Model-building and research implications of an open source GRASS GIS approach:

Dealing with reliability and comparability of off-site landuse models

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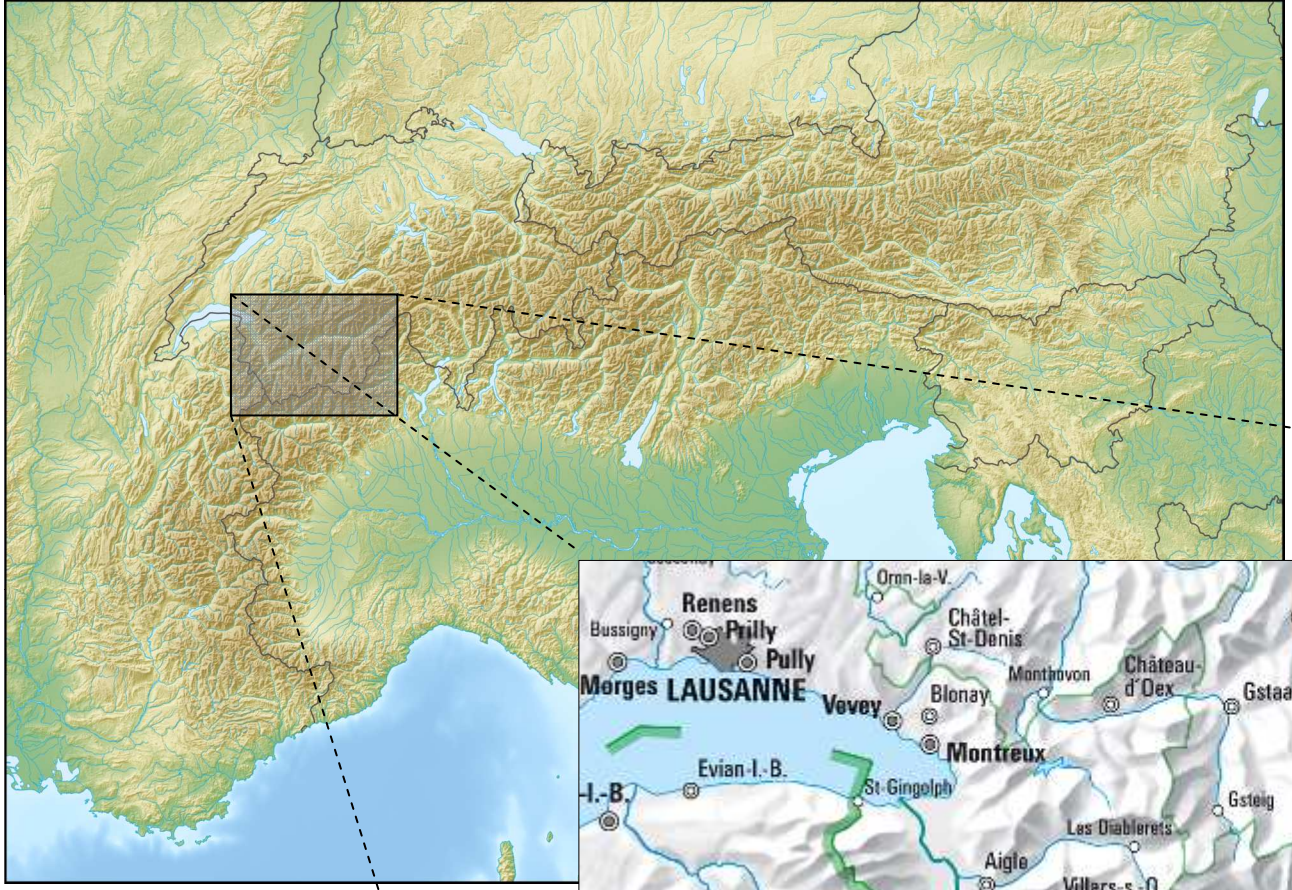
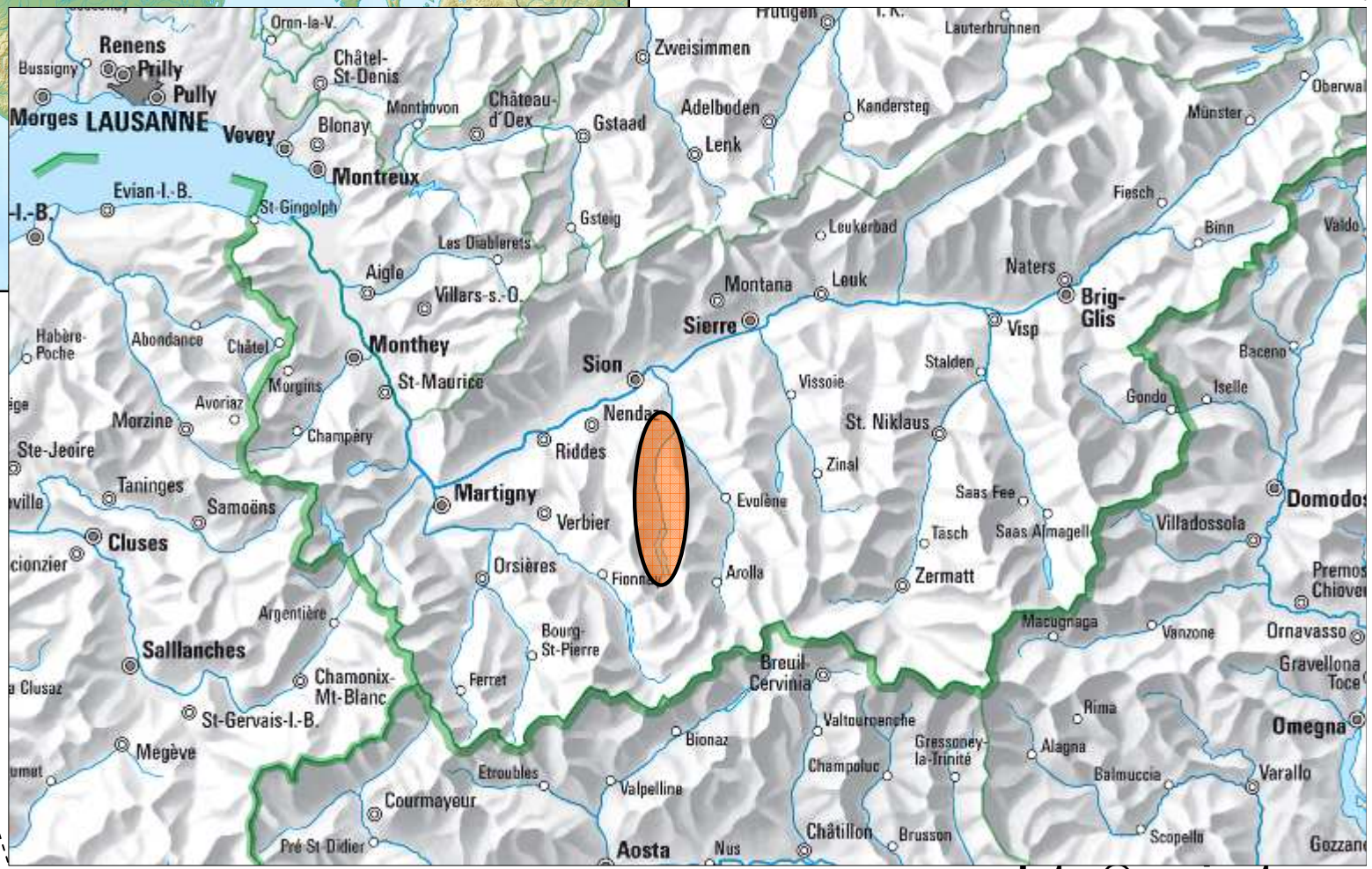
TOPOI-Research Area III, Project AIII-4: "GIS-based comparative analysis of landuse in mountain environment"

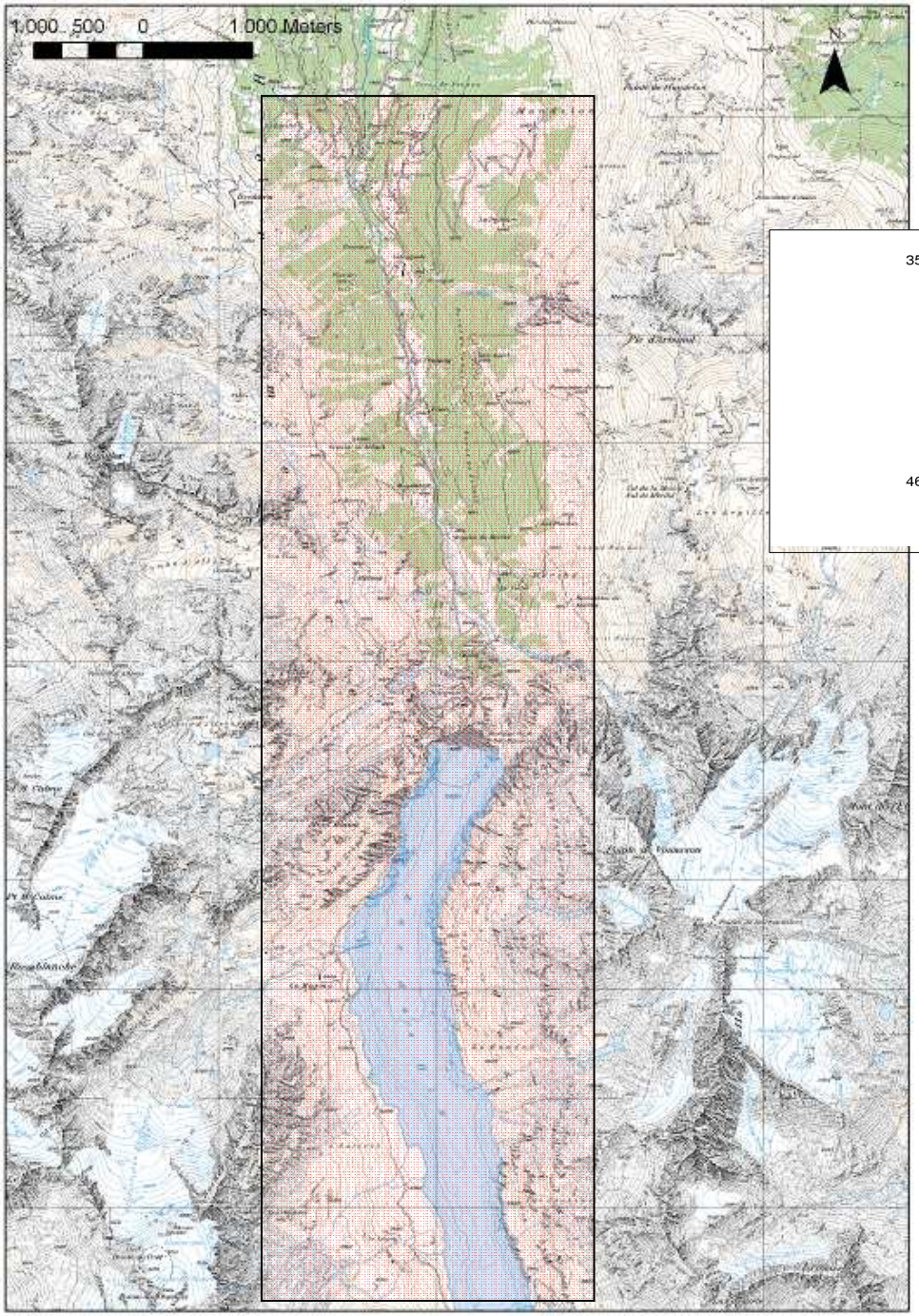


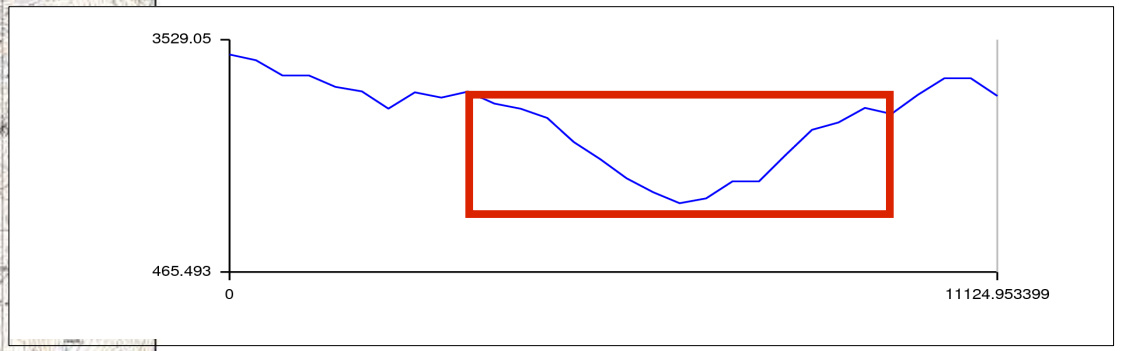


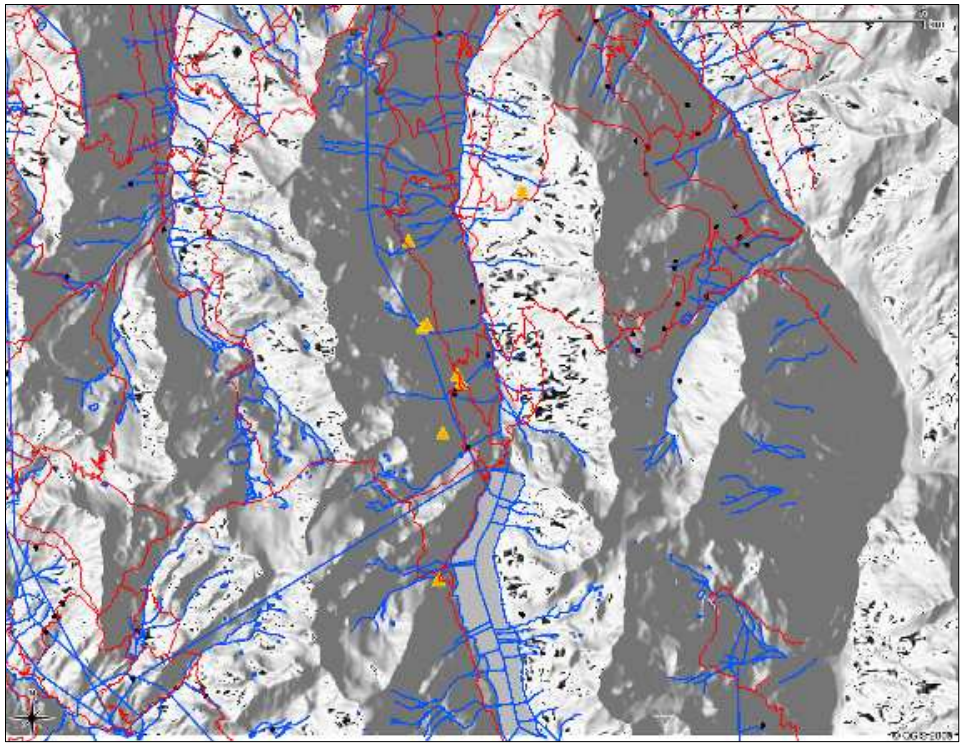
Sub-project AIII-4-1: Val d'Hérémence (Valais-CH)

geodata © swisstopo

Map and profile of the transect



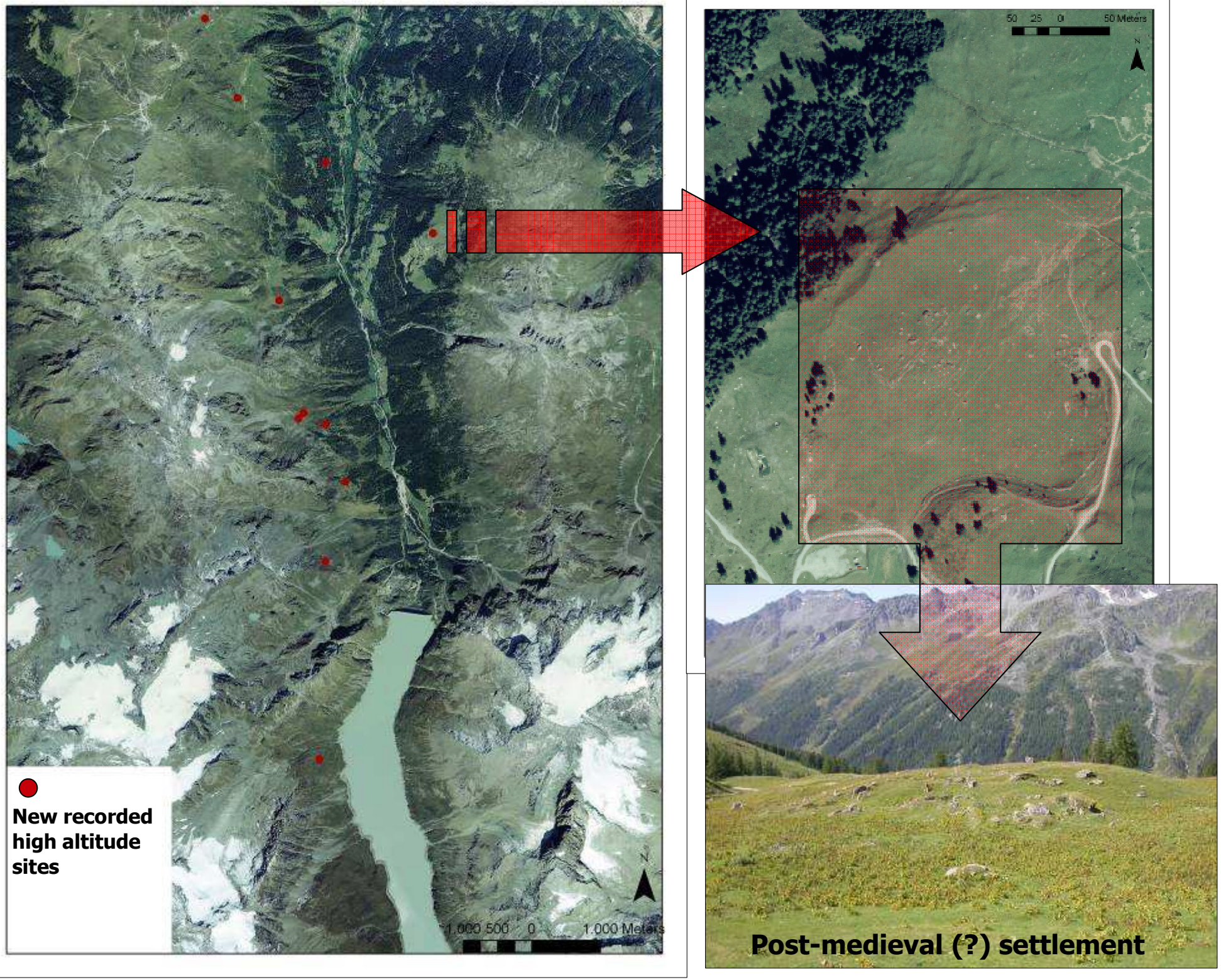


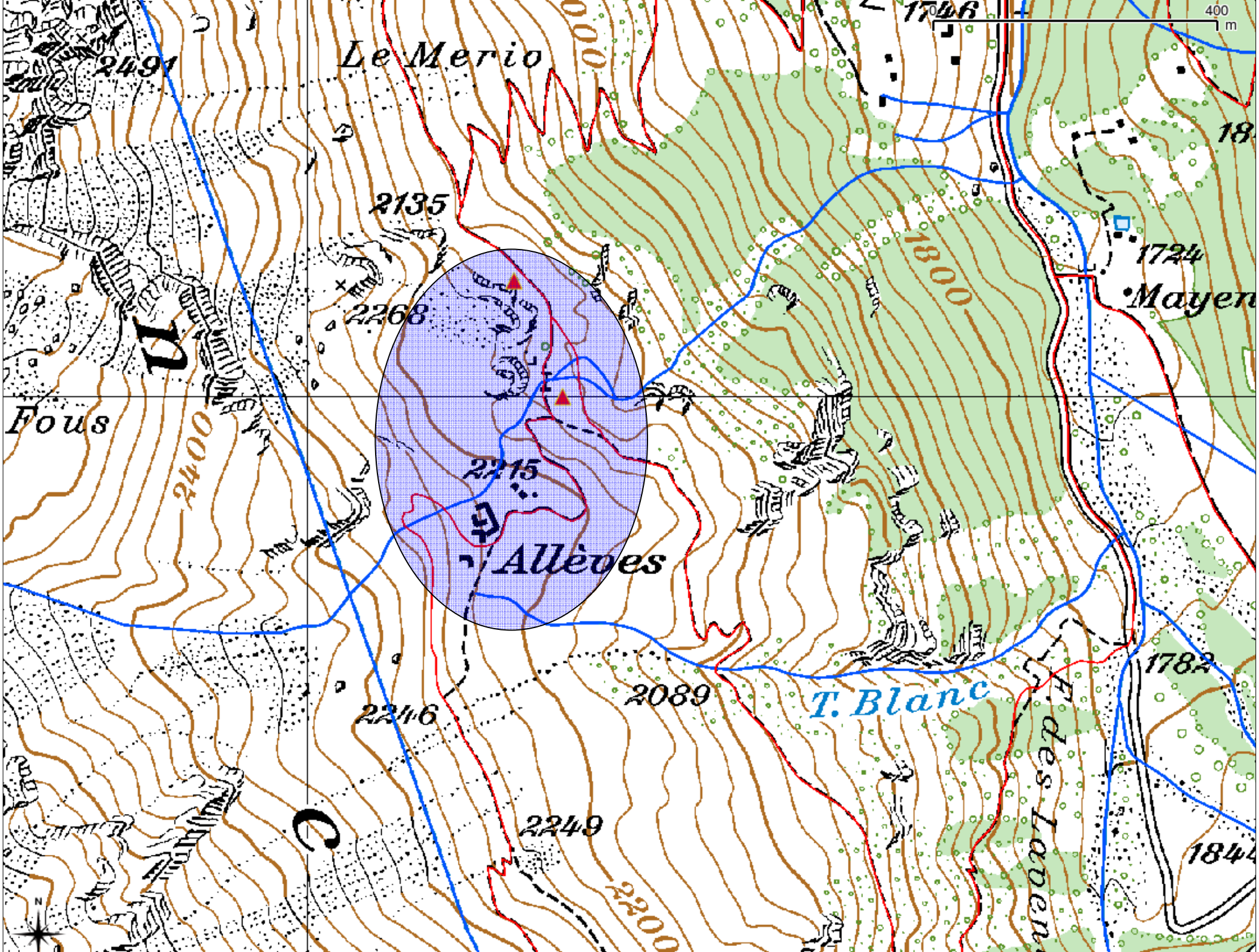


- **Middle altitude multi-phase permanent agro-pastoral settlement (1)**

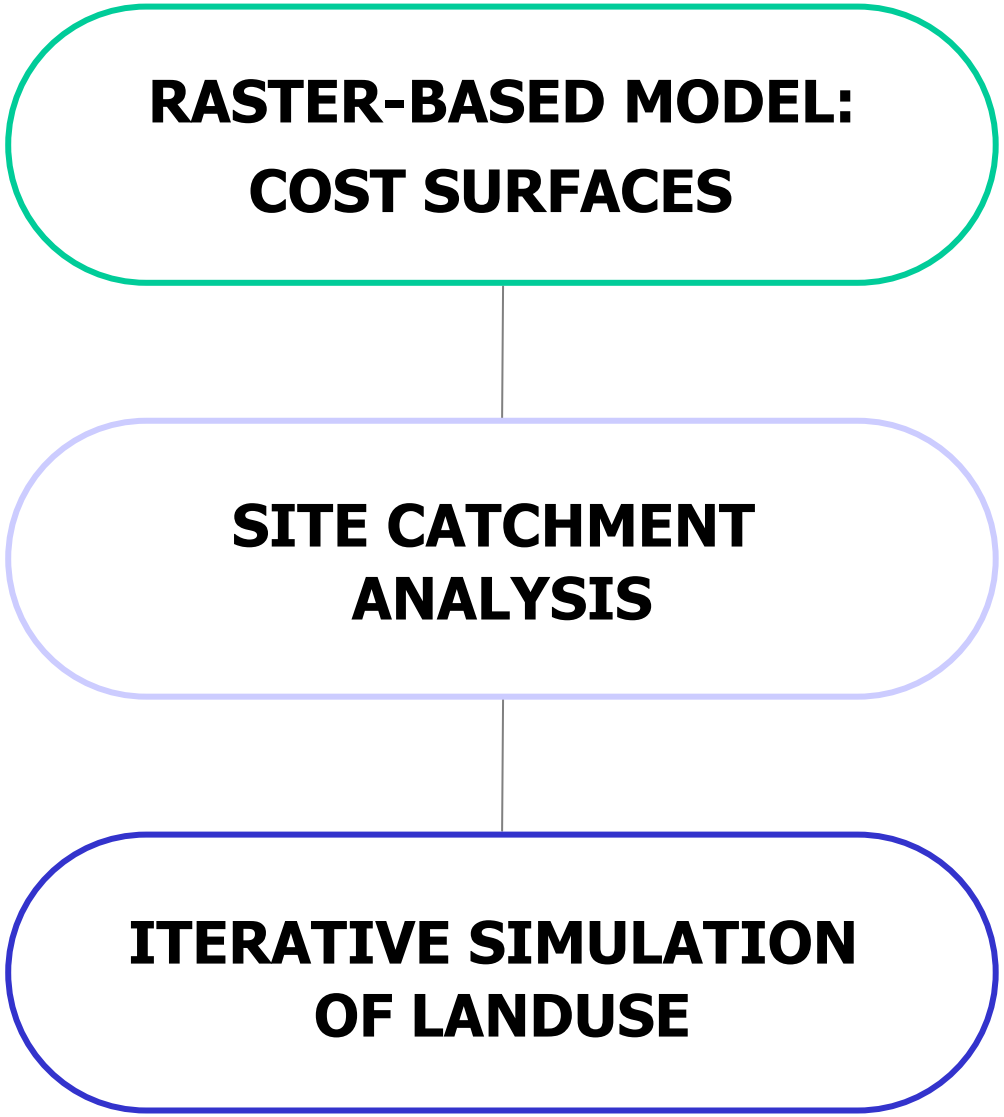
- **High altitude seasonal pastoral post-medieval infrastructures (2)**

- **Transhumance-related paths (3)**

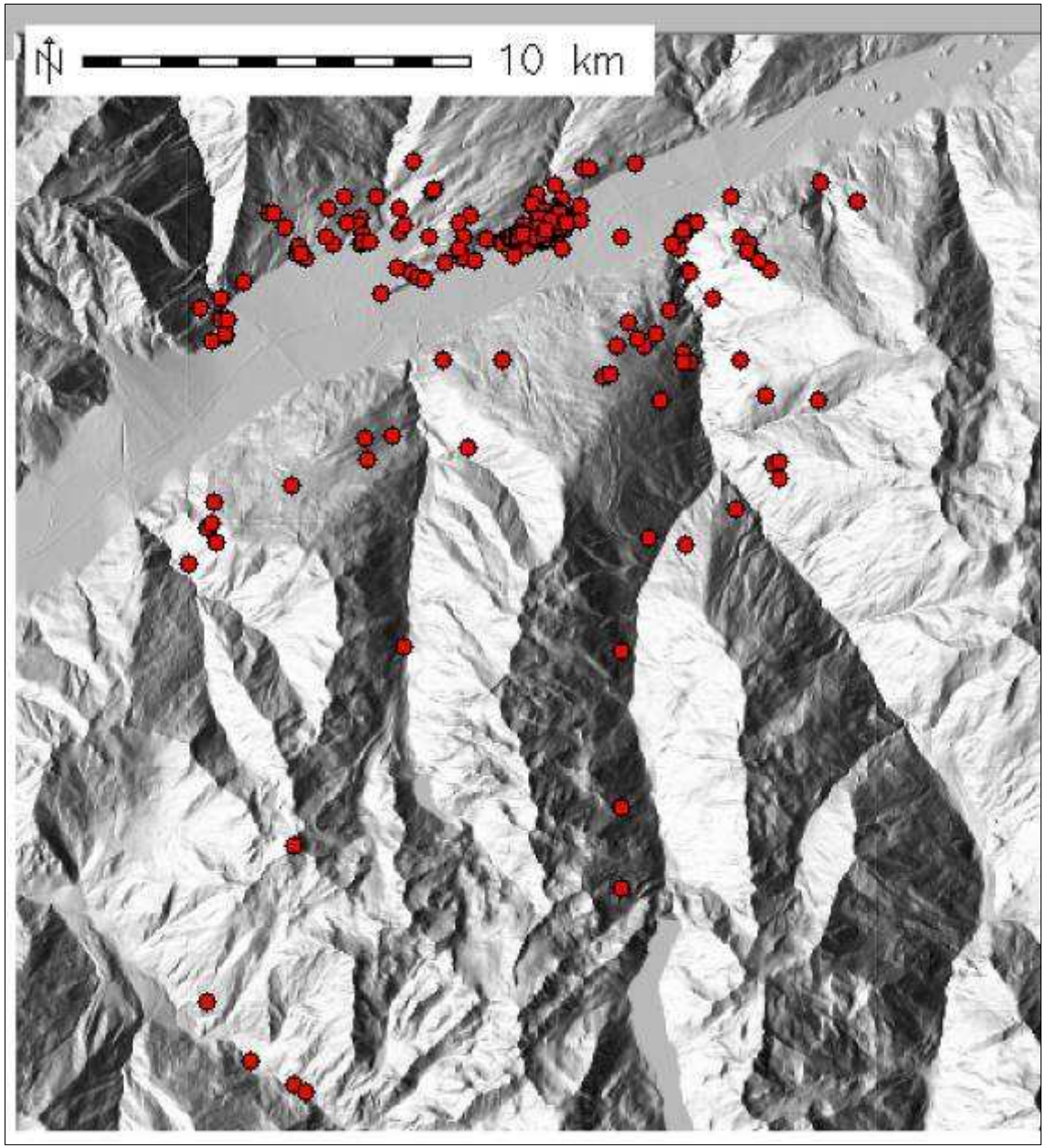

New recorded high altitude sites
1,000 500 0 1,000 Meters
50 25 0 50 Meters
N
Post-medieval (?) settlement


Le Merio
2491
2135
2268
Fous
2400
2215
Allèves
2089
2246
2249
T. Blanc
1782
1724
Mayen
1800
1844
0
400
m
N

GIS-based modeling procedure



Building the raster model

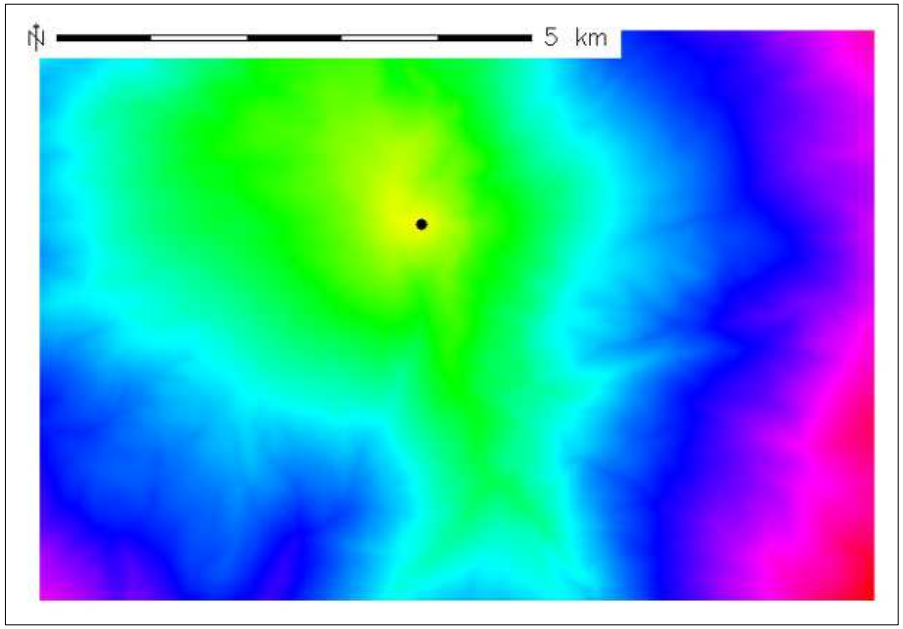


DTM-Shaded **and sample-sites**

- Importing ASCII xyz files to raster;
- Extracting vector points from raster;
- Creating DTM using interpolation algorithm (RST)

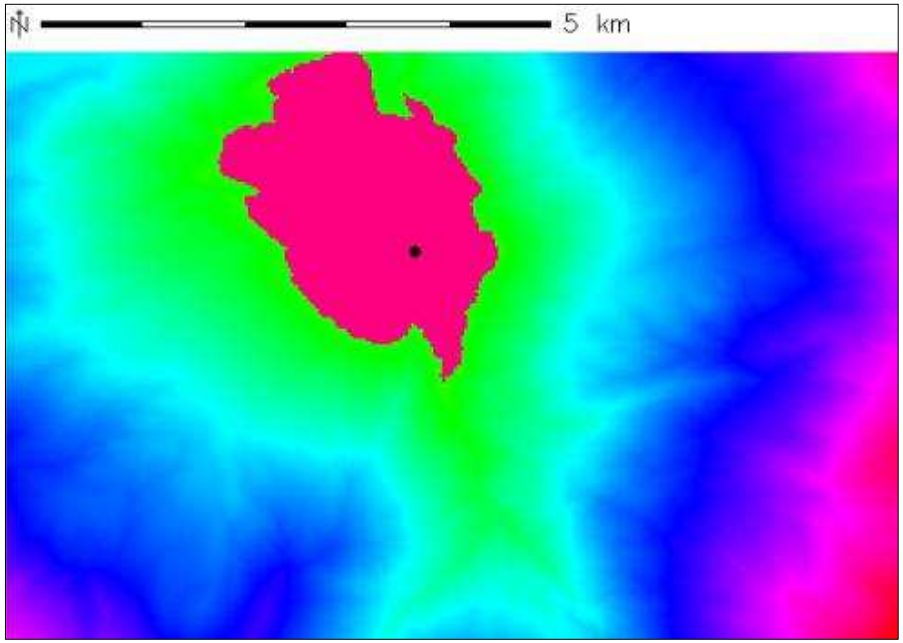
1) Topography- based ground-model Creating a cumulative cost surface from the site as vector point

Module **r.cost** and **r.walk** - GRASS 6.3



2) Modeling site catchment as radius of off-site activity

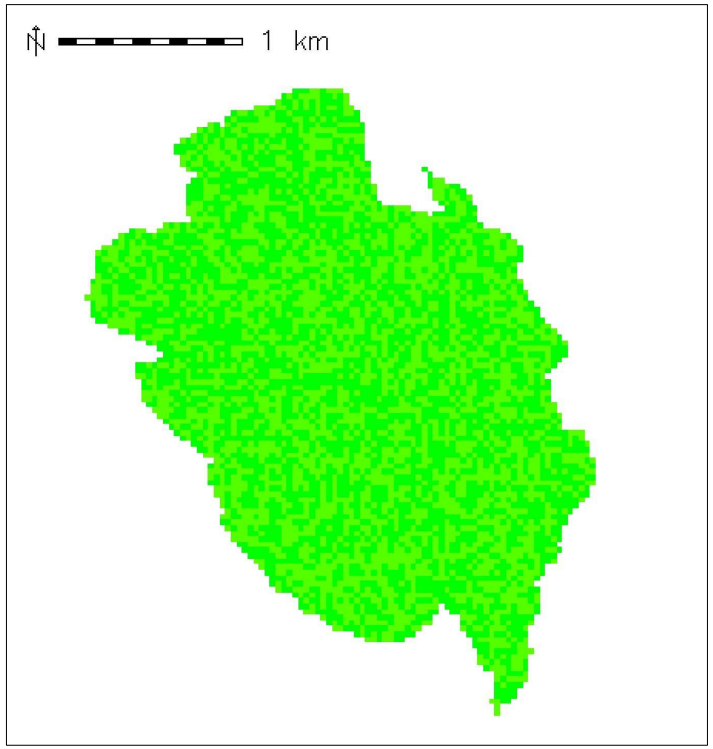
Module **r.catchment** - GRASS *Addons Repository*:
http://trac.osgeo.org/grass/browser/grass-addons/LandDyn
(C) 2007 by Isaac Ullah, Michael Barton, Arizona State University, under GNU General Public License



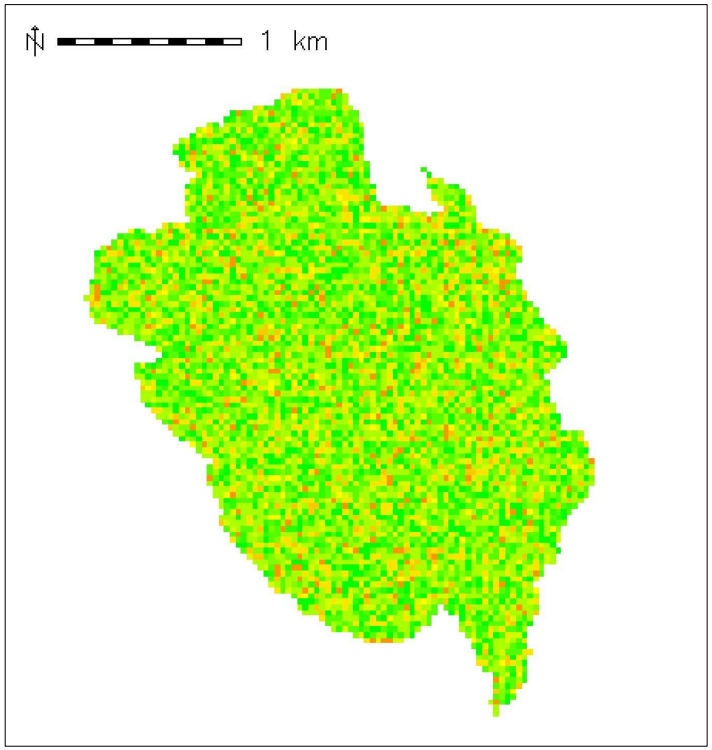
Modeling high mountain pastoral degree of exploitation

Module **r.pastoral.simple**- GRASS *Addons Repository*:

http://trac.osgeo.org/grass/browser/grass-addons/LandDyn



Landuse at first step of iteration after pastoral exploitation
(starting with mostly matured open woodland and fully matured woodland)



Landuse at the fifth step of iteration after pastoral exploitation
(land use evolution calculation; randomized grazing patches)

Modeling plain and middle altitude agro-pastoral landuse

Module **r.agropast** - GRASS *Addons Repository*:
http://trac.osgeo.org/grass/browser/grass-addons/LandDyn
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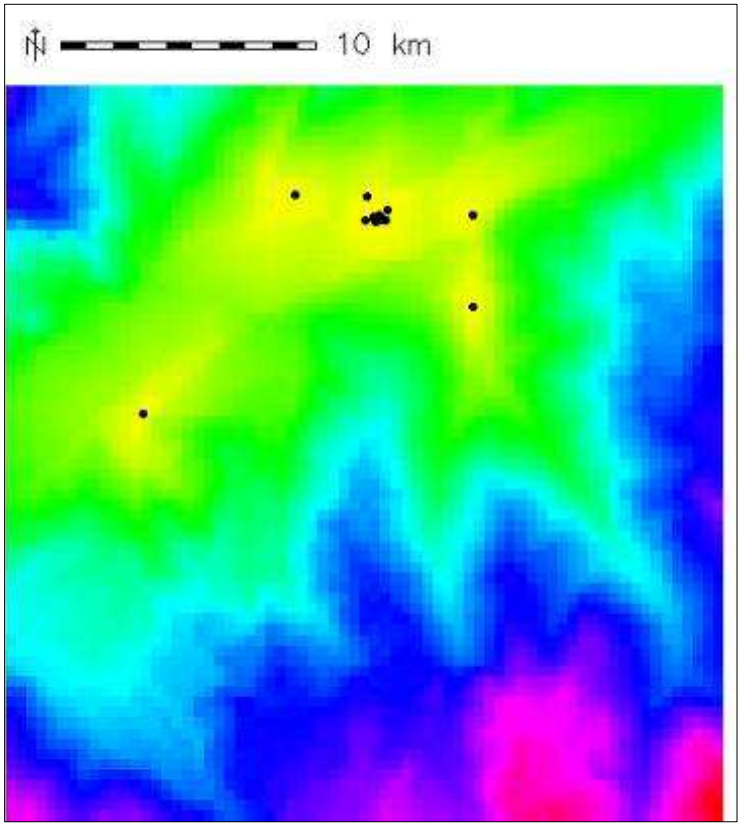
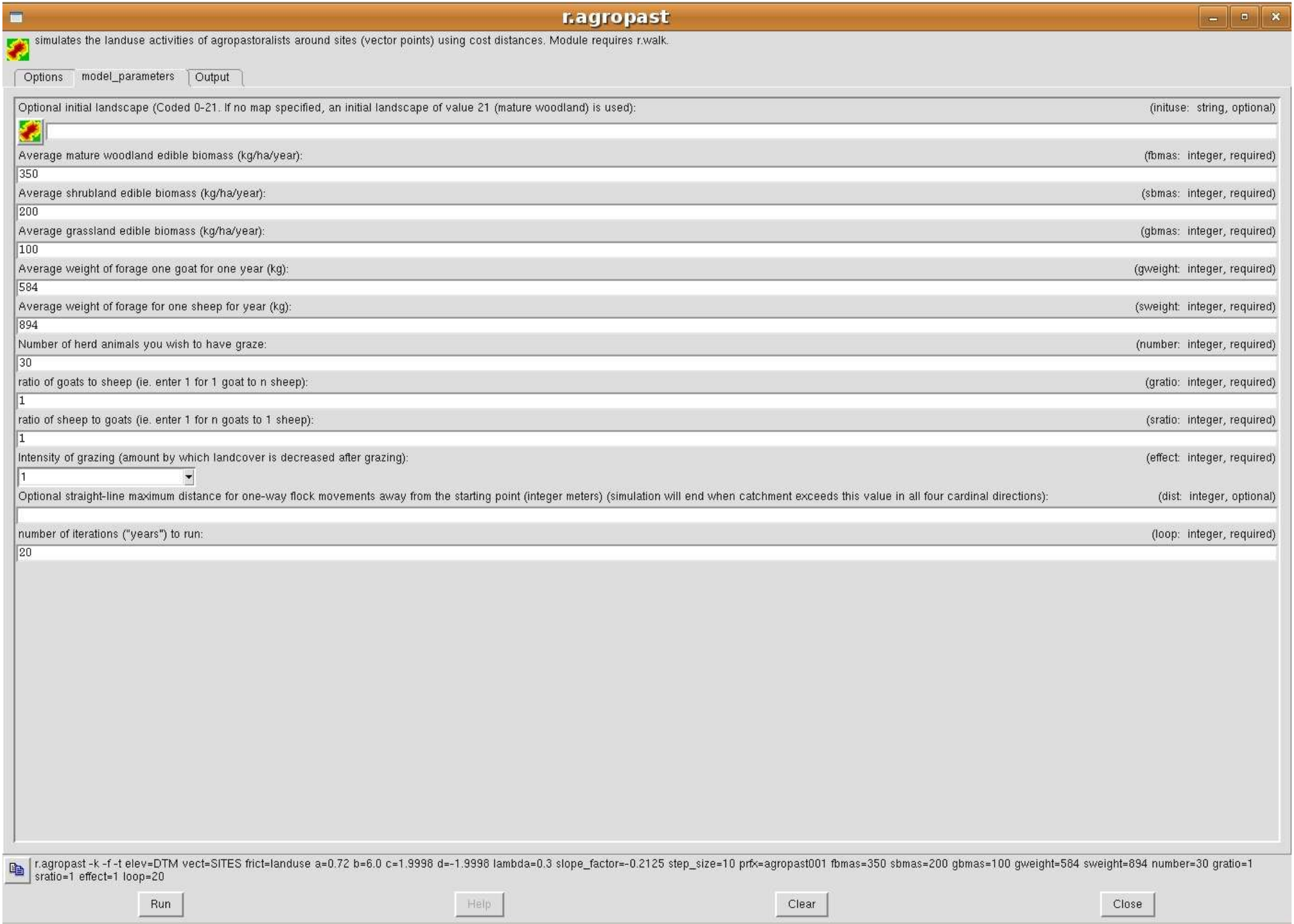
Simulation of landuse activities of agropastoralists around sites (vector points) using cost distances

```
GRASS 6.2.3 (Heremence):~ >r.agropast
elev=<dtm_file> vect=<points_file>
a=0.72 b=6.0 c=1.9998 d=-1.9998
lambda=0 slope_factor=-0.2125
step_size=10 prfx=<agropast_map>
fbmas=350 sbmas=200 gbmas=100
gweight=584 sweight=894 number=30
gratio=1 sratio=1 effect=1 loop=20
```



Test on Bronze and Iron Age sites

MODEL PARAMETERS



THANK YOU FOR YOUR ATTENTION!