

4.2.3 Eos/ Capri Chasma

Capri Chasma (9.8°S/316.7°E) is connected to Coprates Chasma in the west (Fig. 52, 28) and to Ganges Chasma in the north. Towards the east, it extends to Aurorae Chaos (Fig. 28). The chasmata harbour Capri Mensa (13.8°S/312.6°E), a huge ILD. It is enclosed by Capri Chasma to the north and Eos Chasma to the south (Fig. 58). This region features chaotic terrain as well as slumped and tilted plateau material to the northeast.

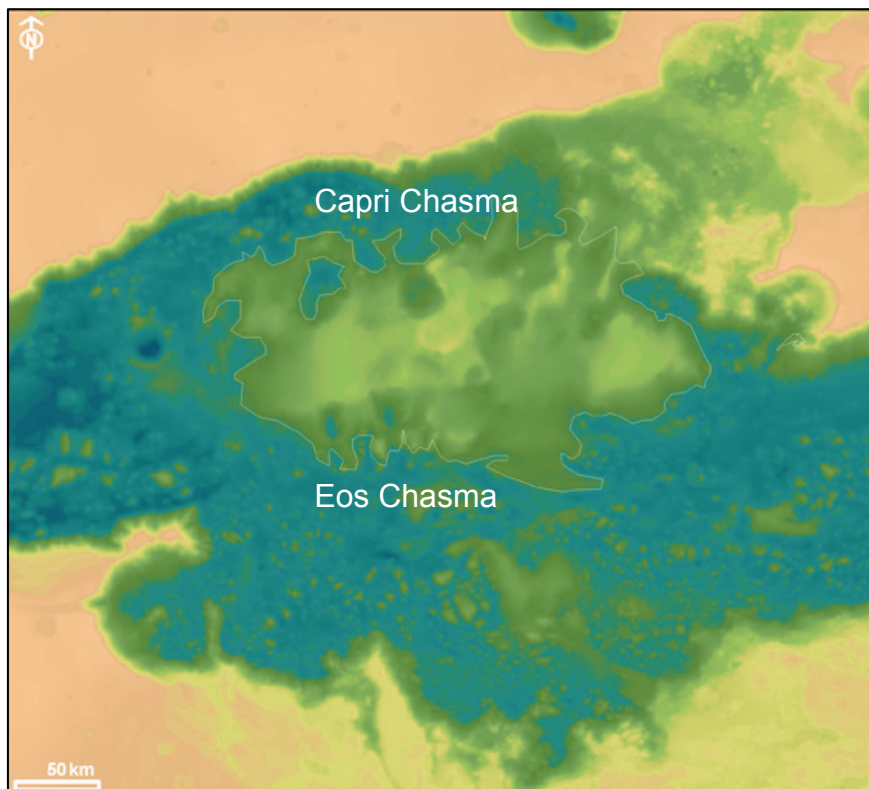


Figure 58: MOLA map of Eos/ Capri Chasma. Capri Mensa (13.9°S/312.2°E) is located in the centre (outlined white) situated between Eos and Capri Chasma and among chaotic terrain.

Capri Mensa:

Capri Mensa shows the typical mesa morphology, meaning a flat top and steep slopes. It is exposed at -5200 m to -1700 m and measures 250 by 150 km. Scarps appear light-toned and layered, while the other parts are thickly covered by dark windblown material and thus appear smooth (Fig. 59A). The streamlined morphology was probably caused by the ILD's situation in an open chasma in which it was exposed to unidirectional erosion on both sides.

The ILD is characterised by the parameters shown in Table 22.

The overall albedo is low. Steep scarps feature high albedo, whereas the flat top shows a low albedo and is covered thickly by dark aeolian material (Fig. 59A). Morphologically speaking, layering seems homogenous below a dark mantle of possibly indurate aeolian material (Fig. 59C, 59H). Undulating high-albedo strata is visible along the scarps (Fig. 59F). In HiRISE images, the cliff-forming material looks similar to that in Ganges 1 (cf. Sect. 4.2.1).

Two units were distinguished. The lowermost unit (unit 1) is characterised by high albedo, a rough and massive surface and undulating strata. It is cliff-forming and shows flutes and grooves (Sect. 2.3.1, 5.1). A stair-stepped morphology is also indicated which means there is material of various consolidation. In parts, there is a low albedo and a smoother surface and fine layering, when eroded into small mesas (cf. Ganges 1, Ganges 5, Sect. 4.2.1). It is observed at an elevation from -5200 m to -1900 m (derived thickness 3300 m). Unit 2 (Fig. 59E) is mostly covered by dark aeolian material and represents the cap unit. It features convoluted strata comparable to Aureum 2 (Sect. 4.1.2). This unit is heavily eroded. It is exposed from -1900 m to -1700 m (derived thickness 200 m). The surface exhibits pits as well. The stair-stepped morphology indicates there is alternating strata of competent and less competent material within unit 2.

THEMIS BT and TES TI (Sect. 3.1.6, 3.1.5) are high in regions that are steep (Fig. 59B, 59C, 59H), freshly eroded and of high albedo (Fig. 59A, 59D). These are mostly regions of the cliff-forming unit 1. The overall TI is low (Sect. 3.2.2, 5.5; Table 22). Advanced weathering comparable to other ILDs is also observed at scarps (cf. Fig. 59A).

Kieserite and PHS in Capri Chasma were detected by OMEGA [*Gendrin et al., 2005*] in the central and western part of the mesa corresponding to unit 1. The central part shows a massive kieserite-rich layer that forms cliffs [*Roach et al., 2007*], which also coincides with unit 1. Material break-up seems more advanced there than in the smoother looking parts of unit 1 where PHS were detected. This unit seems easily eroded and shows flatter slopes. In terms of elevation and morphology (Fig. 59A, 59D-F), there may be interbedded strata with alternating kieserite and polyhydrated sulphate-rich layers.

Layers are slightly tilted, possibly post-depositional when regarding layering (Fig. 59A).

Table 22: Parameters of Capri.

Morphology	Relative Albedo	Elevation [m]	Thickness [m]	Consolidation of Materials	Mineralogy	Layer Geometry
Mesa, dome-like profile	Low	-5200±12.5 to -1700±12.5	Unit 1: -3300±12.5 unit 2: 200±12.5	Intermediate TI TI Ø: 388 SI±65 (surrounding: 364±85) BT: 184-204°K (surrounding: 183-192°K) talus and boulders present	PHS and kieserite within unit 1, and haematite	65±27/5±3 47±32/7±3 34±16/18±12

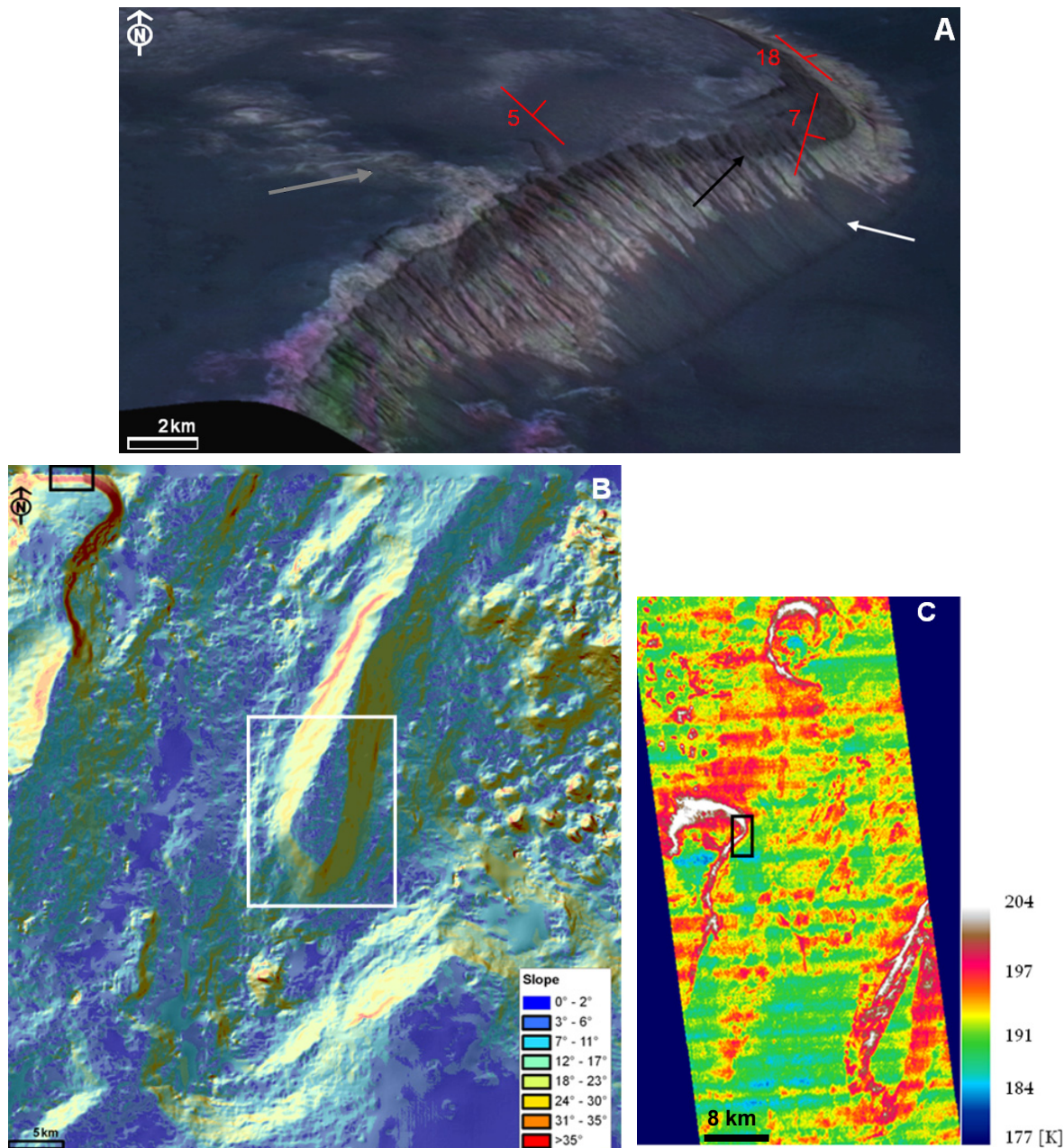
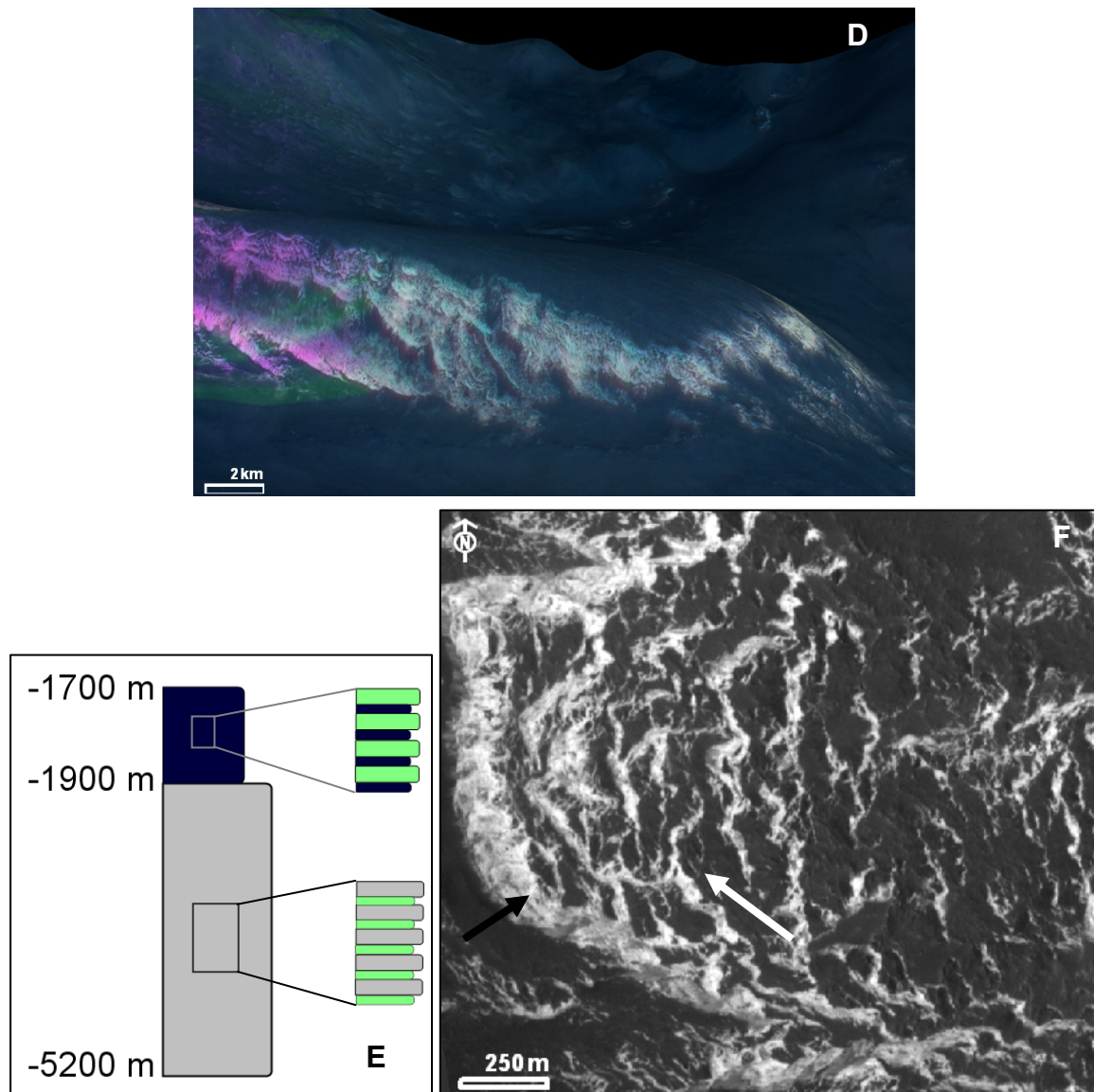
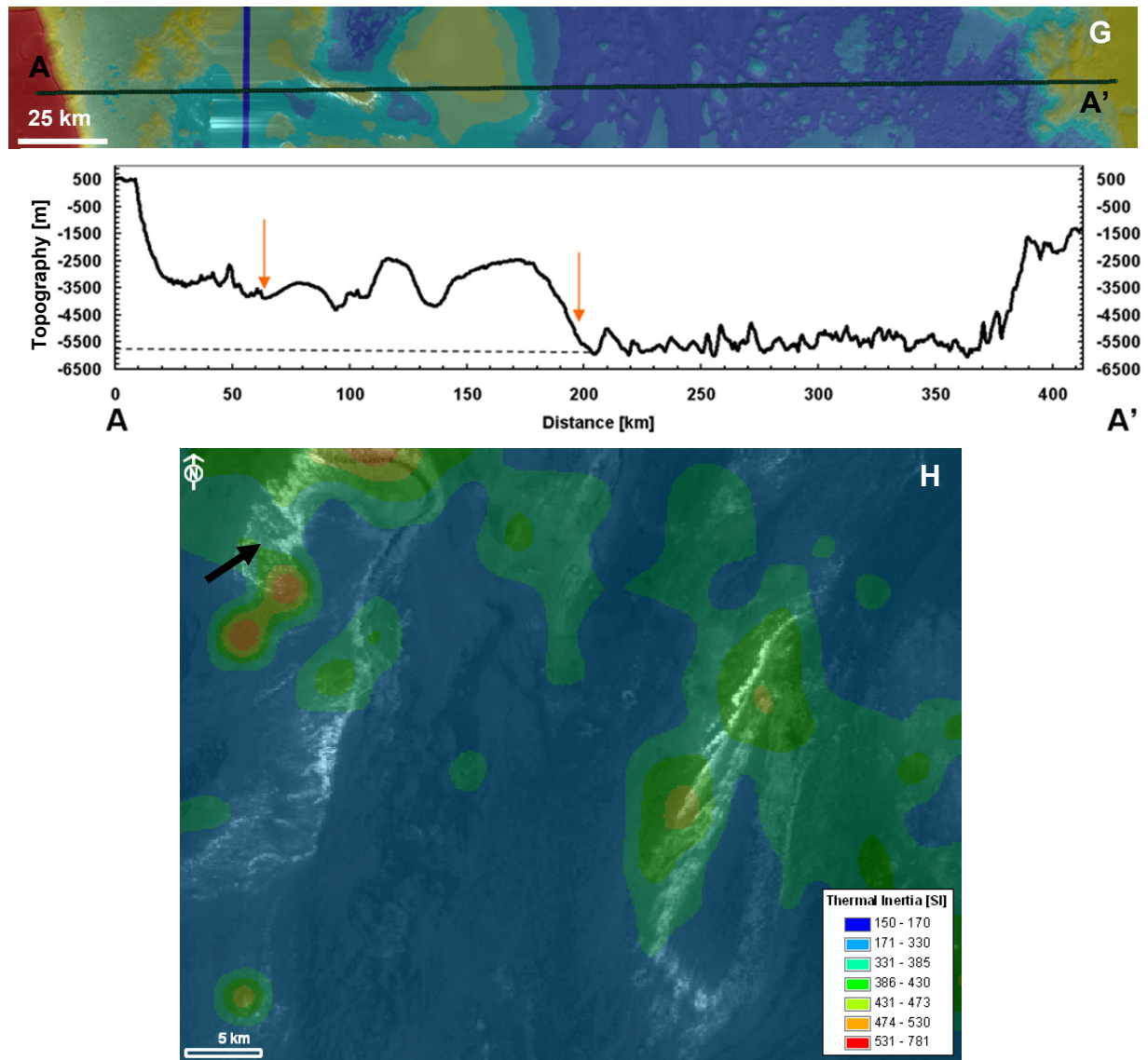


Figure 59: Properties of Capri Mensa. (A) HRSC false colour perspective view (orbit h2145_0000; 13.0°S/312.2°E) of the northern part. See box in Fig. 59C for context. Loose material coverage is visible on top. Steep parts are more or less uncovered (grey arrow; cf. Fig. 59B). Layering (black arrow) is observed along light-toned (steep) cliffs that exhibit dark talus at their base (white arrow). Layering seems inclined an apparently outward dipping. (B) HRSC slope map (orbit h2145_0000) showing steep parts corresponding in yellow-reddish colours that are freshly eroded and layered (Fig. 59A) and have sulphates. Box indicates location of steep scarps. White box shows Fig. 59D. (C) THEMIS BT map (orbit I14824015; LS=195 →S-spring) showing distinct layering at the scarps and thick dark coverage on top in flatter areas. Flat parts are covered by dark windblown material. Regions of high surface temperature (~ 205 K) correspond to steep parts (cf. Fig. 59B), whereas regions of lower BT (~ 188 K) are mostly flat and covered by thick, dark, loose material. Box indicates location of Fig. 59A.



(D) The ILD features undulating high-albedo strata; see Fig. 59B for context. Thick dark mafic (blue) material consists of accumulations of sands deposited on the flat top and in depressions. HRSC false colour perspective (orbit h2145_0000; exaggeration factor 3). Similarities to other ILDs are observed such as Iani 2 (Sect. 4.1.3). (E) Thickness profile showing two different units. Both units show stair-stepped strata which indicate differences in the consolidation of materials. The ILD is observed between -5200 m and -1700 m. The lowermost unit show hydrated sulphates (Fig. 59F), is cliff-forming and has a higher albedo whereas the upper is a cap unit that is distinctly layered and shows convoluted strata. (F) Undulated bedding observed within unit 1 (cf. Fig. 59E). For context, see Fig. 59H. The stair stepped morphology is illustrated by loose low albedo material that is deposited on bedding planes (white arrow) of the massive, competent and cliff-forming, high albedo ILD material (black arrow; MOC orbit R1304755).



(G) (*top*) HRSC DTM overlain by the nadir image shows the course of the profile *below*. (*bottom*) N-S trending profile covering some ILD mesas (cf. Fig. 58, 52). The ILDs show a dome-like profile, ILDs are located between red arrows. The dashed line indicates the potential base of the ILD (cf. Fig. *above*). Accuracy: Distance ± 0.05 km, topography ± 12.5 m (HRSC DTM orbit h2145_0000). (H) TES TI map showing steep high-albedo scarps with highest TI of 500–600 SI corresponding to rock (Sect. 3.2.3, Table 22) whereas flat covered areas have low TI indicating loose material (< 300 SI; cf. 59A, 59B, 59D). Arrow shows location of Fig. 59F.