spinning wheel, IM17: 2, the diameter is 3.5cm, thickness is 0.6cm</p> <p>Bone Spinning wheel, IM17: 21, the diameter is 3.2cm, height is 1.8cm</p> <p>Bone Arrowhead, IM17: 1, the length is 3.4cm, width is 1cm</p> <p>Iron Sword, IM17: 28, the length is 26.5cm, width is 3.8cm</p>	<p>IM12 & 21</p> <p>IM12: 2, Golden Earring, the length is 5.5cm, width is 0.5cm</p> <p>IM12: 1, Bronze Spinning Wheel, the diameter is 3cm, thickness is 0.8cm</p> <p>IM2: 4, Pottery spouted Jar, the lip diameter is 7.8cm, height is 13cm</p> <p>IM2: 2, Pottery spouted Jar, the lip diameter is 6.8cm, base diameter is 4.5cm, height is 11.7cm</p>
<p>IM18</p>	<p>IM18A: 1, Pottery Single-handled Jar, the lip diameter is 7.6cm, base diameter is 4cm, height is 11.4cm</p> <p>Pottery Double-handled Jar, IM18: 14, the lip diameter is 13.3cm, height is 25cm</p> <p>Pottery spouted Jar, IM18: 4, the lip diameter is 14cm, height is 20.4cm</p> <p>Millstone, IM18: 10, the length is 4.4cm, height is 3.5cm</p> <p>Pottery Spinning wheel, IM18: 21, the diameter is 5cm, height is 2.5cm</p> <p>Wooden Arrowhead, IM18: 15, the length is 5.2cm</p>	<p>Others</p> <p>IM4: 1, Pottery Single-handled Cup, the lip diameter is 12cm, base diameter is 10.6cm, height is 10.6cm</p> <p>IM4: 4, Millstone, the length is 13.8cm, width is 5.5cm, thickness is 1.4cm</p> <p>IM2: 1, Pottery Spinning wheel, the diameter is 3.7cm, thickness is 1.6cm</p> <p>IM18A: 1, Bone Spinning wheel, the diameter is 2.2cm, height is 1.2cm</p> <p>IM18: 2, Bone Bead, the length is 20.8cm</p>

Fig. 5.3.4-16

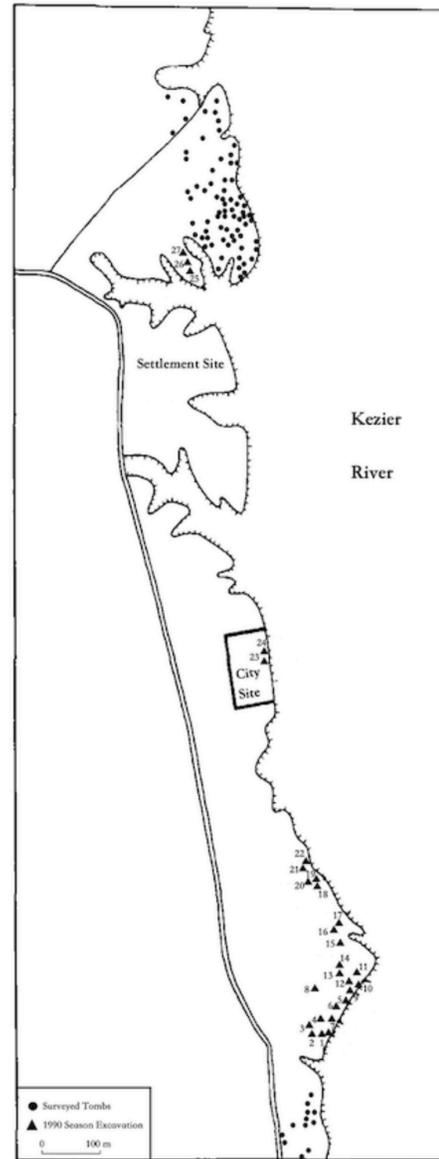


Fig. 5.3.6-1

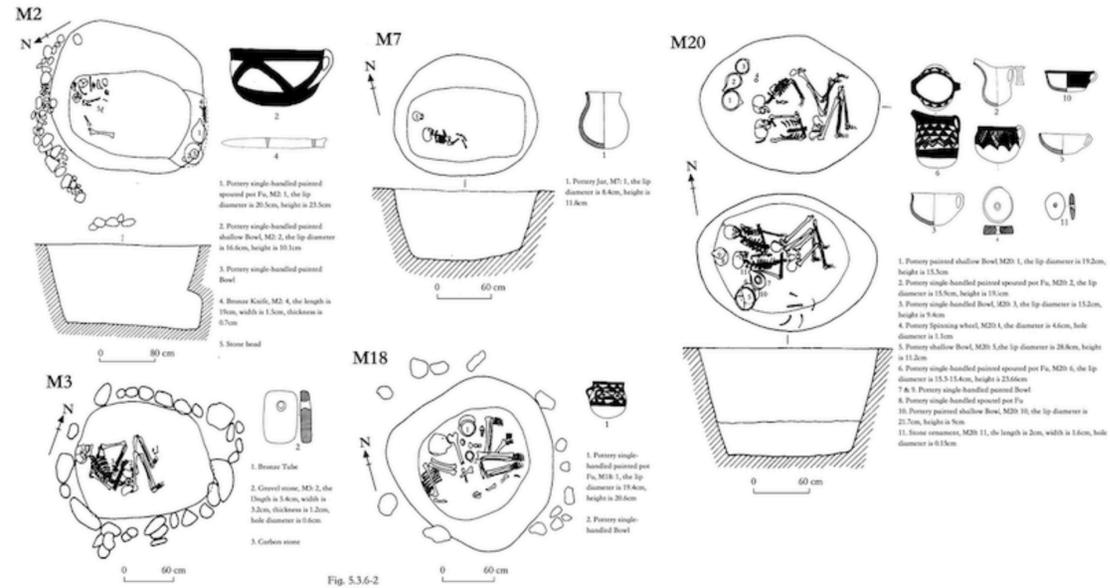


Fig. 5.3.6-2

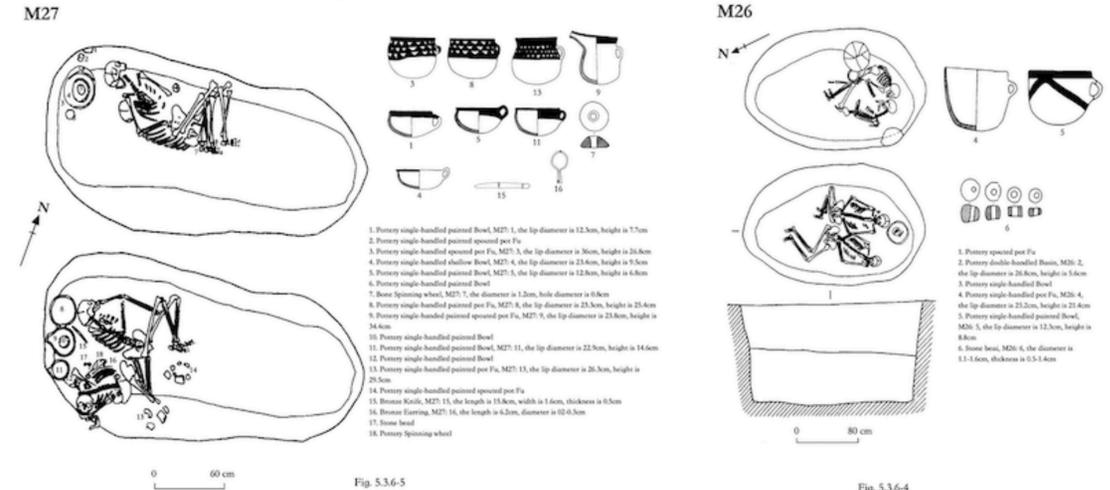


Fig. 5.3.6-5

Fig. 5.3.6-4

M8	<p>M8 1, Pottery Basin, the lip diameter is 28.6cm, height is 11.6cm</p> <p>M8 2, Pottery single-handled pointed spouted pot Fu, the lip diameter is 21.2cm, height is 27cm</p>	M15	<p>M15A 1, Pottery pointed pot Fu, the lip diameter is 31.6cm, height is 34cm</p> <p>M15B 1, Pottery pointed Jar, the lip diameter is 19.2cm, height is 17.6cm</p>
M12	<p>M12 1, Pottery single-handled pointed spouted pot Fu, the lip diameter is 20.2cm, height is 24.8cm</p> <p>M12 2, Pottery single-handled pointed Bowl, the lip diameter is 14cm, height is 7.6cm</p> <p>M12 3, 1/2 bone, the length is 3.3cm, width is 2.6cm, hole diameter is 0.5cm</p> <p>M12 4, Bone Tube, the length is 3.3cm, width is 1.5cm, hole diameter is 0.5cm</p>	M21	<p>M21 1, Pottery single-handled pointed Bowl, the lip diameter is 10.6cm, height is 7.8cm</p> <p>M21 2, Pottery pointed pot Fu, the lip diameter is 16.6cm, height is 21cm</p>
M14	<p>M14 1, Pottery single-handled pointed spouted pot Fu, the lip diameter is 17.4cm, height is 22.8cm</p> <p>M14 2, Bone Knife, the length is 19.5cm, width is 2cm, thickness is 0.7cm</p> <p>M14 3, stone cosmetic stick, the length is 5cm, diameter is 0.6cm</p>	Others	<p>M10 2, Pottery pointed shallow Bowl, the lip diameter is 14.2cm, height is 9.8cm</p> <p>M11 4, stone cosmetic stick, the length is 14.6cm, diameter is 0.7cm</p> <p>M22 1, Pottery pointed pot Fu, the lip diameter is 29.5cm, height is 24.2cm</p>

Fig. 5.3.6-6

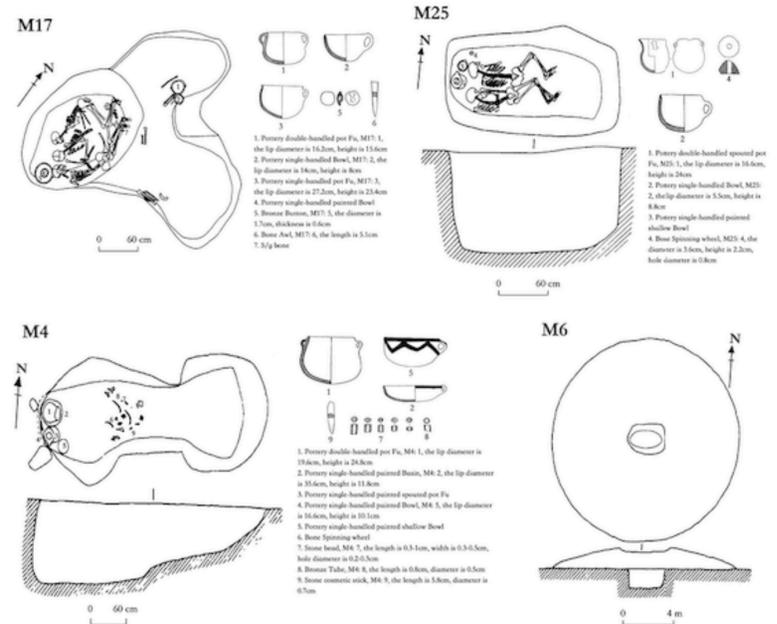
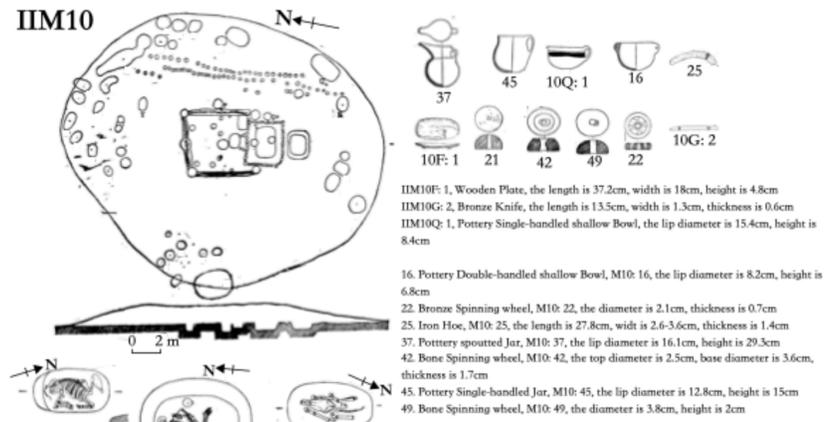
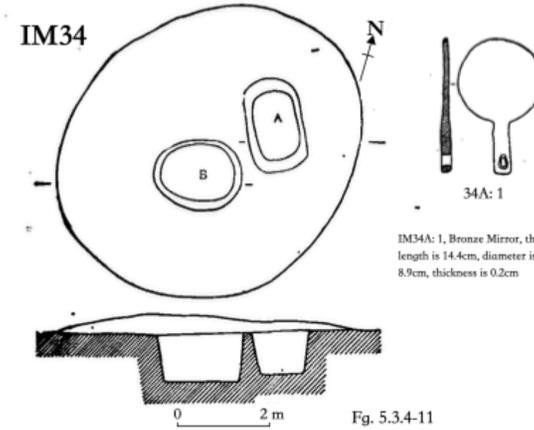


Fig. 5.3.6-3



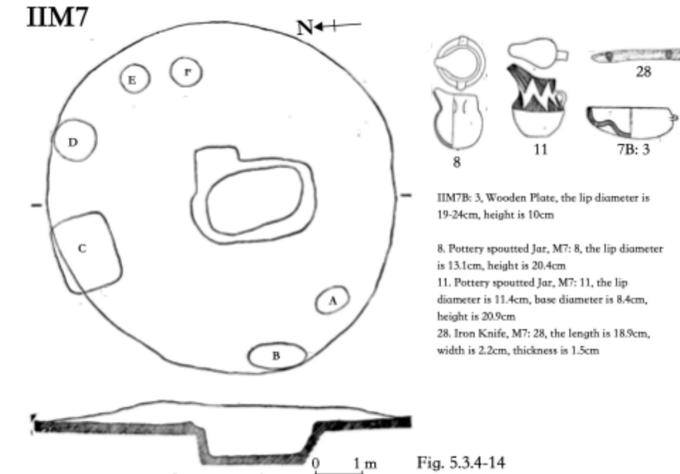
IIM10F: 1. Wooden Plate, the length is 37.2cm, width is 18cm, height is 4.8cm
 IIM10G: 2. Bronze Knife, the length is 13.5cm, width is 1.3cm, thickness is 0.6cm
 IIM10Q: 1. Pottery Single-handled shallow Bowl, the lip diameter is 15.4cm, height is 8.4cm
 16. Pottery Double-handled shallow Bowl, M10: 16, the lip diameter is 8.2cm, height is 6.8cm
 22. Bronze Spinning wheel, M10: 22, the diameter is 2.1cm, thickness is 0.7cm
 25. Iron Hoe, M10: 25, the length is 27.8cm, width is 2.6-3.6cm, thickness is 1.4cm
 37. Pottery spouted Jar, M10: 37, the lip diameter is 16.1cm, height is 29.3cm
 42. Bone Spinning wheel, M10: 42, the top diameter is 2.5cm, base diameter is 3.6cm, thickness is 1.7cm
 45. Pottery Single-handled Jar, M10: 45, the lip diameter is 12.8cm, height is 15cm
 49. Bone Spinning wheel, M10: 49, the diameter is 3.8cm, height is 2cm

Fig. 5.3.4-15



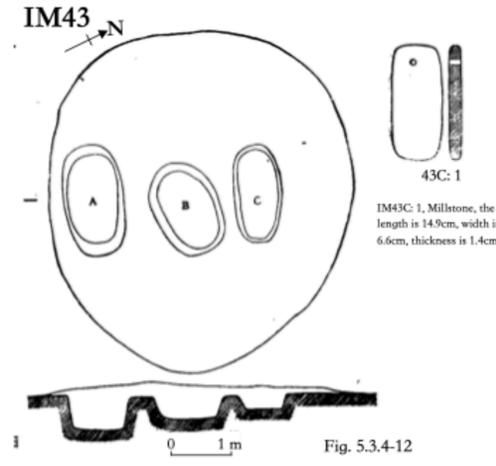
IM34A: 1. Bronze Mirror, the length is 14.4cm, diameter is 8.9cm, thickness is 0.2cm

Fig. 5.3.4-11



IIM7B: 3. Wooden Plate, the lip diameter is 19-24cm, height is 10cm
 8. Pottery spouted Jar, M7: 8, the lip diameter is 13.1cm, height is 20.4cm
 11. Pottery spouted Jar, M7: 11, the lip diameter is 11.4cm, base diameter is 8.4cm, height is 20.9cm
 28. Iron Knife, M7: 28, the length is 18.9cm, width is 2.2cm, thickness is 1.5cm

Fig. 5.3.4-14

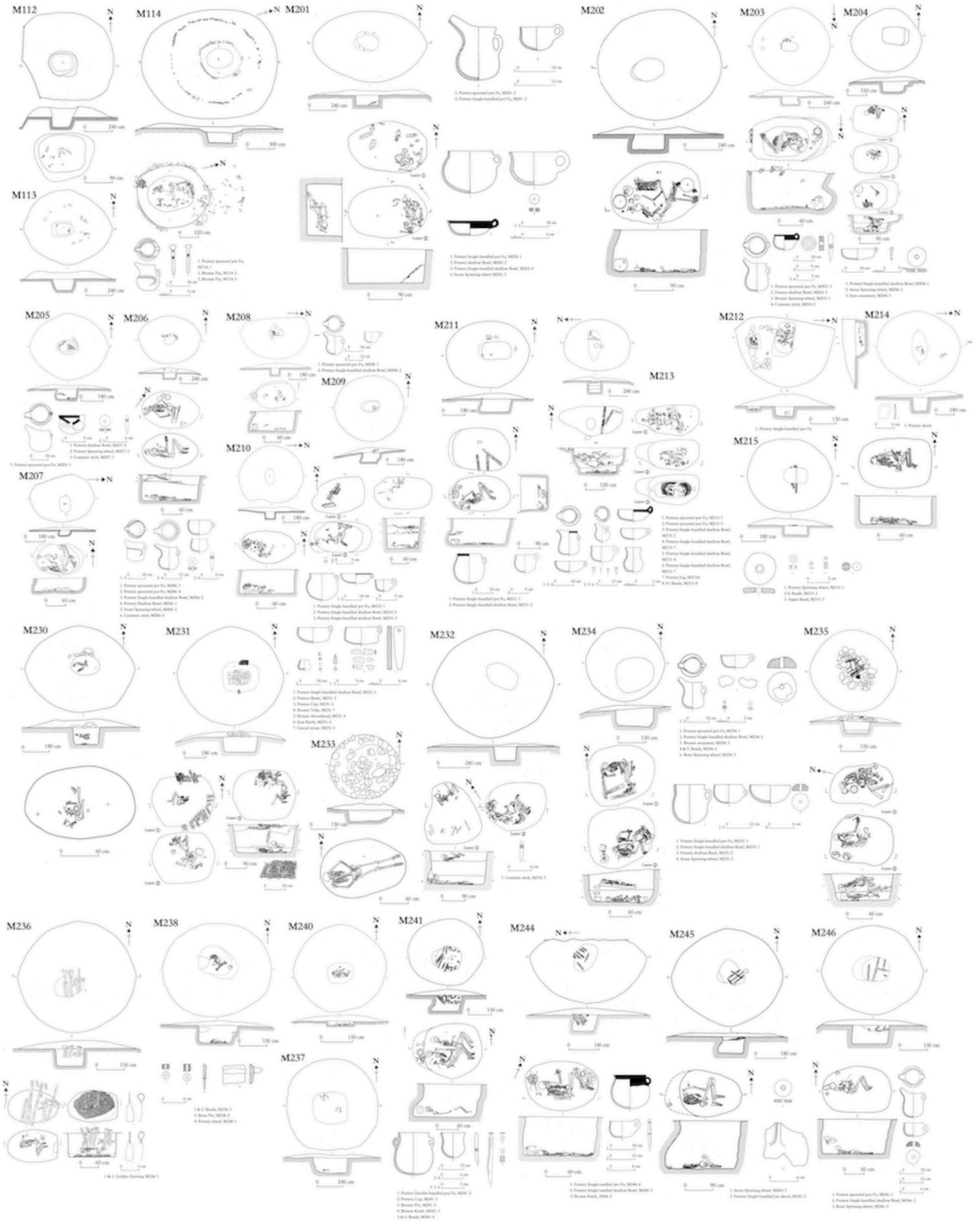


IM43C: 1. Millstone, the length is 14.9cm, width is 6.6cm, thickness is 1.4cm

Fig. 5.3.4-12

<p>IIM2</p>	<p>Pottery spouted Jar, IM1: 23, the lip diameter is 8.7cm, base diameter is 5.76cm, height is 16.5cm Pottery Spinning Wheel, IM1: 3, the diameter is 3.7cm, thickness is 2.5cm, hole diameter is 0.6cm Pottery Single-handled Cup, IM1: 19, the lip diameter is 7.3cm, height is 7.5cm Millstone, IM1: 7, the length is 6.9cm, width is 1.8cm, thickness is 0.8cm, hole diameter is 0.35-0.7cm Bone Pin, IM1: 15, the length is 8.4cm, diameter is 0.8cm, hole diameter is 0.6cm Pottery Spinning Wheel, IM1: 2 Pottery Spinning Wheel, IM1: 25, the diameter is 4.1cm, thickness is 1.3cm, hole diameter is 0.6cm Bone Bead, IM1: 29, the height is 0.85-1.3cm, diameter is 0.35-0.55cm Bone Bead, IM1: 12, the height is 1cm, diameter is 0.7cm, hole diameter is 0.2cm Pottery Spinning Wheel, IM1: 31, the diameter is 15cm, thickness is 0.2cm Stone Awl, IM1: 13, the length is 7cm, diameter is 0.6-0.9cm, hole diameter is 0.35cm</p>	<p>IIM4</p> <p>IM4: 12. Bronze Mirror, the length is 14.2cm, diameter is 9.5cm, thickness is 0.2cm IM4: 20. Bronze Flange, the diameter is 10.6cm, thickness is 0.28cm IM4: 4. Stone Awl, the length is 5cm, diameter is 1cm IM4: 5. Bone Awl, the length is 6.1cm, width is 0.6cm IM4: 3. Iron Knife, the length is 25cm, width is 2.2cm, thickness is 1.2cm IM4: 14. Bronze Bell, the height is 3.4cm, length is 2.9cm, width is 1.5cm IM4: 22. Bone ornament, the length is 4.2cm, width is 1.8cm</p>
<p>IIM17</p>	<p>Bone Awl, IM17: 27, the length is 18.7cm, diameter is 1.8-2.6cm Bone Spinning wheel, IM17: 14, the top diameter is 1.3cm, base diameter is 3.2cm, thickness is 1cm Bone Spinning wheel, IM17: 2, the diameter is 3.5cm, thickness is 0.6cm Bone Spinning wheel, IM17: 21, the diameter is 3.2cm, height is 1.8cm Bone Arrowhead, IM17: 1, the length is 3.4cm, width is 1cm Iron Sword, IM17: 28, the length is 26.5cm, width is 3.8cm</p>	<p>IIM12 & 21</p> <p>IIM12A: 2. Golden Earring, the length is 3.5cm, width is 0.5cm IIM12C: 2. Bronze Spinning Wheel, the diameter is 3cm, thickness is 0.8cm IM21: 4. Pottery spouted Jar, the lip diameter is 7.8cm, height is 13cm IM21: 2. Pottery spouted Jar, the lip diameter is 6.8cm, base diameter is 4.5cm, height is 11.7cm</p>
<p>IIM18</p>	<p>IM18A: 1. Pottery Single-handled Jar, the lip diameter is 7.6cm, base diameter is 4cm, height is 11.4cm Pottery Double-handled Jar, IM18: 14, the lip diameter is 13.5cm, height is 23cm Pottery spouted Jar, IM18: 4, the lip diameter is 14cm, height is 20.4cm Millstone, IM18: 10, the length is 4.4cm, height is 3.3cm Pottery Spinning wheel, IM18: 21, the diameter is 5cm, height is 2.5cm Wooden Arrowhead, IM18: 15, the length is 5.2cm</p>	<p>Others</p> <p>IM8: 1. Pottery Single-handled Cup, the lip diameter is 12.8cm, base diameter is 10.4cm, height is 10.6cm IM8: 4. Millstone, the length is 13.8cm, width is 3.5cm, thickness is 1.4cm IM26: 1. Pottery Spinning wheel, the diameter is 3.7cm, thickness is 1.6cm IM35A: 1. Bone Spinning wheel, the diameter is 2.2cm, height is 1.2cm IM9: 2. Bone Bead, the length is 20.8cm</p>

Fig. 5.3.4-16

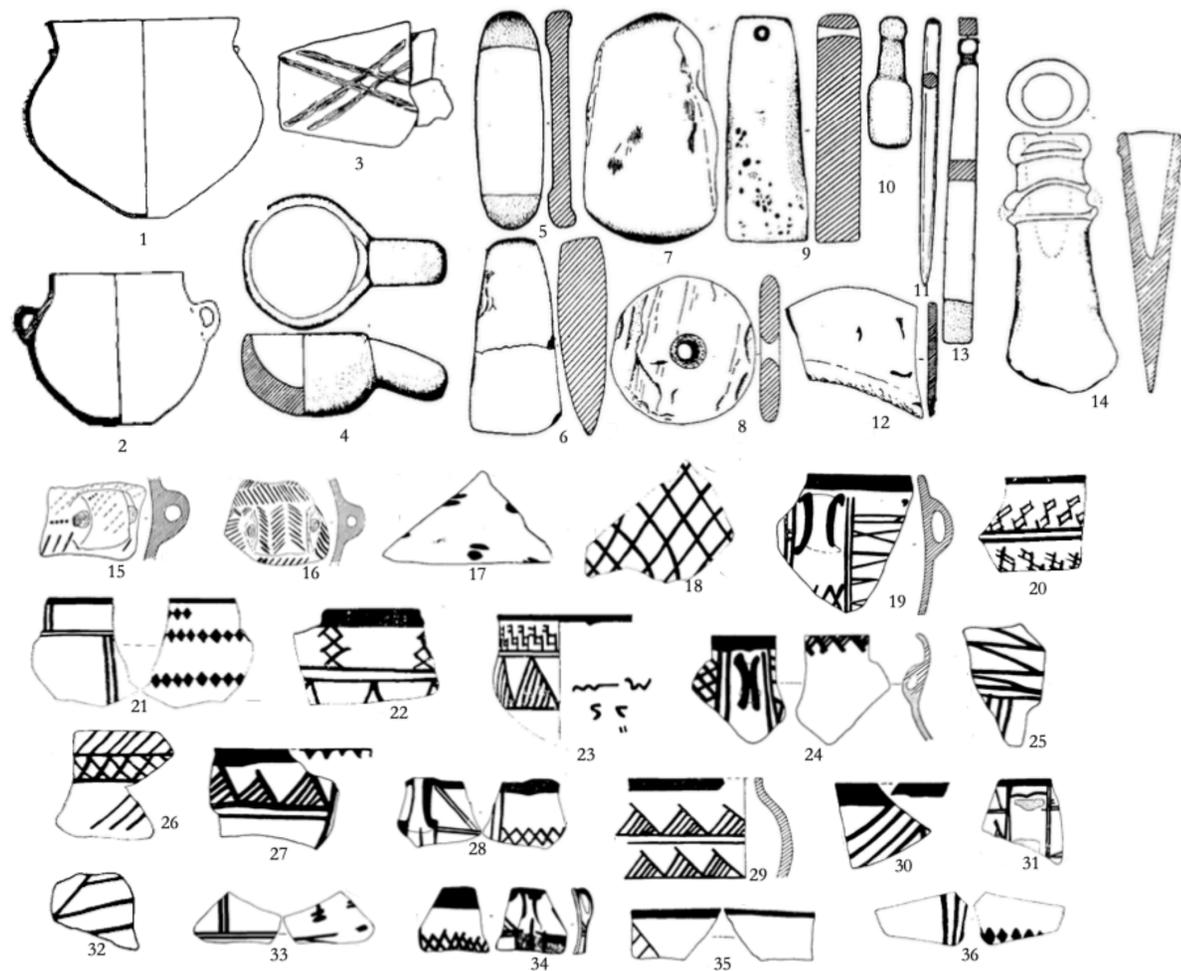


Sub-Phase	Tomb No.	Tomb Structure	Grave Goods
I	M201		
	M202		
IIA	M254		
	M260		
IIB	M250		
	M244		

Fig. 5.3.7-2-1
Fig. 5.3.7-2

Sub-Phase	Tomb No.	Tomb Structure	Grave Goods
IIIA	M220		
	M108		
IIIB	M213		
	M267		
IV	M242		
	M109		

Fig. 5.3.7-2-2



- 1. Pottery Jar with two small handles, the lip diameter is 38cm, belly diameter is 50cm, base diameter is 6cm, height is 41cm
- 2. Pottery double-handled Jar, the lip diameter is 14cm, base diameter is 7cm, height is 16cm
- 3. Mudbrick
- 4. Stone mortar, the length is 12.7cm, lip diameter is 6.7cm, handle length is 5.5cm, handle diameter is 2.7cm
- 5. Millstone, the length is 37.5cm, width is 12.1cm, thickness is 3cm
- 6. Stone Axe, the length is 8.8cm, width is 4.3cm, thickness is 2cm
- 7. Stone Hammer, the length is 9.5cm, width is 5-6cm
- 8. Stone Spinning wheel, the diameter is 6.5cm, thickness is 0.8cm, hole diameter is 0.5-0.7cm

- 9. Gravel stone, the length is 10cm, width is 4cm, thickness is 2cm, hole diameter is 0.4cm
- 10. Stone Pestle, the length is 22.7cm, diameter is 8.4cm
- 11. Stone Awl, the length is 13.2cm, diameter is 0.7cm
- 12. Stone Sickle, the length is 12cm, width is 9cm, thickness is 0.6cm
- 13. Gravel stone, the length is 14cm
- 14. Bronze Axe, the length is 17cm, width is 7.5cm
- 15 & 16 Black pottery sherd
- 17-36. Pottery sherds with painted patterns

Fig. 5.3.8-1

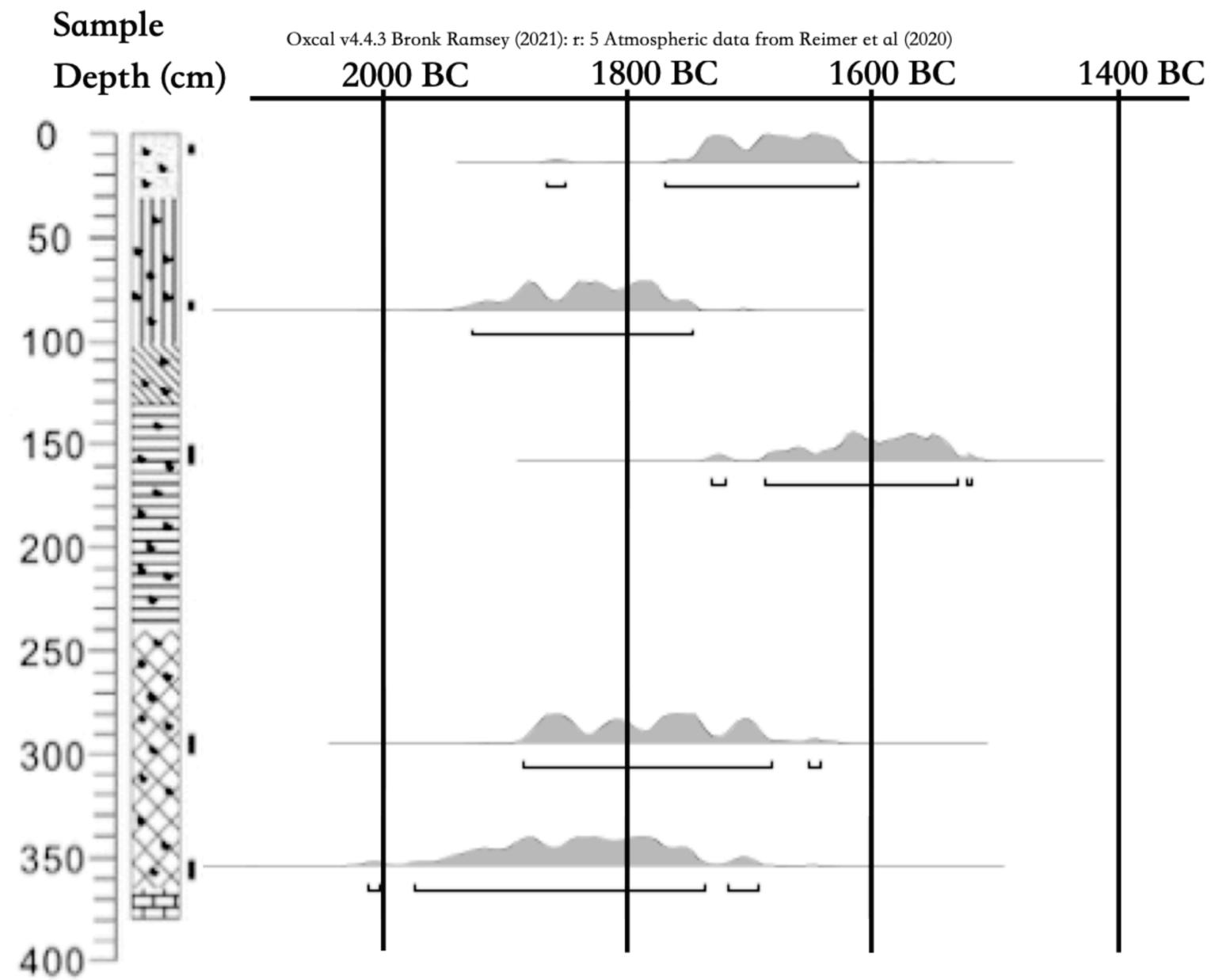


Fig. 5.3.8-2 (adopted from Zhao, et al., 2013: Fig. 2)

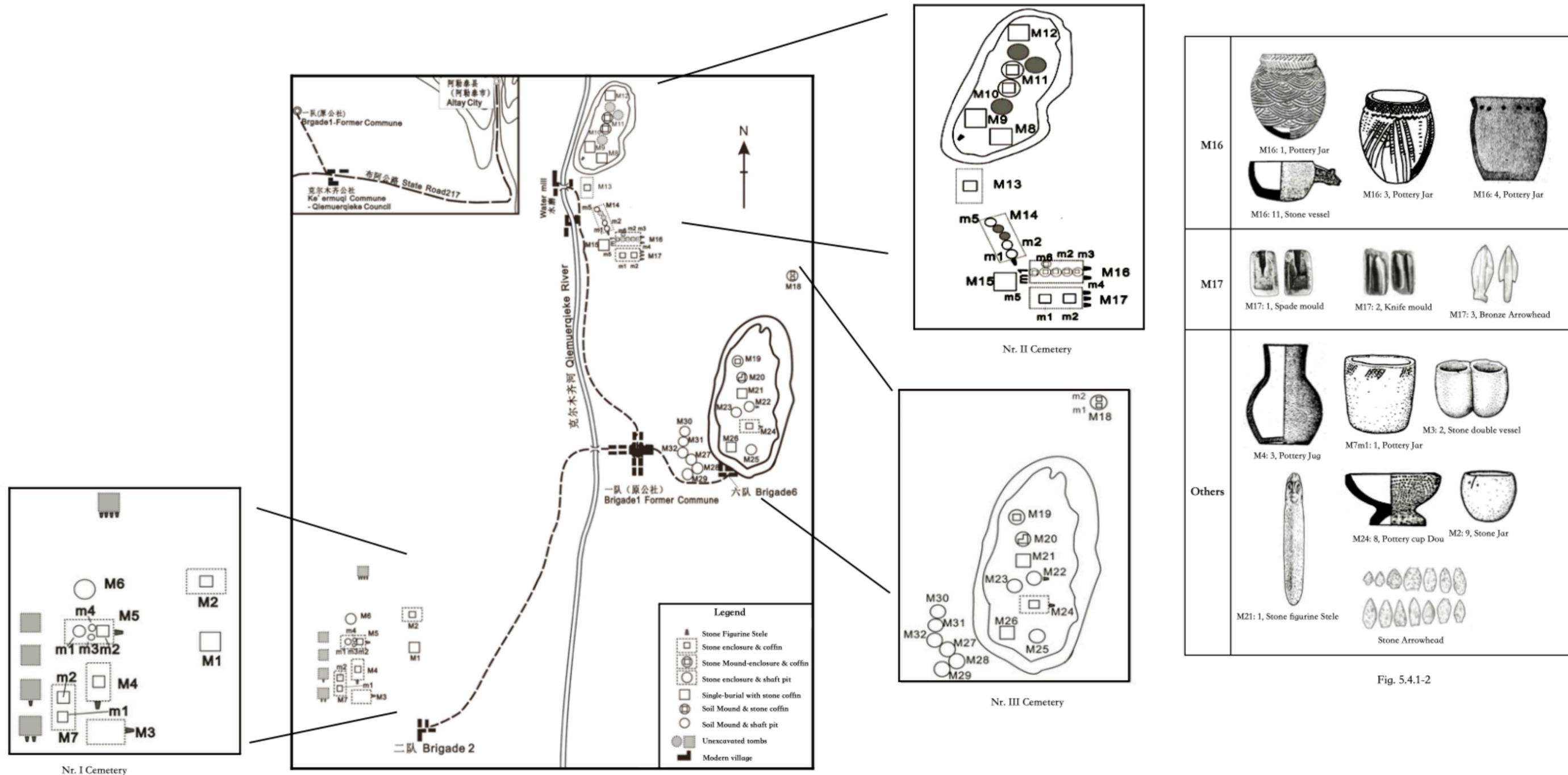


Fig. 5.4.1-1 Distribution of Qiemu'erqie sub-cemeteries (adopted from Jia & Betts, 2010, Fig. 2-5)

Fig. 5.4.1-2

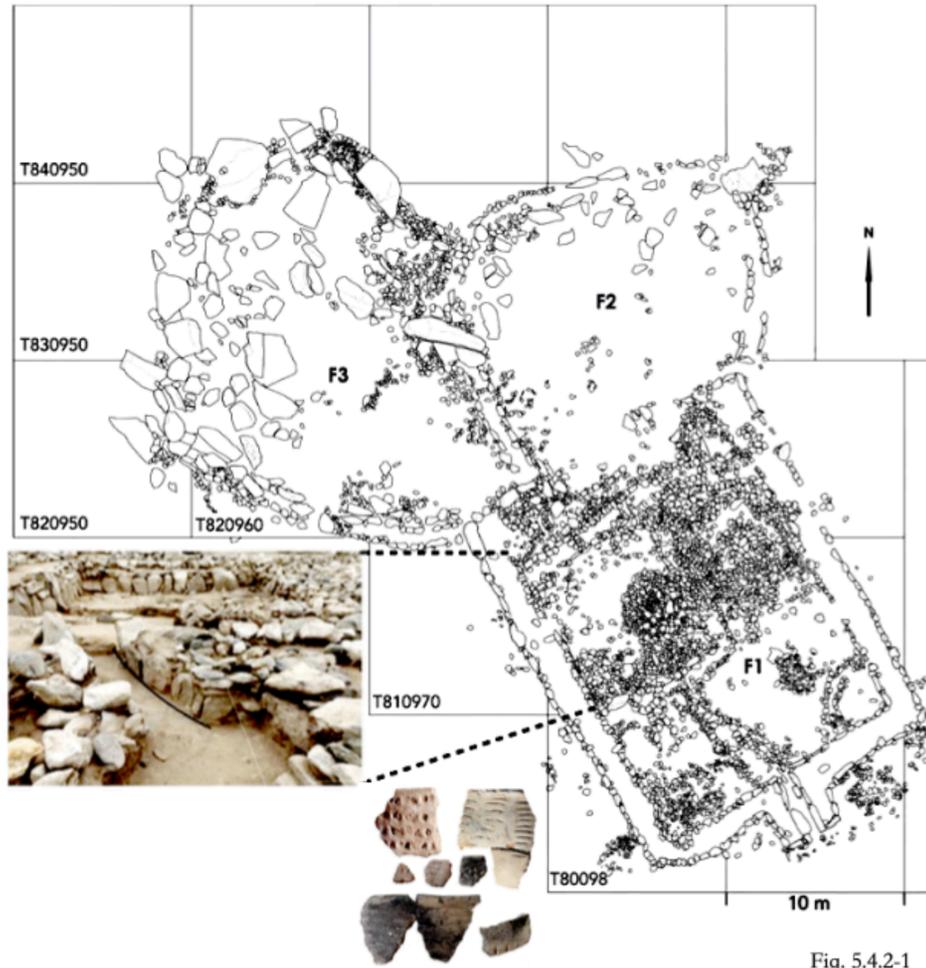


Fig. 5.4.2-1

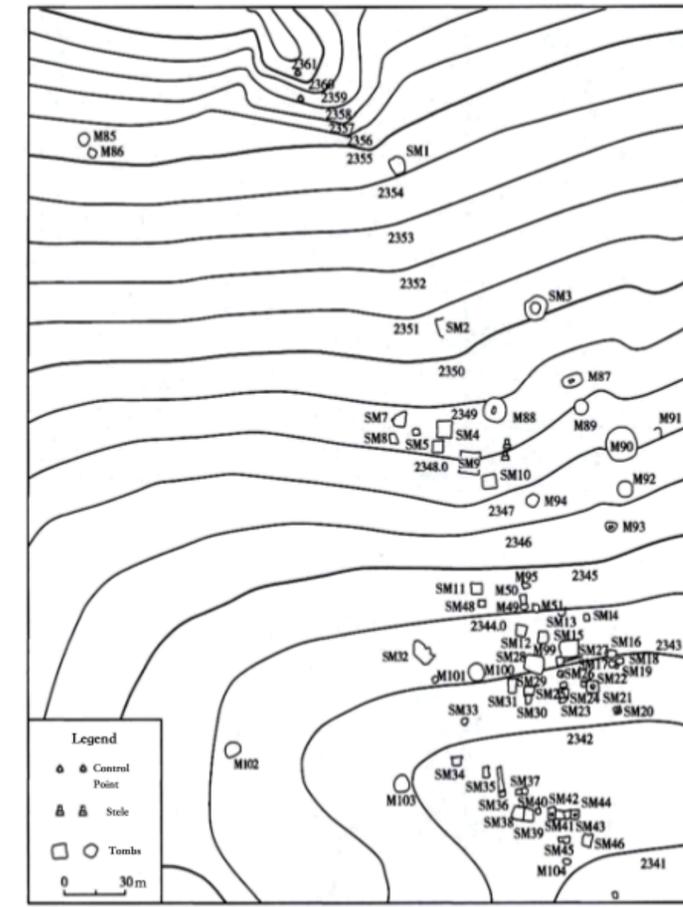


Fig. 5.4.2-2



SM4

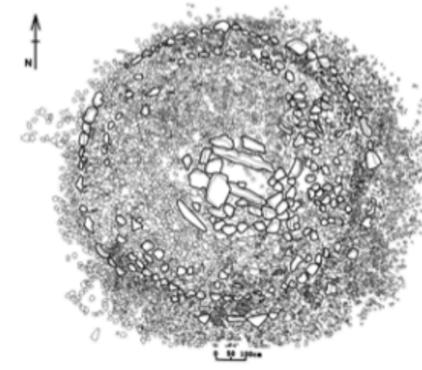


SM50

Fig. 5.4.2-4



SM23-24-25



M88



SM29-30



SM4-1



M4-1, Golden Earring

Fig. 5.4.2-3

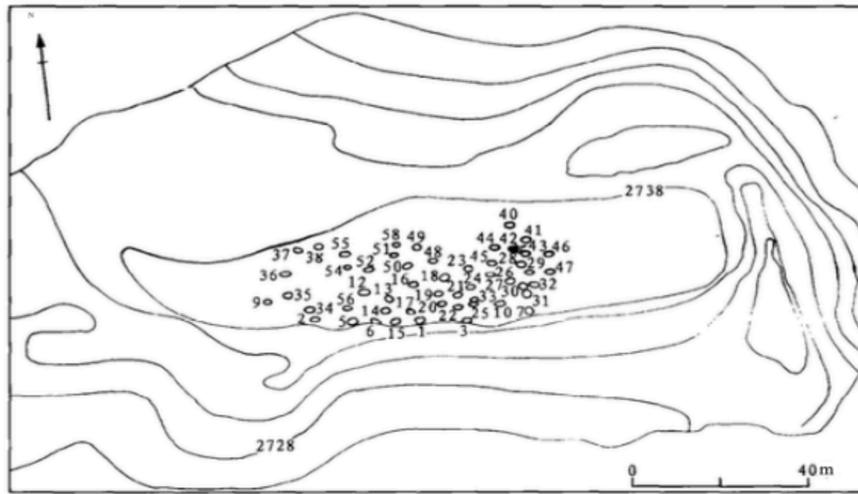


Fig. 5.4.2-5-2



SM36

Fig. 5.4.2-5-1



(West→East)
Fig. 5.5.1-1

M18



M18 (Southeast→Northwest)

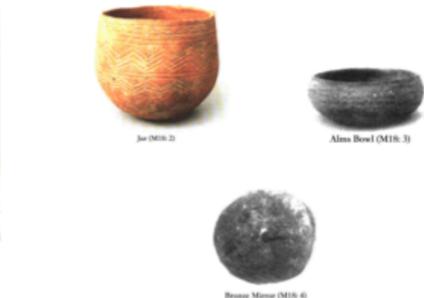


Fig. 5.5.1-9

M35



M35 (East→West)



Fig. 5.5.1-10

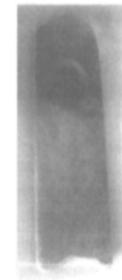


Fig. 5.5.1-2 Gravel Tool (M9: 9)



Fig. 5.5.1-4 Golden Earring (M10: 5)



Fig. 5.5.1-4 Pottery shallow Bowl (M24: 5)

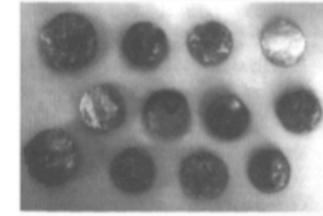


Fig. 5.5.1-5 Bronze Button (M40: 16)



Fig. 5.5.1-6 Bronze Axe (M55: 4)



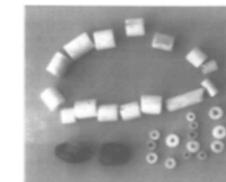
Fig. 5.5.1-7 Bronze Spear (M55: 8)



Double-handled Jar (M14: 1)



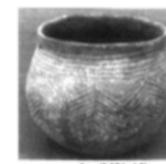
Bronze Harness (M15: 9)



Bead (M26: 6)



Alms Bowl (M30: 2)



Jar (M51: 12)

Fig. 5.5.1-8 Other grave goods

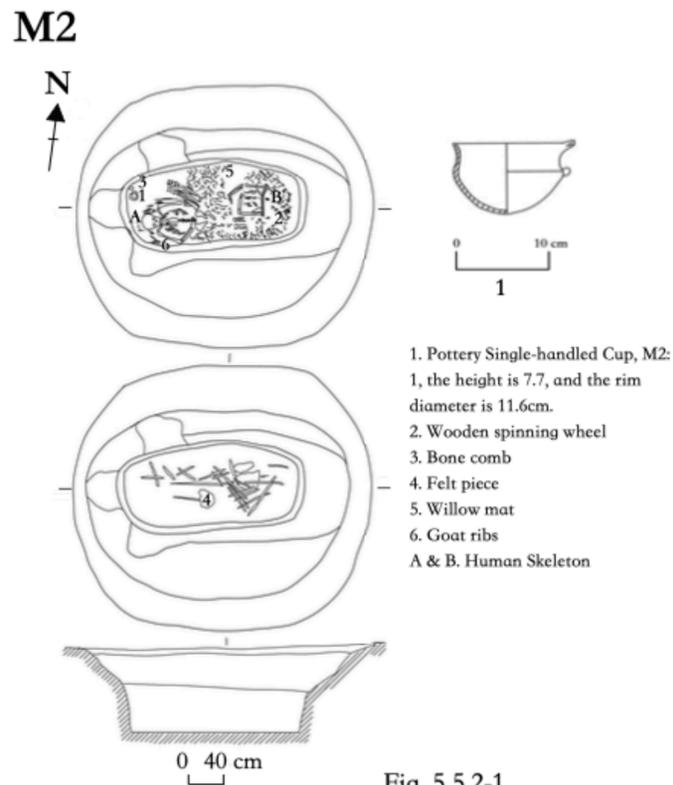


Fig. 5.5.2-1

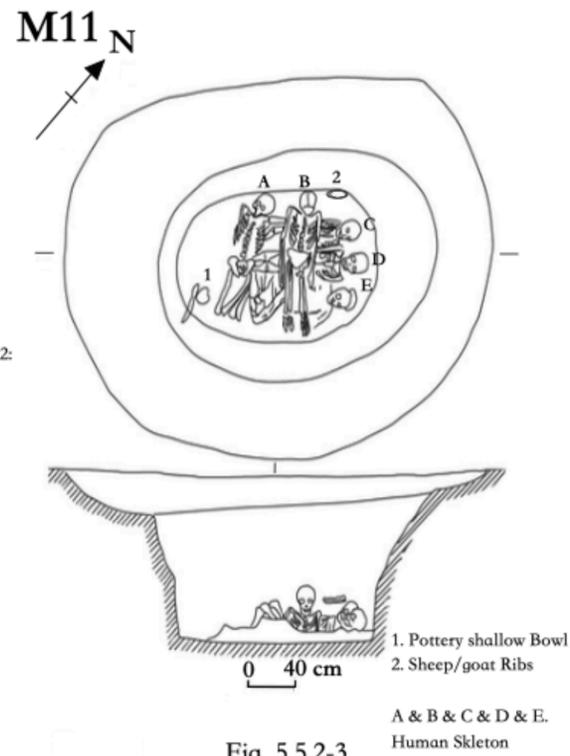


Fig. 5.5.2-3

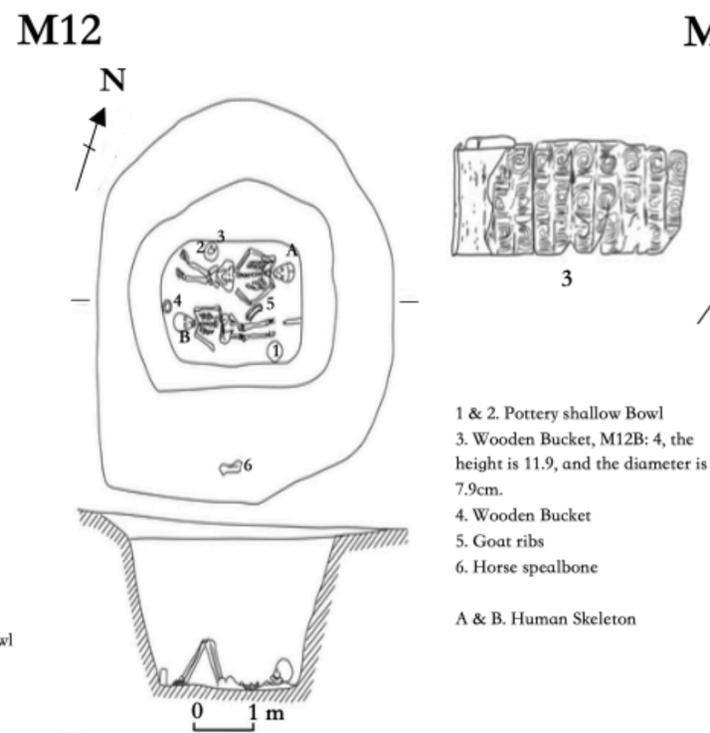


Fig. 5.5.2-4

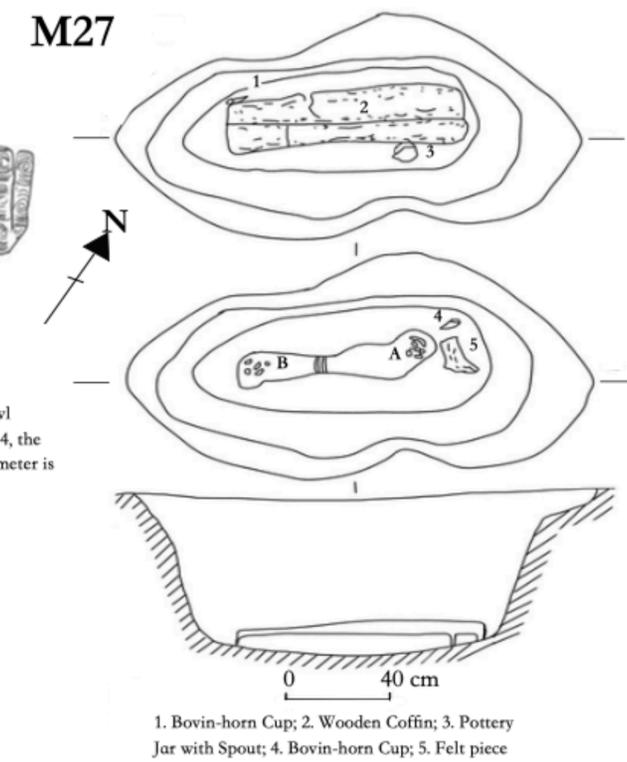


Fig. 5.5.2-7

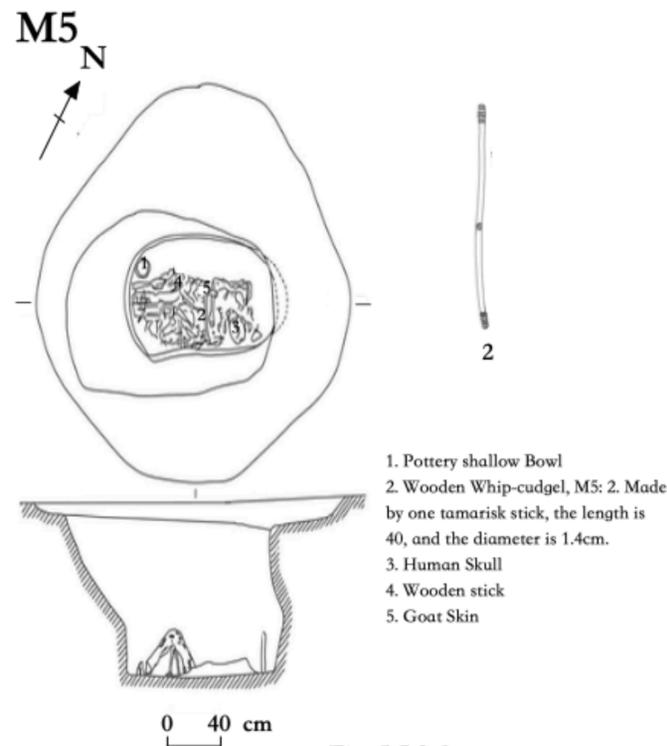


Fig. 5.5.2-2

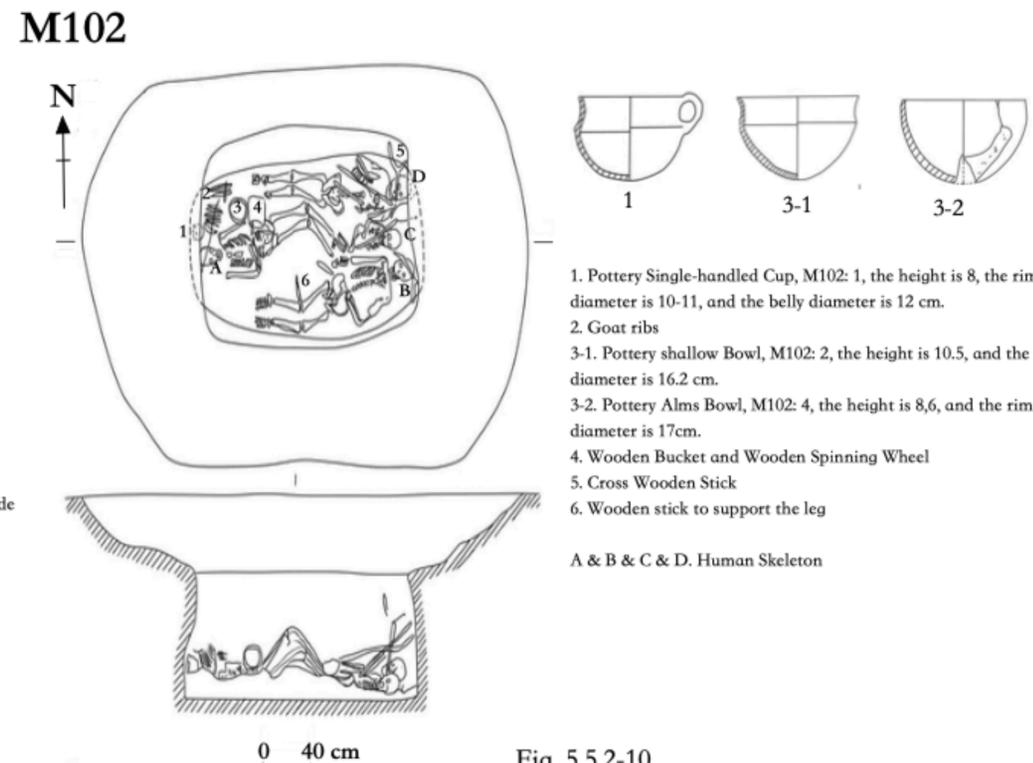


Fig. 5.5.2-10

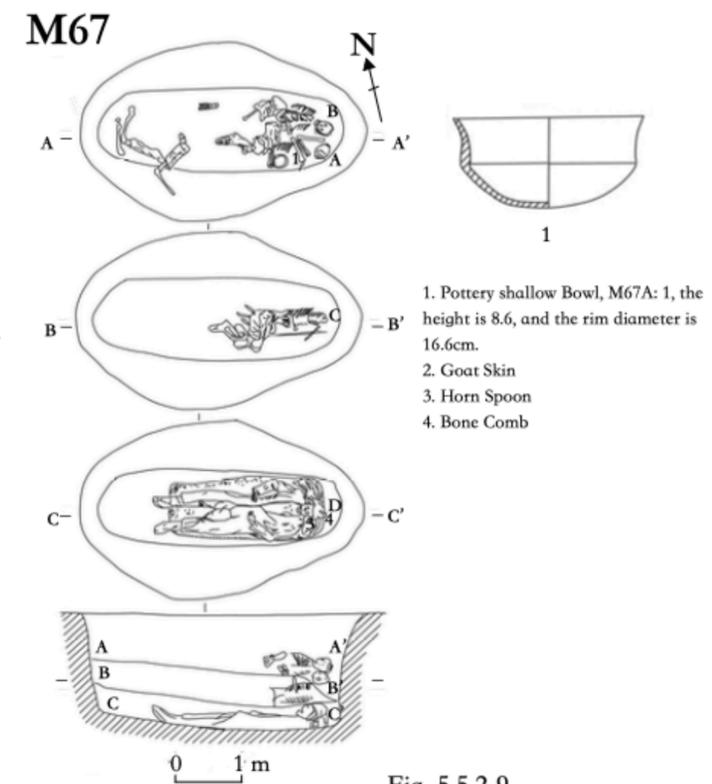
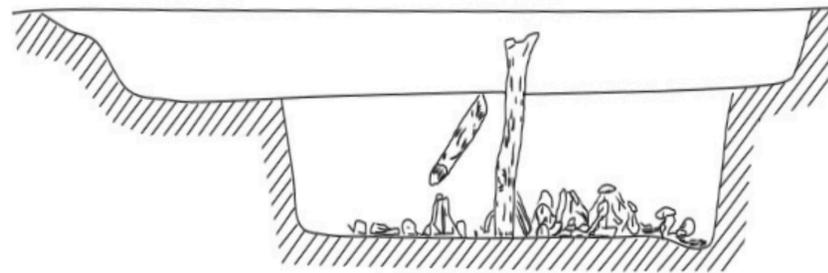
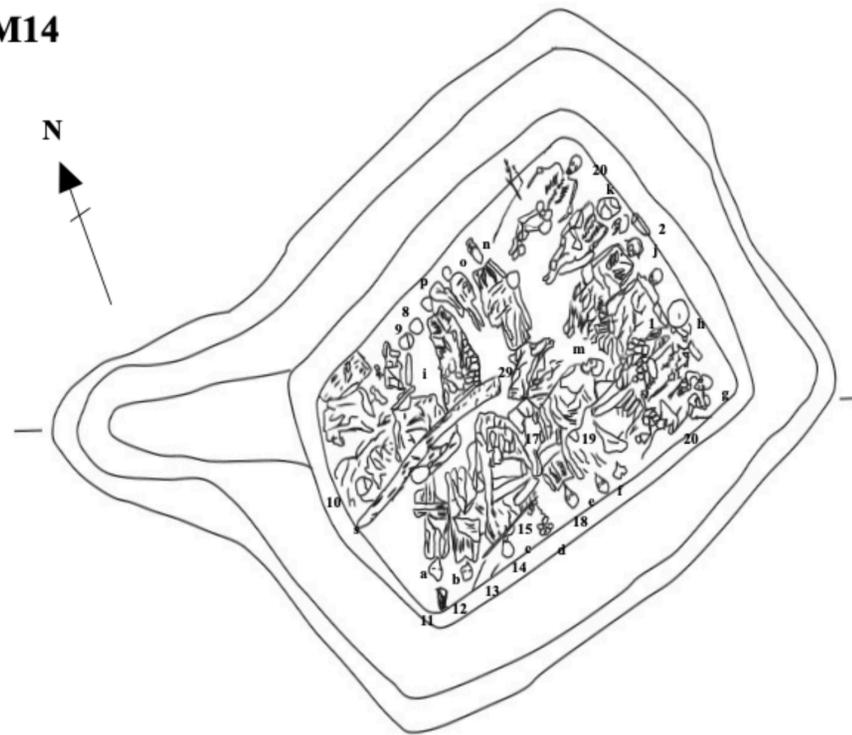
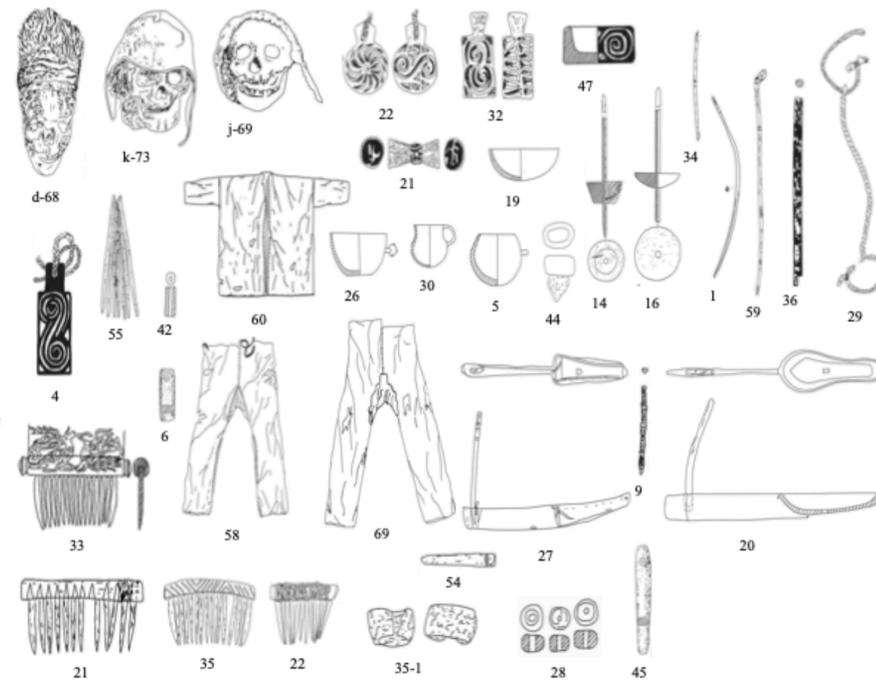


Fig. 5.5.2-9

M14



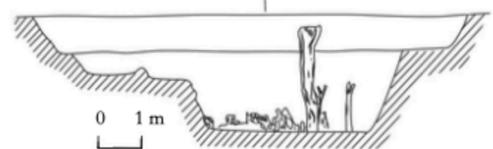
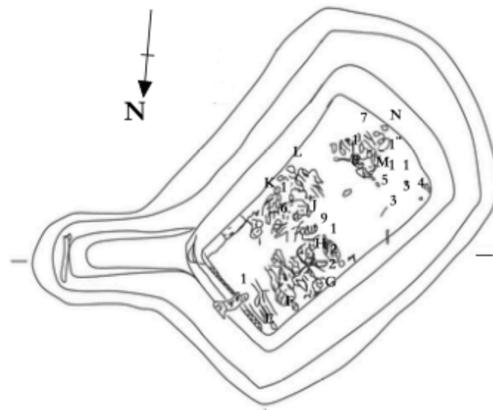
0 40 cm



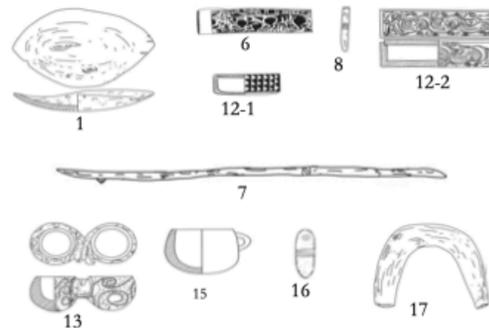
1. Wooden Bow, M14: 1, the length is 88.8cm, diameter is 2.2cm
4. Wooden Plaque, M14: 4, the height is 9.4cm, width is 3.7cm
5. Wooden Single-handed Jar, M14: 5, the lip diameter is 13-15cm, base diameter is 5cm, the height is 14.6cm
14. Wooden Spinning Wheel, M14: 14, the diameter is 3-5.4cm, height is 2.4cm
16. Wooden Spinning Wheel, M14: 16, the diameter is 6.2cm, height is 1.5cm; the shaft length is 48cm, diameter is 0.5cm
19. Wooden Basin, M14: 19, the lip diameter is 30cm, height is 11cm, diameter is 1.5cm
20. Wooden Harp "Konghou", M14: 20, the length is 87.6cm, the voicebox length is 41.6cm, width is 6.8-13.2cm, height is 4-6.8cm, depth is 2.8-5.2cm; the horizontal stick length is 3.6cm, diameter is 0.35cm
21. Wooden Stamp, M14: 21, the height is 4cm, diameter is 2cm
22. Wooden Plaque, M14: 22, the height is 6.2cm, diameter is 4.7cm, thickness is 0.5-0.8cm
27. Wooden Harp "Konghou", M14: 27, the length is 61.6cm
28. Stone Bead, M14: 28, the height is 0.5-0.7cm, diameter is 0.8-0.95cm
29. Wooden Harness, M14: 29, the woolen rope length is 55.5cm, wi
30. Pottery Jar, M14: 30, the lip diameter is 8.5cm, height is 16cm, belly diameter is 10.2cm
32. Wooden Plaque, M14: 32, the height is 7.2cm, width is 3.6cm, thickness is 0.8-1cm
33. Wooden Comb, M14: 33, the height is 5.2cm, width is 9.8cm
34. Wooden Bow object, M14: 34, the length is 60cm, width is 2cm, thickness is 0.8cm
35. Wooden Comb, M14: 35, the height is 5.4cm, width is 9.7cm
42. Stone Bead, M14: 42, the height is 1.8cm, diameter is 0.7cm
43. Stone Bead, M14: 43, the height is 1.1-1.6cm, diameter is 1.6-1.7cm
44. Bronze Ring, M14: 44, the diameter is 1.3-1.9cm, width is 0.9cm, thickness is 0.3cm
45. Gravel Stone, M14: 45, the length is 15.9cm, width is 1.6-3cm, thickness is 1.6cm
47. Wooden Box, M14: 47, the height is 4.6cm, length is 9cm, width is 3.5-4.4cm
49. Wooden object, M14: 49, the length is 10cm, diameter is 0.8cm
55. Wooden Comb, M14: 55, the height is 20.3cm, tooth diameter is 0.7cm
56. Felt Hat, M14: 56, the height is 24cm, width is 12.5cm, lip diameter is 14.8cm
59. Wooden Stick, M14: 59, the length is 91.2cm, diameter is 1.2cm
60. Woolen robe, M14: 60, the length is 105cm, the upper width is 75cm, lower width is 105cm
63. Woolen Dress, M14: 63, the length is 115cm
69. Woolen Trousers, M14: 69, the length is 138cm, waist width is 56cm, leg width is 26cm

Fig. 5.5.2-5

M24



0 1 m



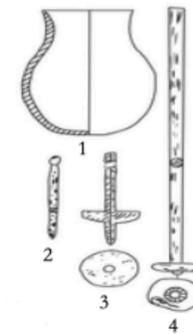
1. Wooden Plate, M24: 17, the height is 7.5, rim length is 43.5, and the rim width is 29cm.
2. Wooden Arrow stick; 3 & 4. Spinning wheel; 5. Wooden comb
6. Wooden tube, M24: 12, the height is 11.1, rim longer diameter is 8.1, and rim shorter diameter is 8.9 cm.
7. Wooden tool, M24: 16, the length is 62.4, and the diameter is 1 cm.
8. Wooden tool, M24: 25, the length is 10.8, and the diameter is 1.2cm.
9. Wooden Bow; 14. Ceramic Single-handed Cup
10. Wooden Basin; 11. Stone millstone
12. Wooden Box, M24: 6, the length is 12.5, height is 4, and the width is 4cm.
13. Wooden Doubled Cup, M24: 7, the height is 3.5, the width is 8.7 cm, and each rim diameter is 2.3 cm.
15. Wooden Single-handed Cup, M24: 14, the height is 14.4, rim diameter is 15, and belly diameter is 15.7 cm.
16. Gravel stone tool, M24L: 29, the remained length is 12.2, and the thickness is 1.2-1.9cm.

Fig. 5.5.2-6

M61



0 40 cm



1. Pottery Jug, M61: 1, the height is 15.4, and the rim diameter is 7.6cm.
2. Wooden cone-shaped tool, M61: 4, the length is 10.3, and the diameter is 0.6cm.
3. Wooden Spinning wheel, M61: 3, the longer diameter is 4.9, and the shorter diameter is 4.4cm, and the height is 1.4cm. The remained stick is 36cm long and the diameter is 0.8cm.
4. Wooden pestle, M61: 2, the shaft is 66.6 cm long and the diameter is 2cm; while the stone is an oval gravel, with one hole drilled in the middle, the longer diameter is 8.8, the shorter diameter is 7.6, and the thickness is 2cm.

Fig. 5.5.2-8

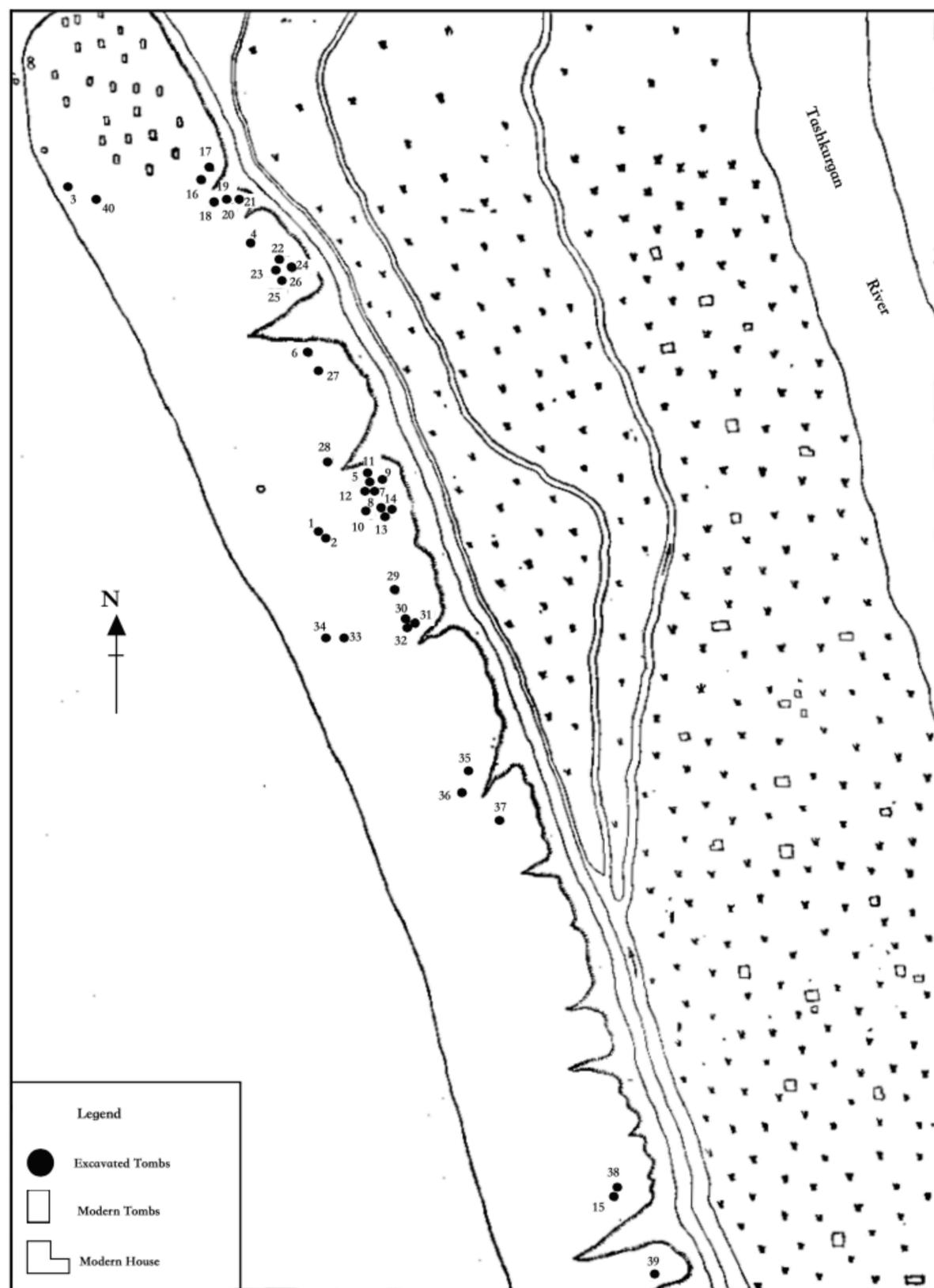


Fig. 5.5.3-1

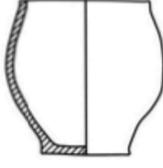
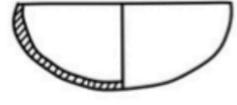
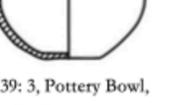
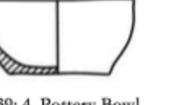
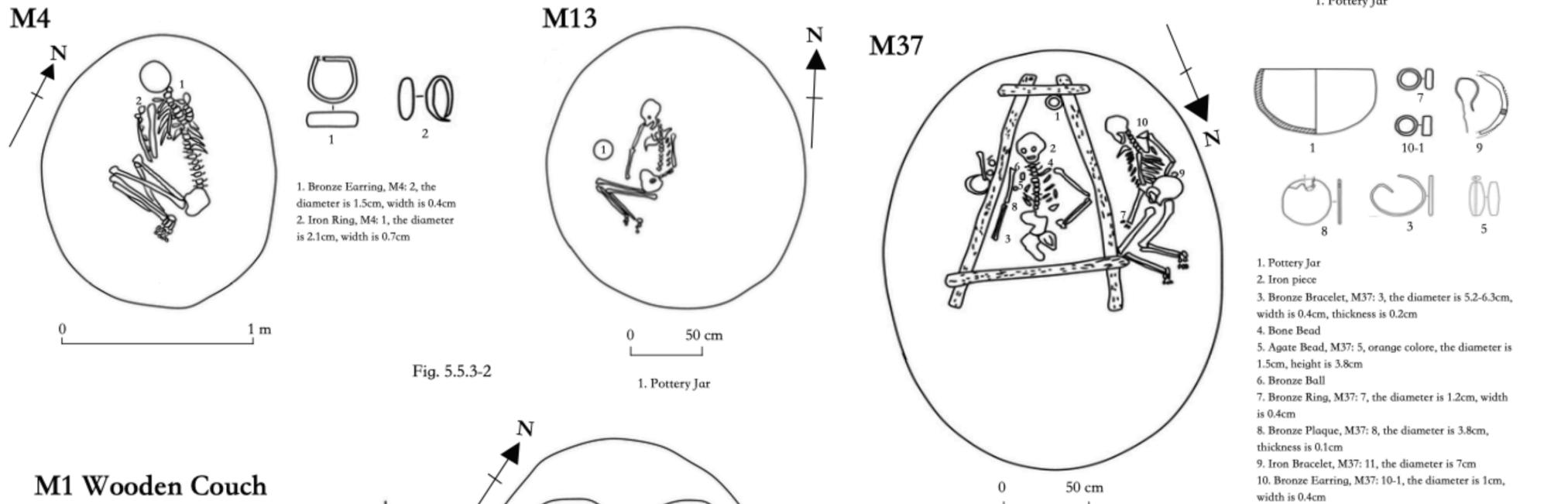
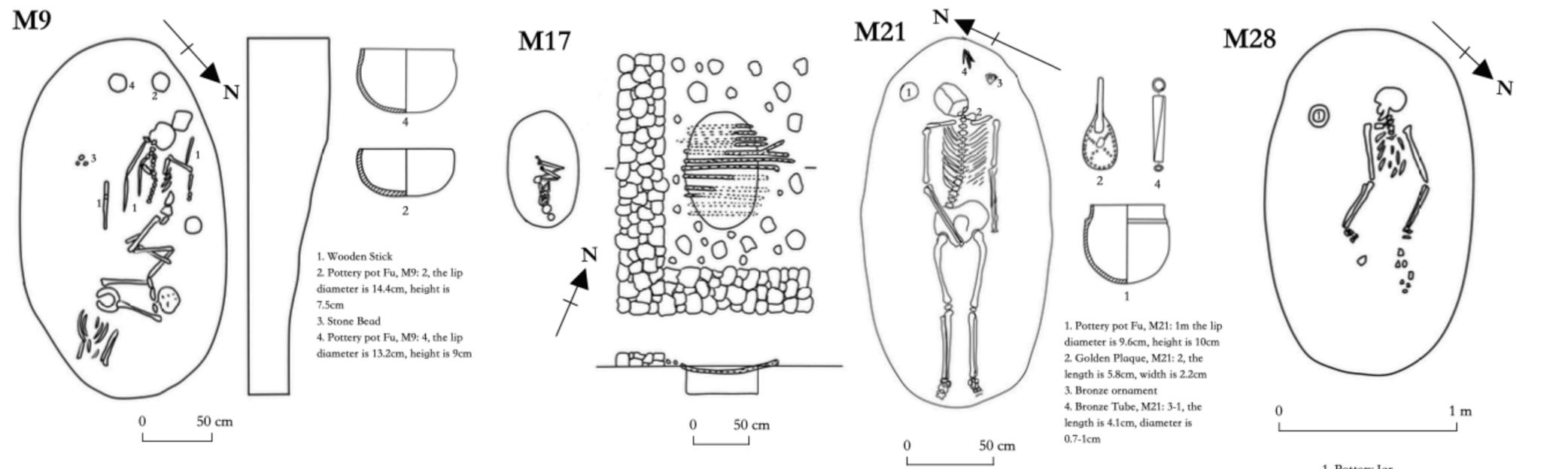
M5	 M5: 1, Pottery Jar, the lip diameter is 9.2cm, base diameter is 6cm, height is 10.4cm	 M5: 3-1, Bronze piece, the length is 3.8cm, width is 3.2cm	 M5: 4, Stone Bead, the diameter is 0.4-1cm, height is 0.6-1.3cm  M5: 5, Agate Bead, orange color, the diameter is 1cm, height is 1.5cm  M5: 7, Bronze Bead, the diameter is 0.4cm, thickness is 0.3cm	
M10	 M10: 8, Pottery shallow Bowl, the lip diameter is 25cm, height is 10cm  M10: 1, Pottery Jar, the lip diameter is 6.4cm, height is 9.6cm	 M10: 3, Pottery pot Fu, the lip diameter is 14.4cm, height is 7.5cm  M10: 4-2, Bronze ornament, the height is 2.4cm, width is 4cm, thickness is 0.8cm	 M10: 11, Iron Knife, the length is 12.2cm, width is 1.5cm  M10: 7-1, Bronze piece, the length is 4.8cm, width is 2.5cm  M10: 10, Pottery Spinning wheel, the diameter is 0.8-2.2cm, height is 1.7cm	 M10: 6-1, Bronze Ball, the diameter is 1.2cm, height is 0.6cm  M10: 9, Agate Bead, in black & white colors, the diameter is 0.8cm, height is 2.6cm  M10: 5, Bronze ornament, the height is 1.9cm, diameter is 1.2cm
M39	 M39: 6, Pottery shallow Bowl, the lip diameter is 8.8cm, height is 6cm  M39: 1, Pottery Bowl, the lip diameter is 11.6cm, base diameter is 5.6cm, height is 6.8cm	 M39: 3, Pottery Bowl, the lip diameter is 8.4cm, base diameter is 3.2cm, height is 4.4cm  M39: 4, Pottery Bowl, the lip diameter is 8.8cm, base diameter is 6cm, height is 4.4cm	 M39: 9, Bronze Button, the diameter is 1.2cm, height is 0.5cm  M39: 10-1, Bronze Circle, the diameter is 3cm  M39: 11-1, Bronze Earring, the diameter is 1.7cm	 M39: 7, Bronze Arrowhead, the length is 6.2cm  M39: 8, Bronze Arrowhead, the length is 5.5cm
Others	 M26: 1, Bronze Earring, the diameter is 2.1cm, width is 0.35cm	 M29: 2, Bronze Arrowhead, the length is 3.6cm		

Fig. 5.5.3-5



M1 Wooden Couch

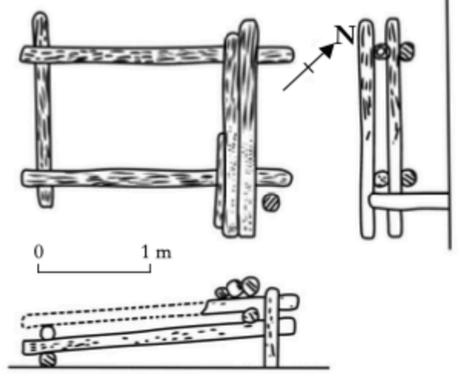


Fig. 5.5.3-2

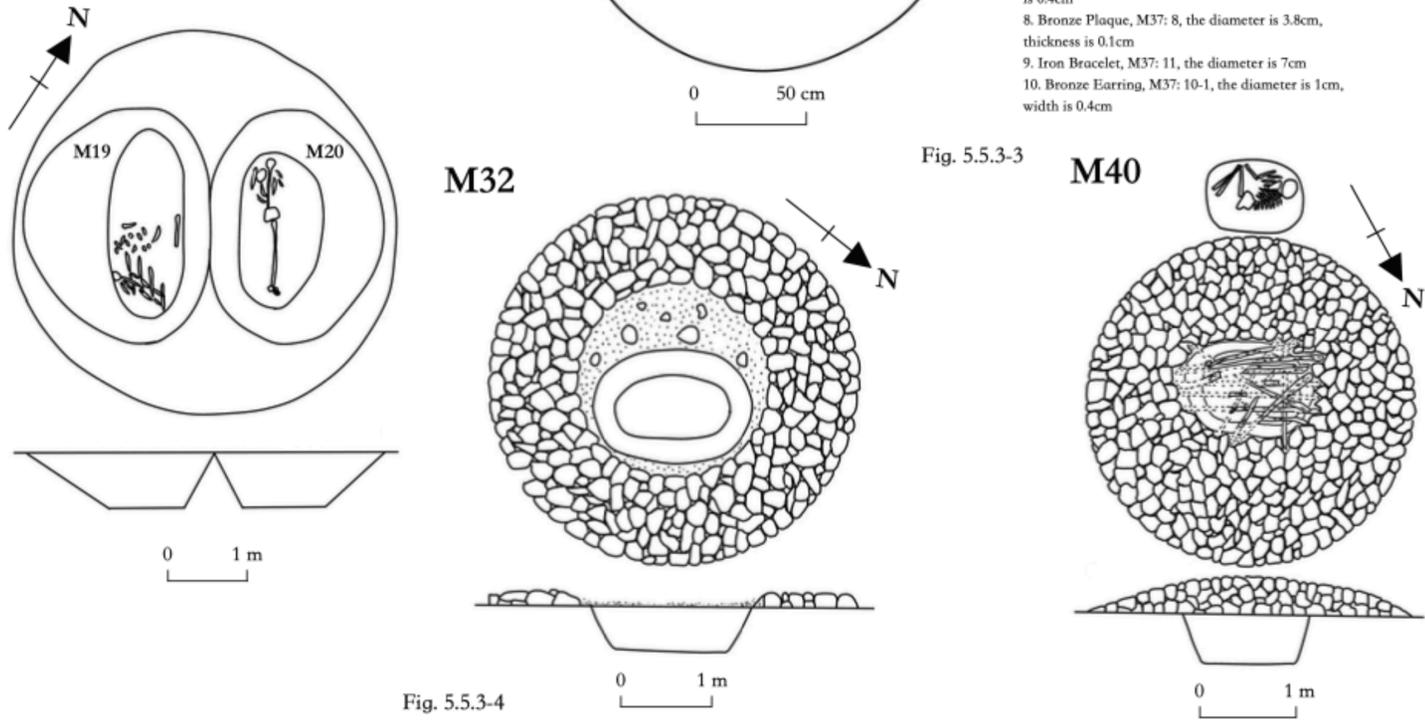


Fig. 5.5.3-4

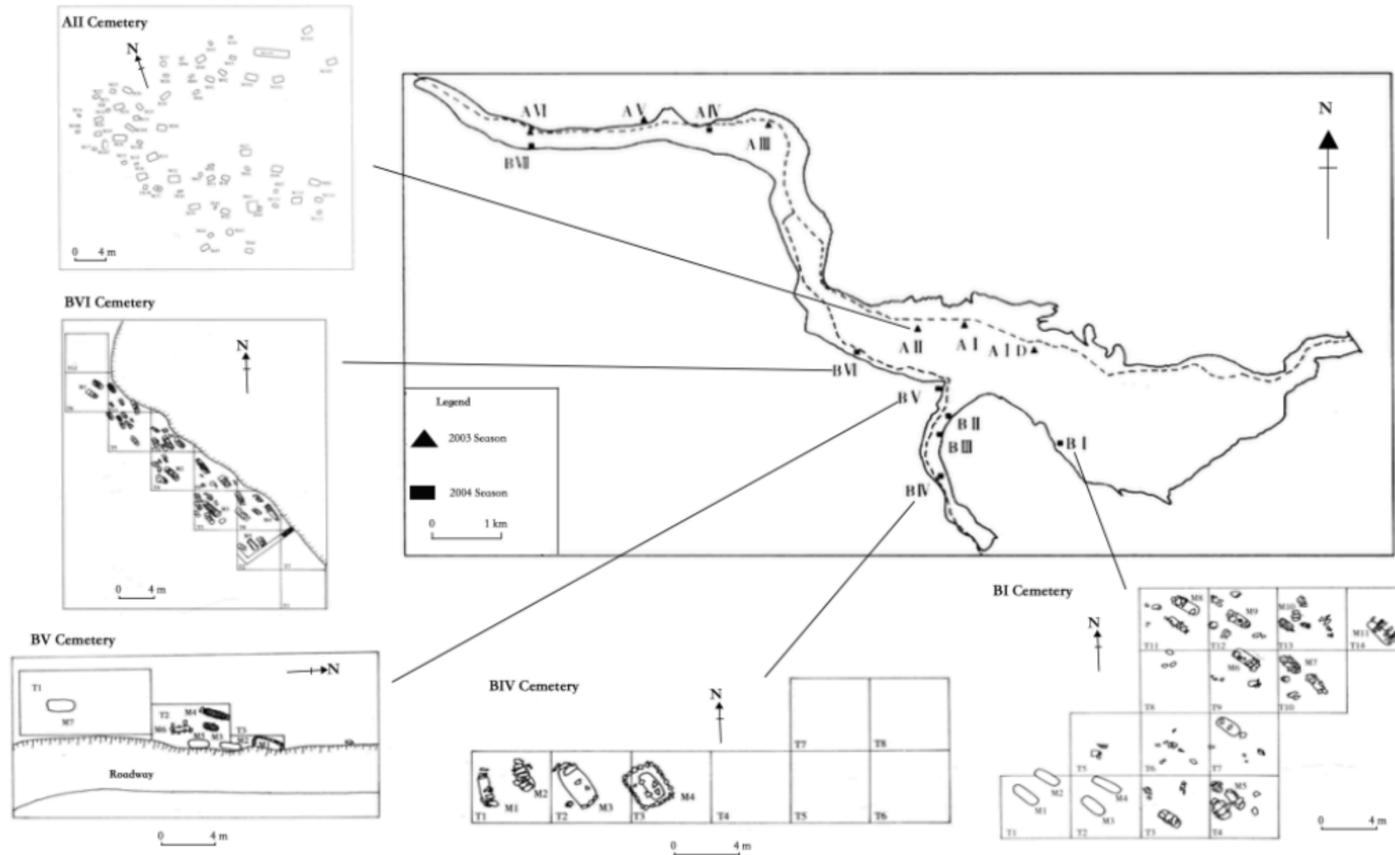


Fig. 5.5.4-1

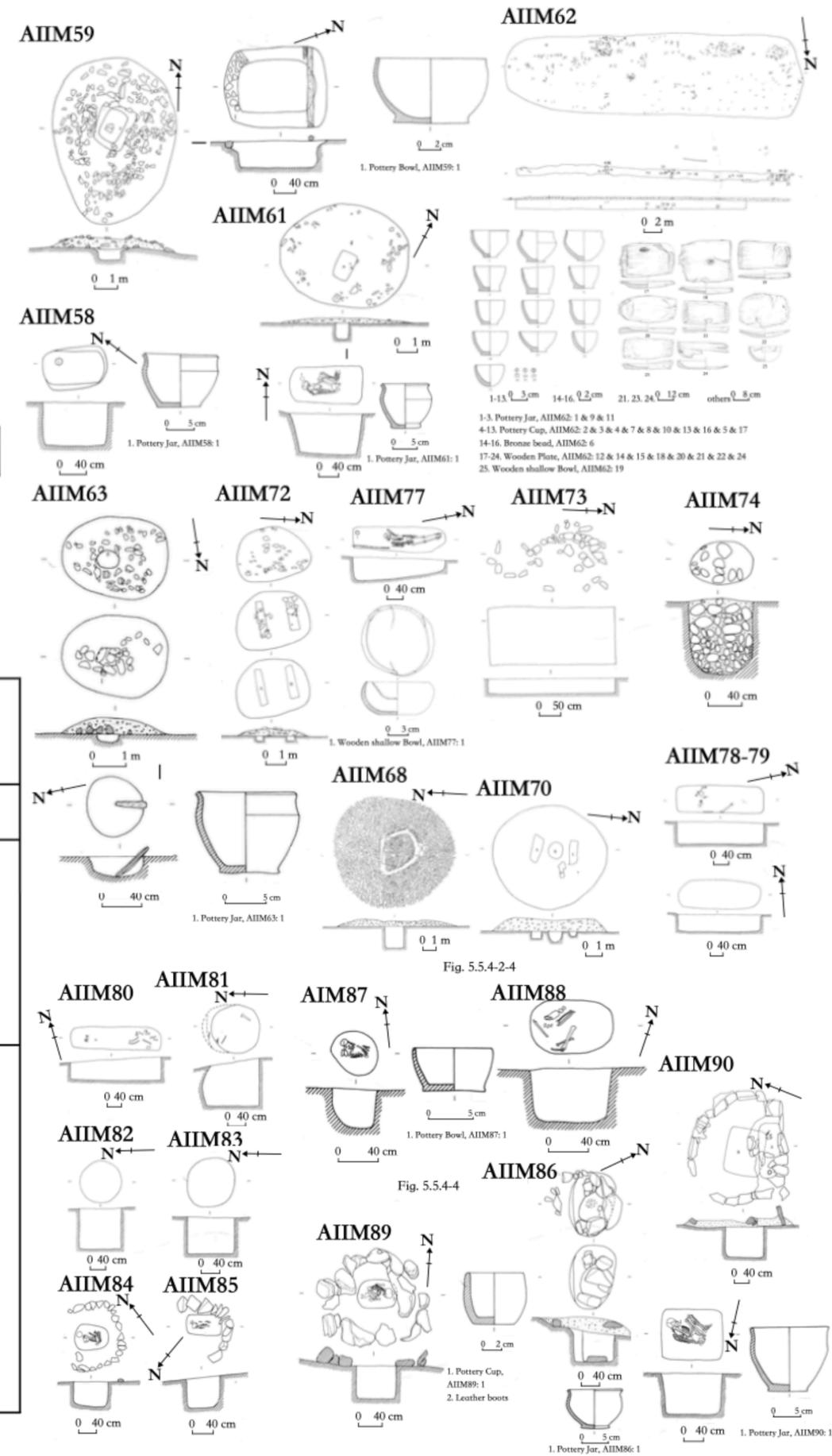


Fig. 5.5.4-2-4

Fig. 5.5.4-4

Sub-phase	Tomb Structure	Other Typical Grave Goods	
Bronze Age Phase I	<p>AIIM4</p>	<p>Pottery</p>	<p>Bronze</p>
		<p>AIIM18</p>	

Fig. 5.5.4-3

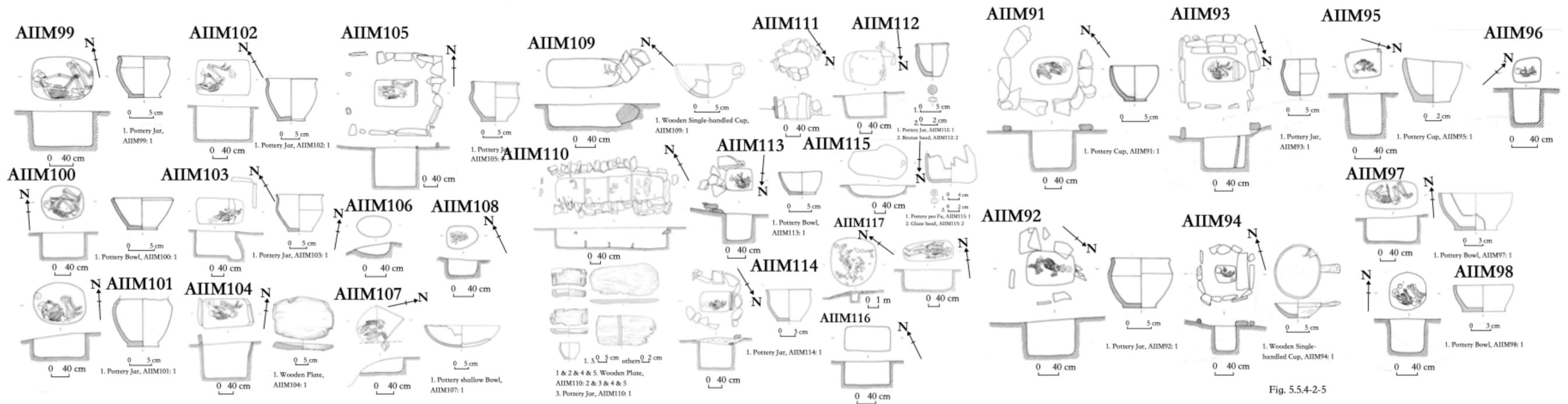


Fig. 5.5.4-2-6

Fig. 5.5.4-2-5



Fig. 5.5.4-2-1

Fig. 5.5.4-2-2

Fig. 5.5.4-2-7

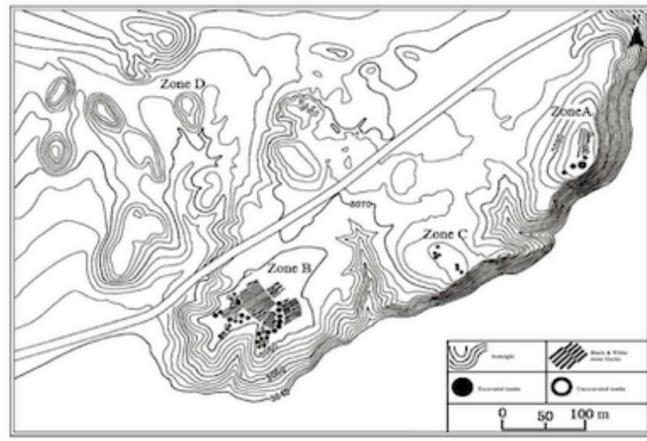


Fig. 5.5.5-1

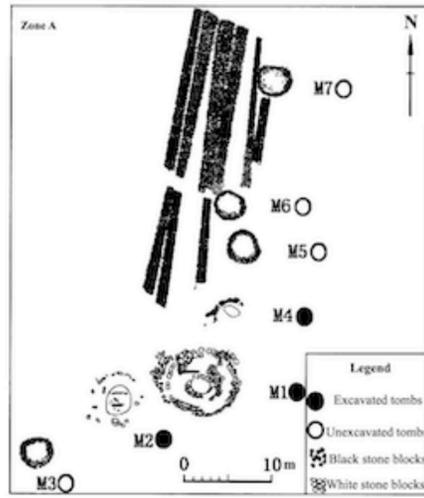


Fig. 5.5.5-2

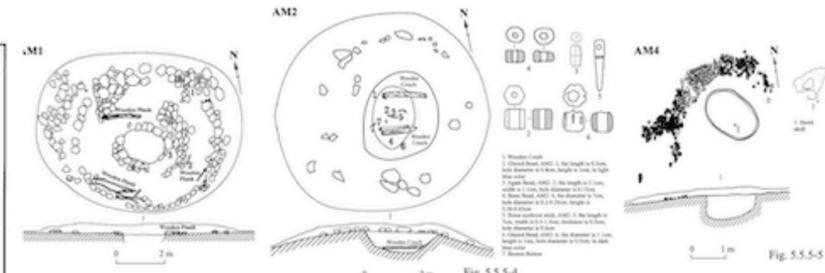


Fig. 5.5.5-4

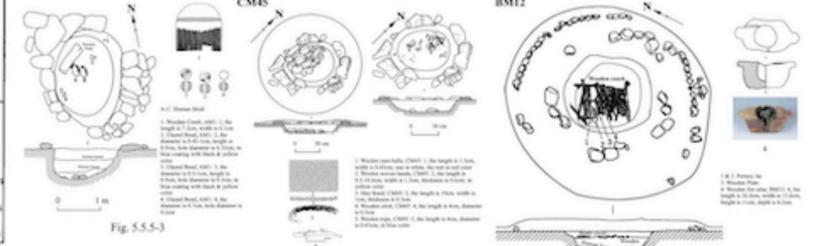


Fig. 5.5.5-3

Fig. 5.5.5-22

Fig. 5.5.5-10

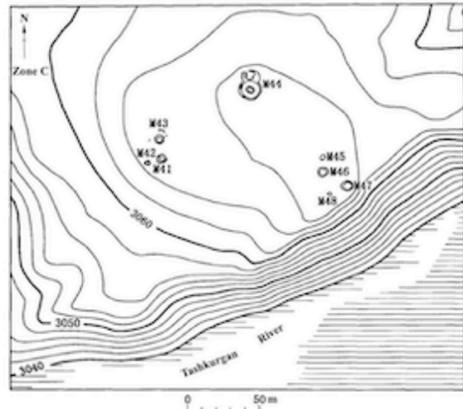


Fig. 5.5.5-20

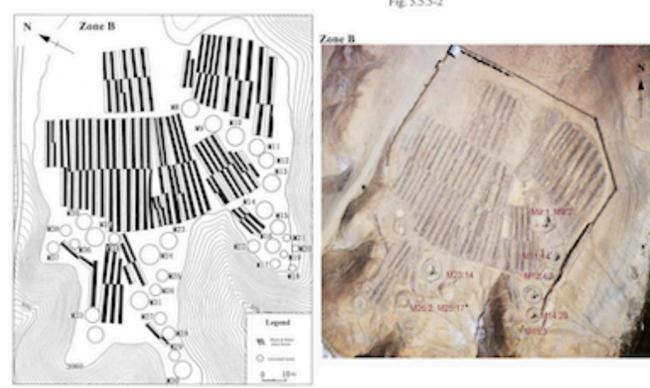


Fig. 5.5.5-6

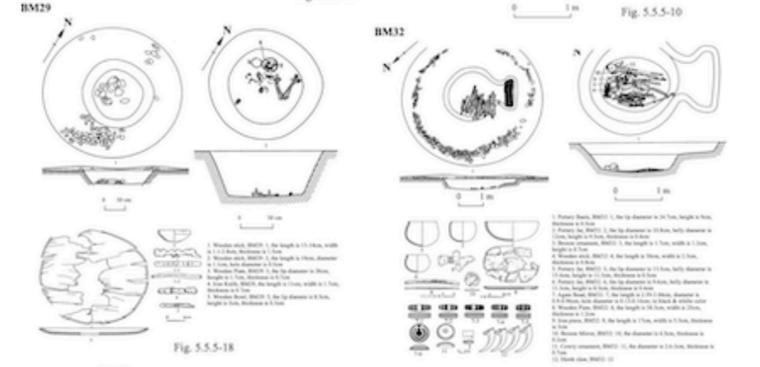


Fig. 5.5.5-18

Fig. 5.5.5-19

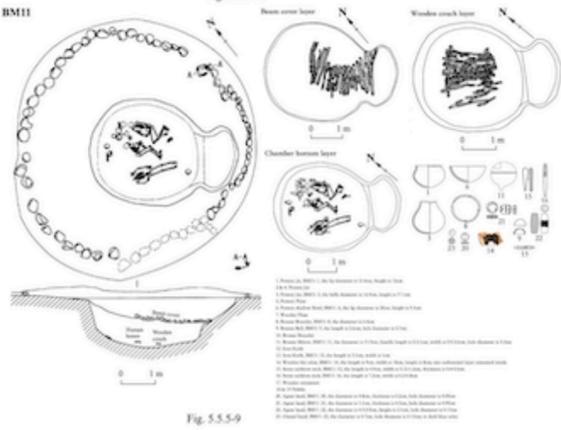


Fig. 5.5.5-9

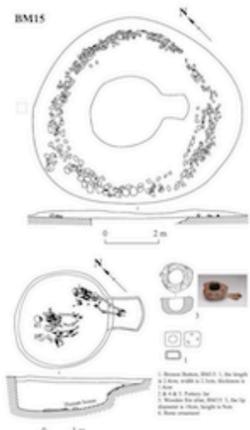


Fig. 13

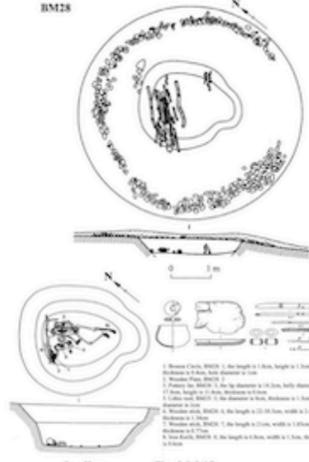


Fig. 5.5.5-17

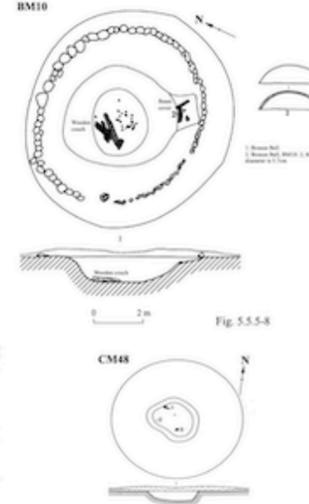


Fig. 5.5.5-8

Fig. 5.5.5-23

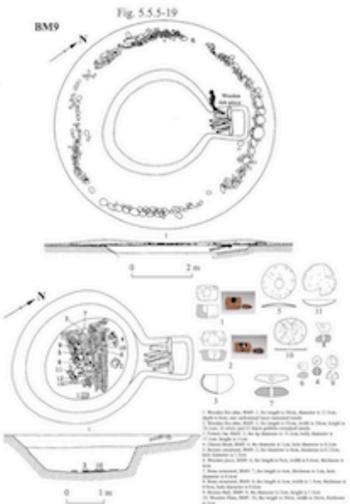


Fig. 5.5.5-7

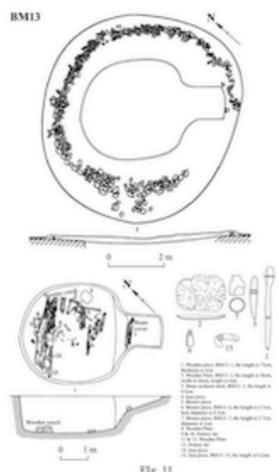


Fig. 11

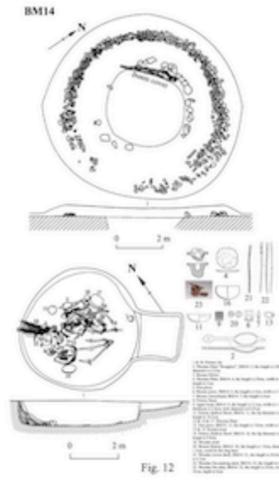


Fig. 12

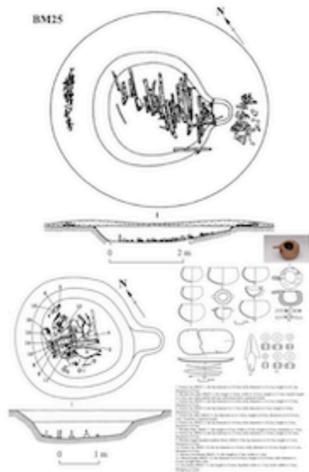


Fig. 5.5.5-16

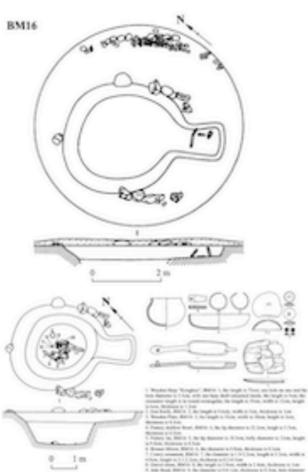


Fig. 5.5.5-14

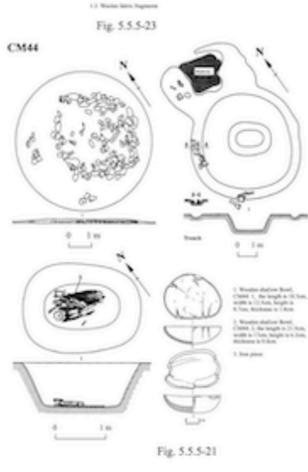


Fig. 5.5.5-21

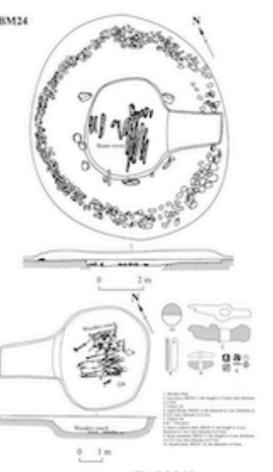


Fig. 5.5.5-15

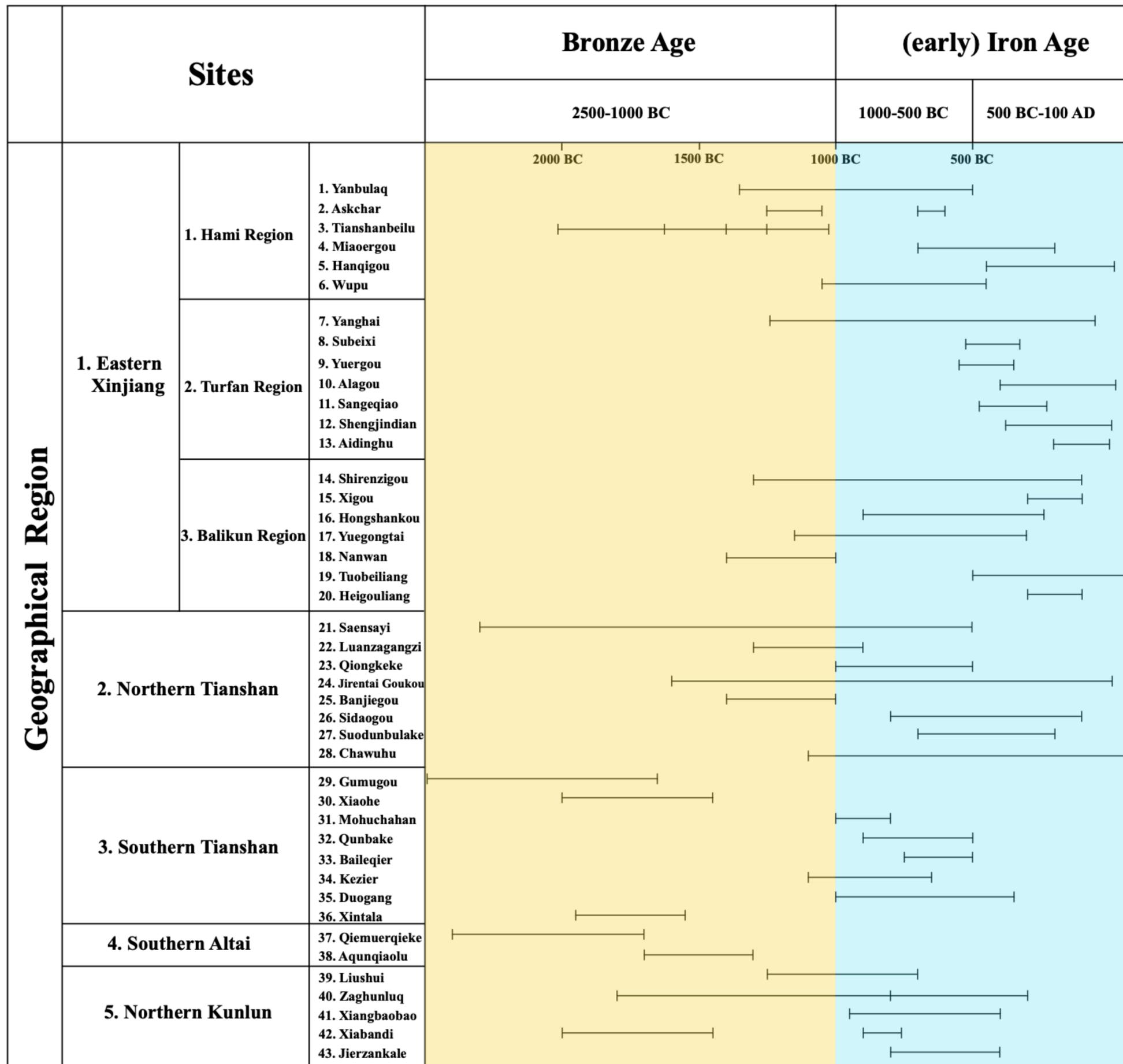


Fig. 6.1

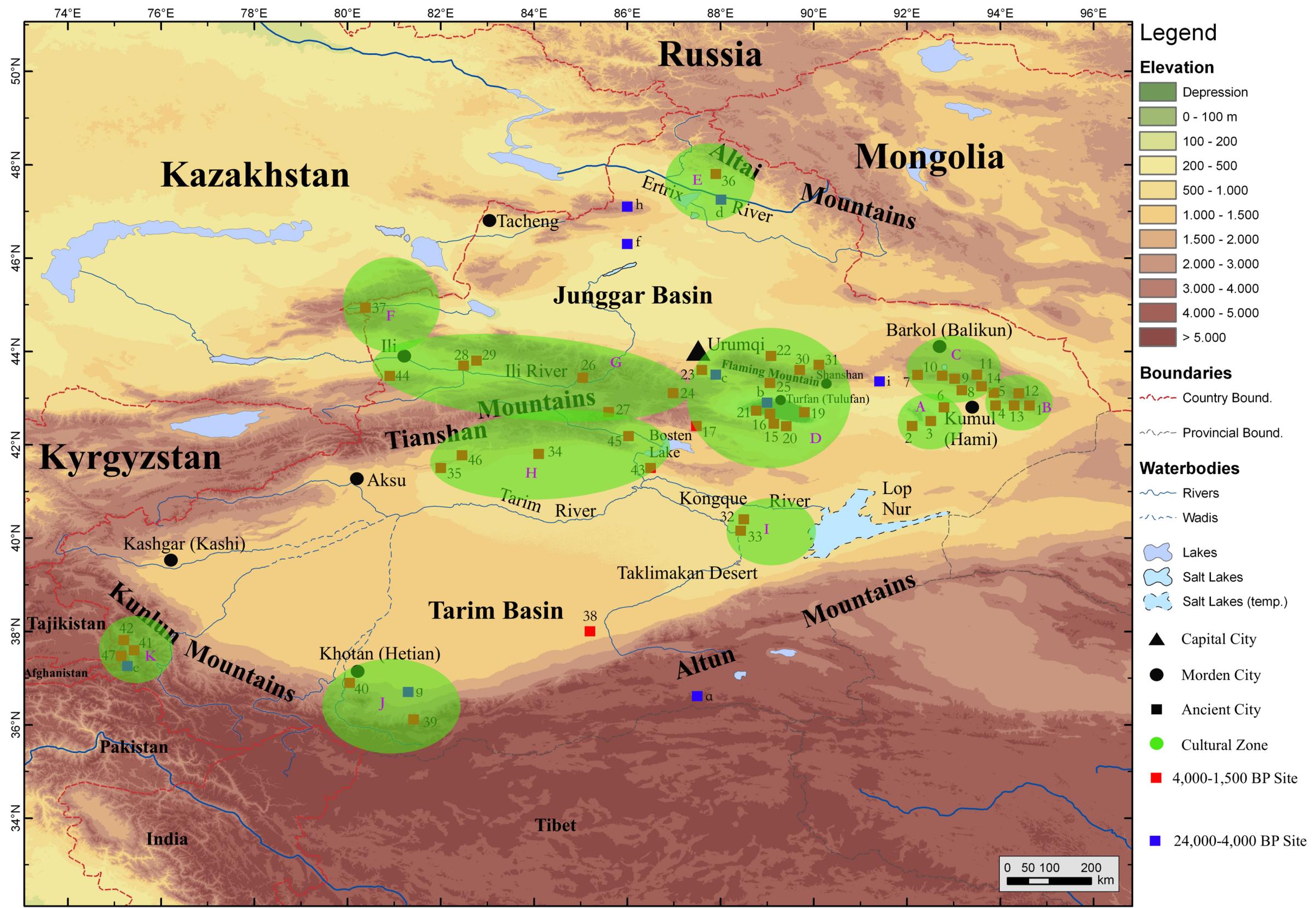


Fig. 6.2

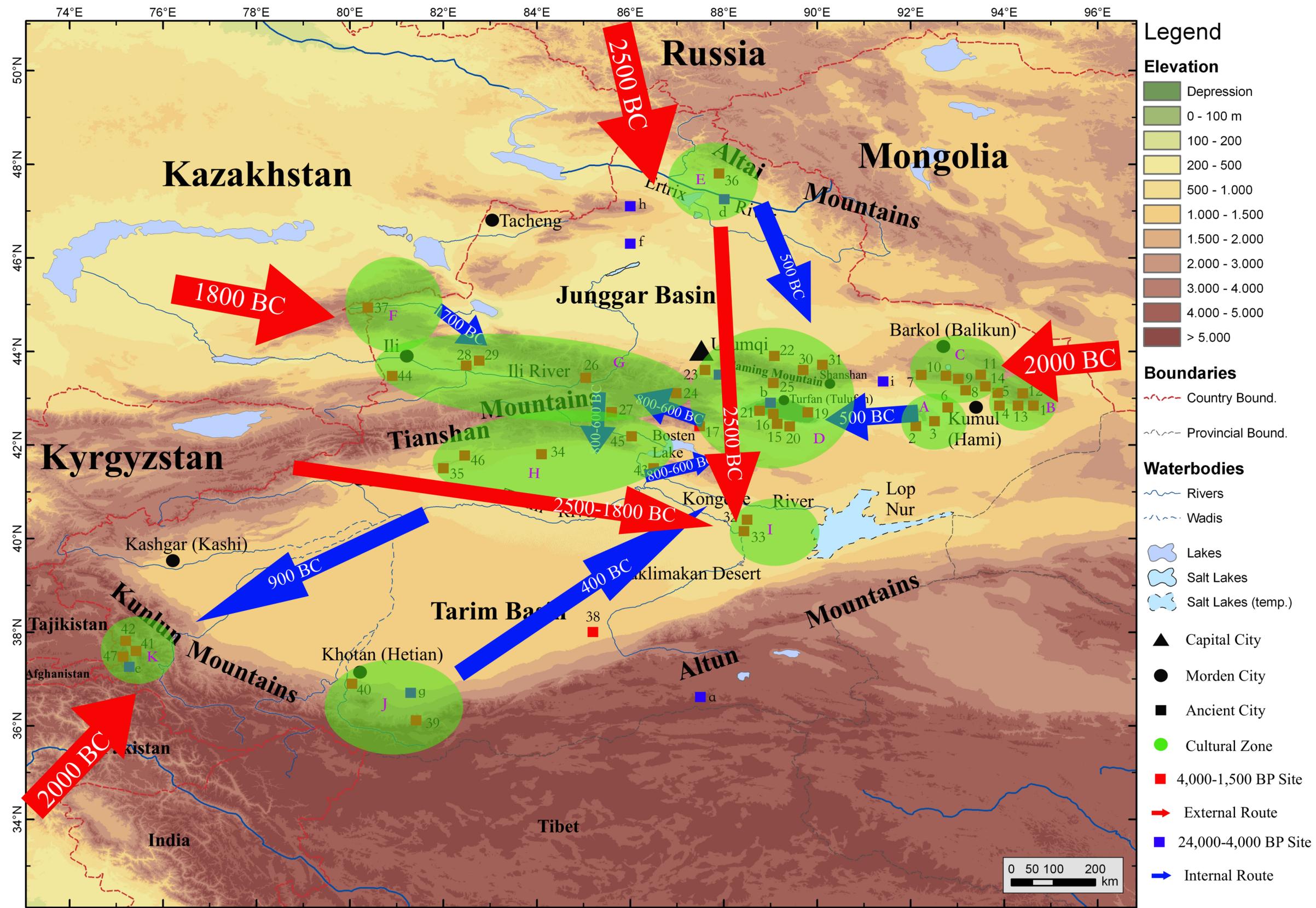


Fig. 6.3