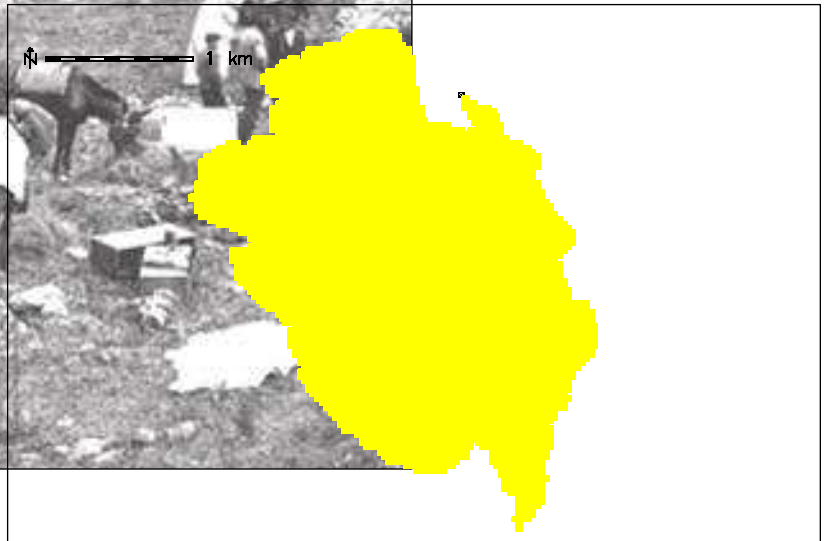
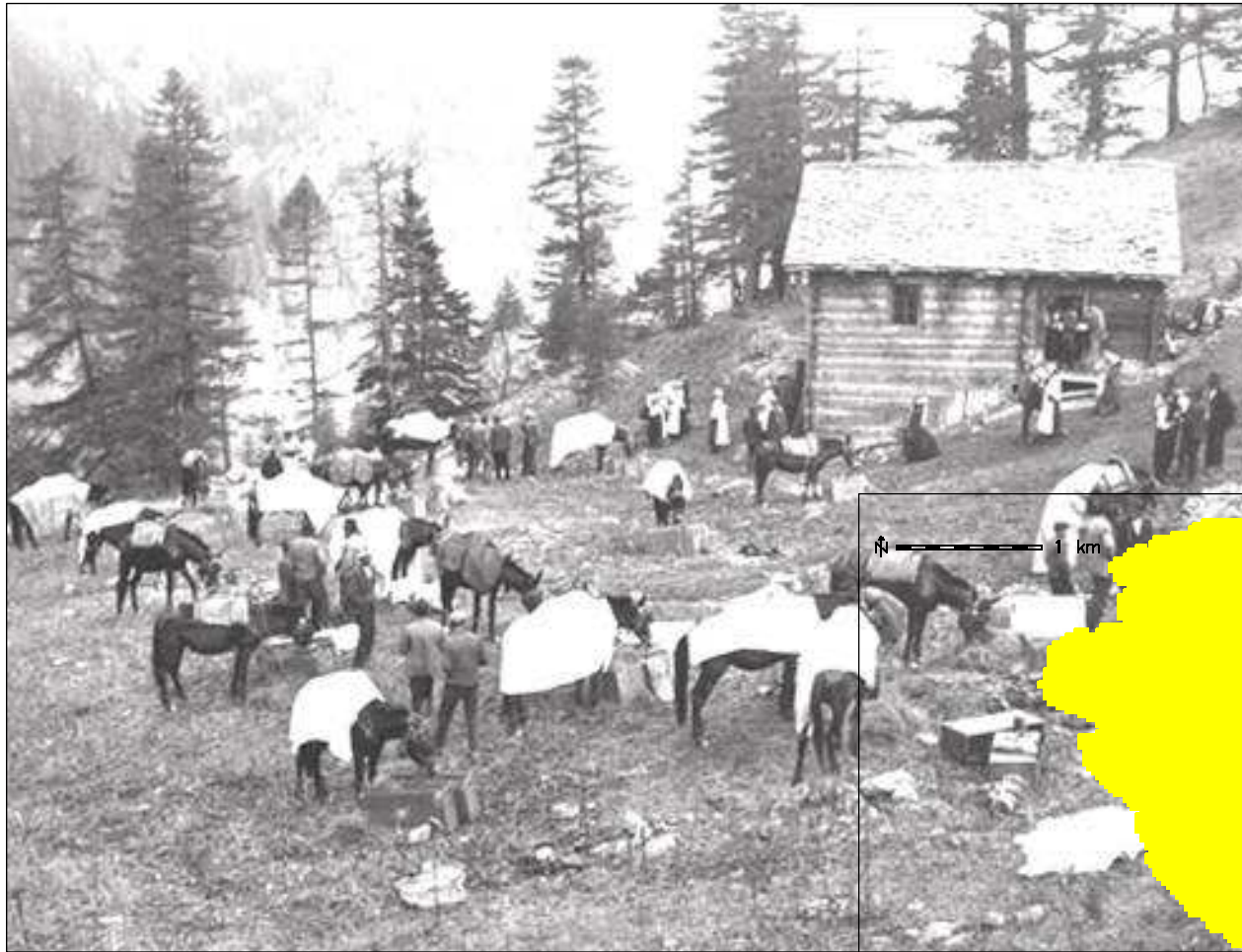


Model-building and research implications of an open source GRASS GIS approach:

Dealing with reliability and comparability of off-site landuse models



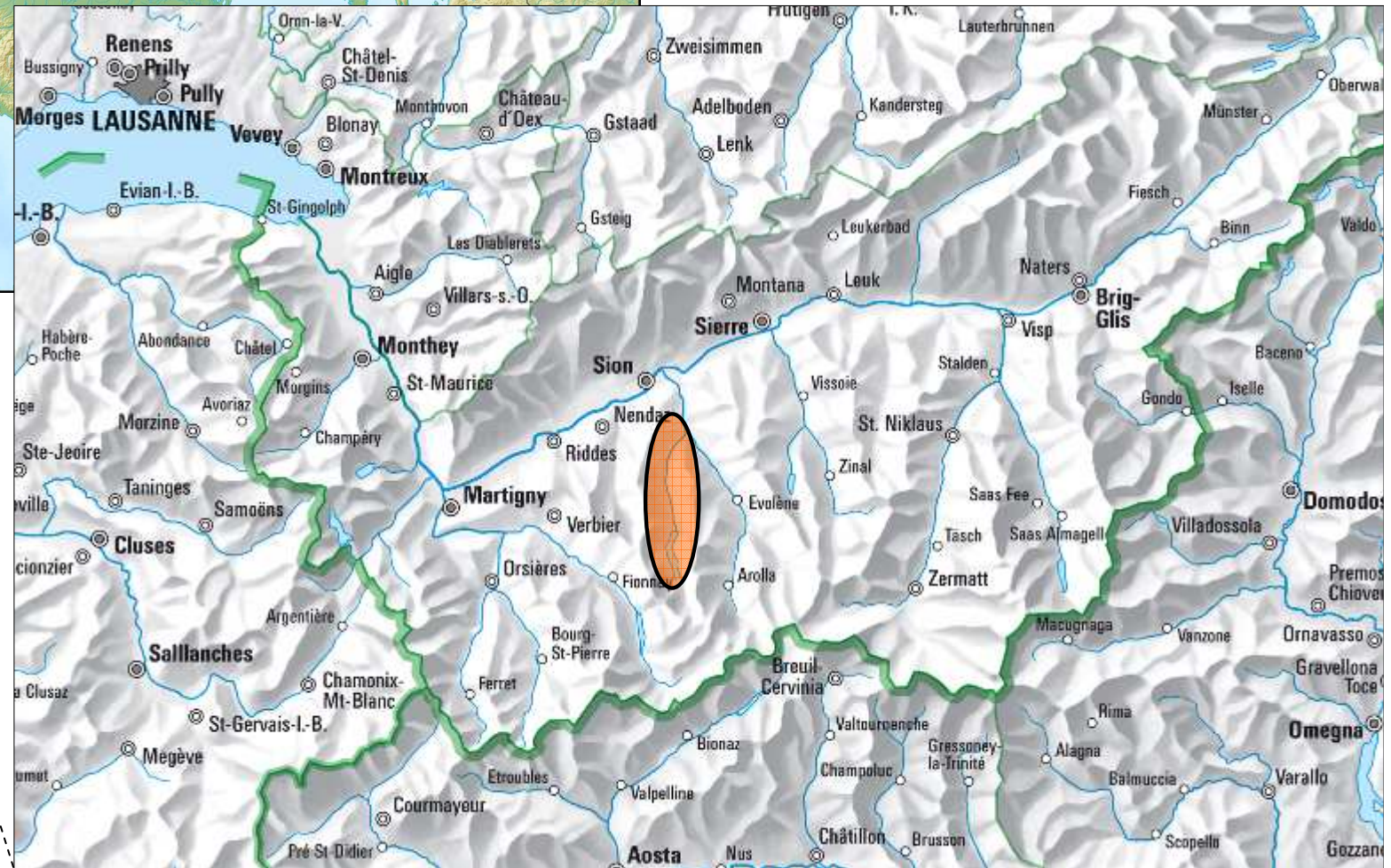
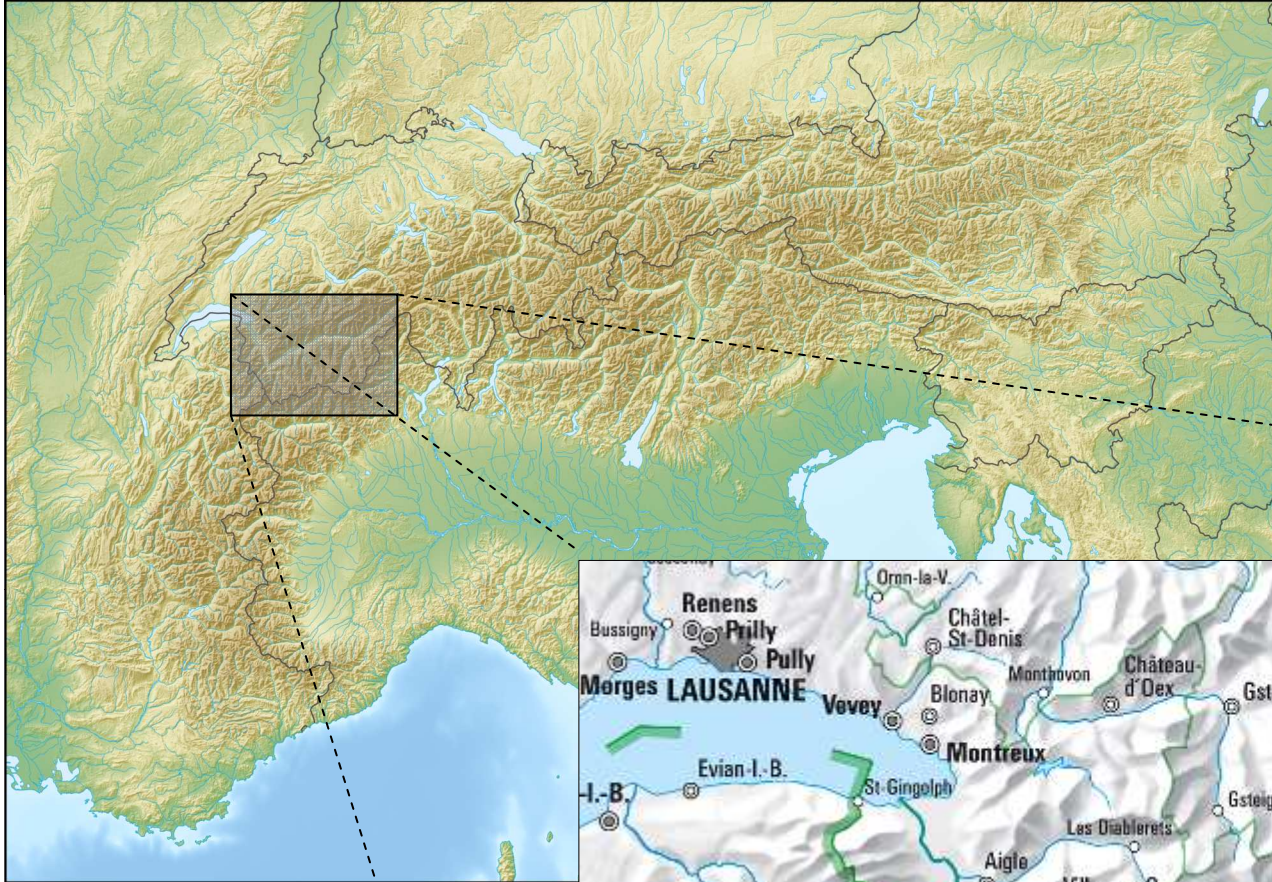
Silvia Polla

FU Berlin, Institute of Classical Archaeology

Computational Archaeology

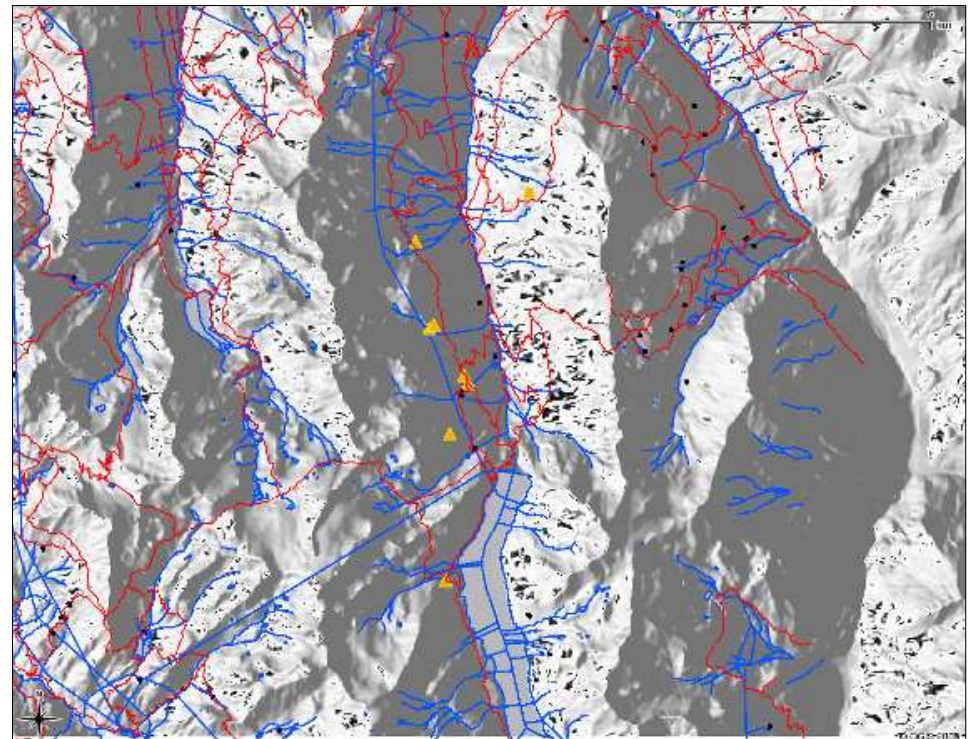
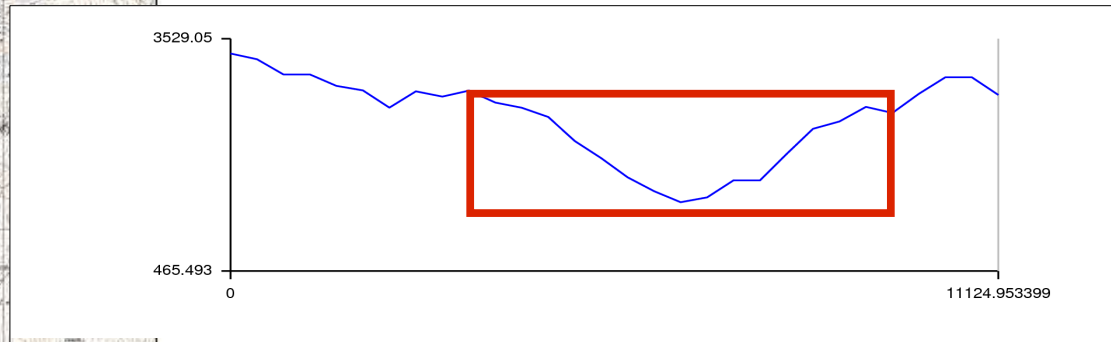
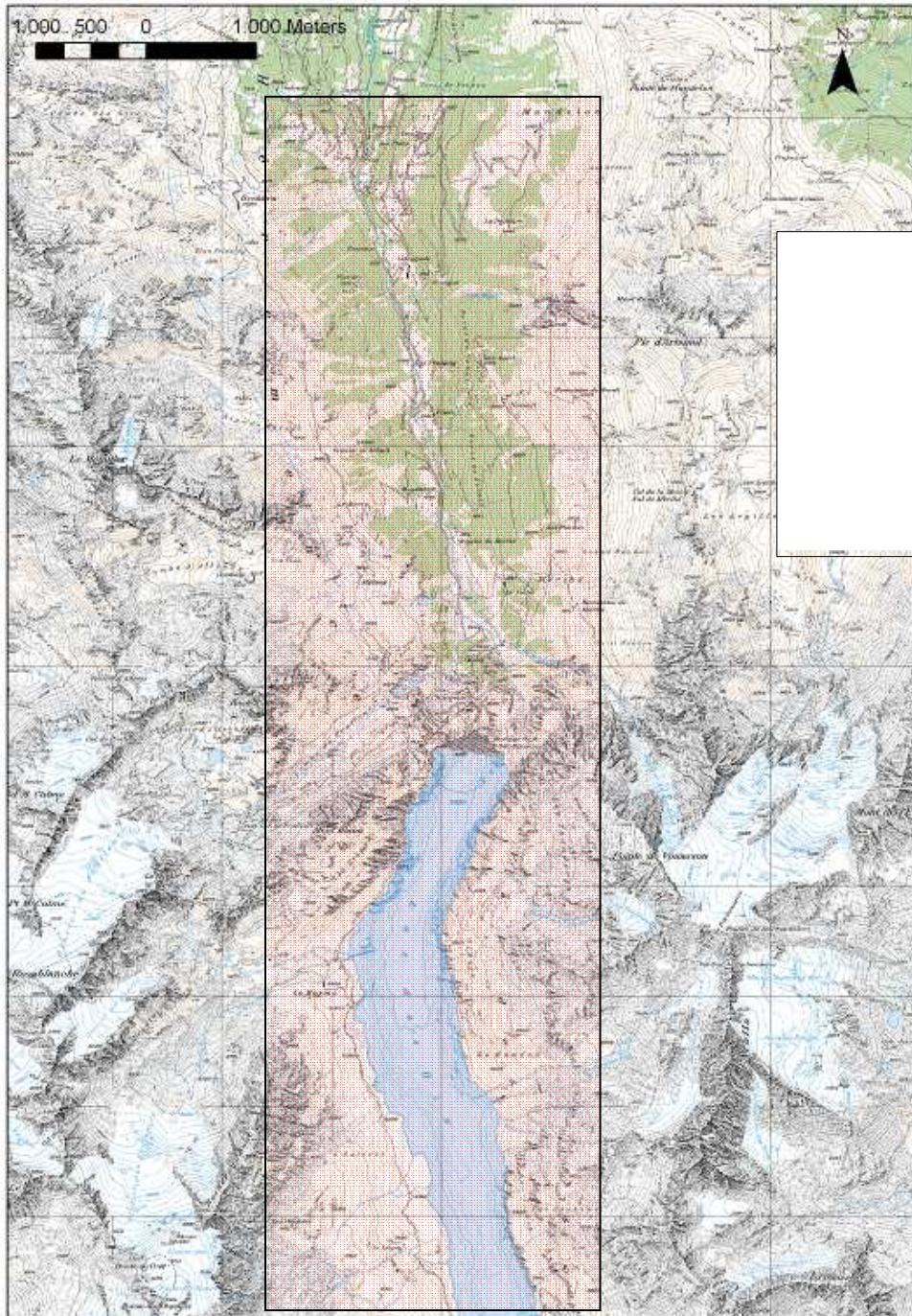
TOPOI, Excellence Cluster 264

**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)**

Map and profile of the transect

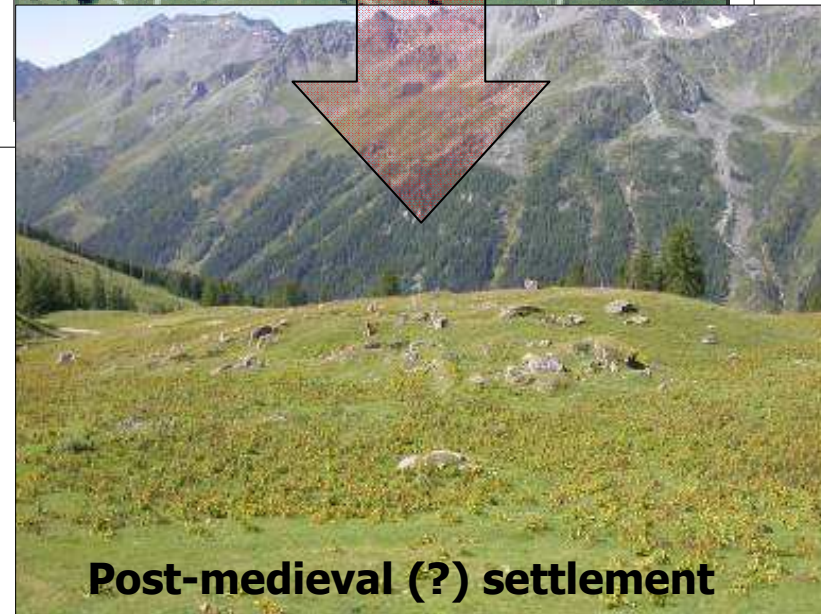
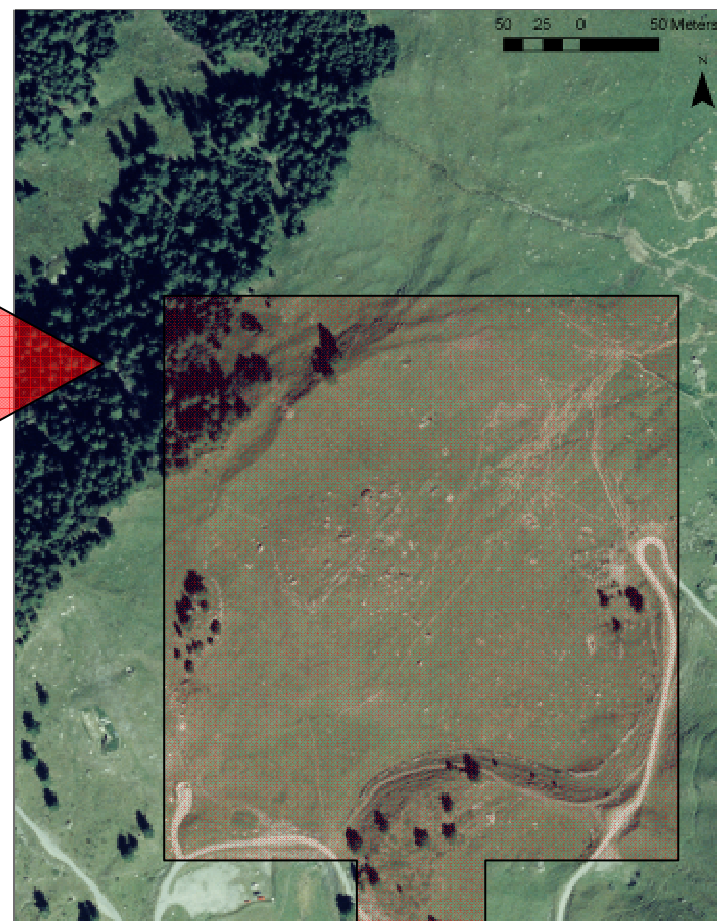
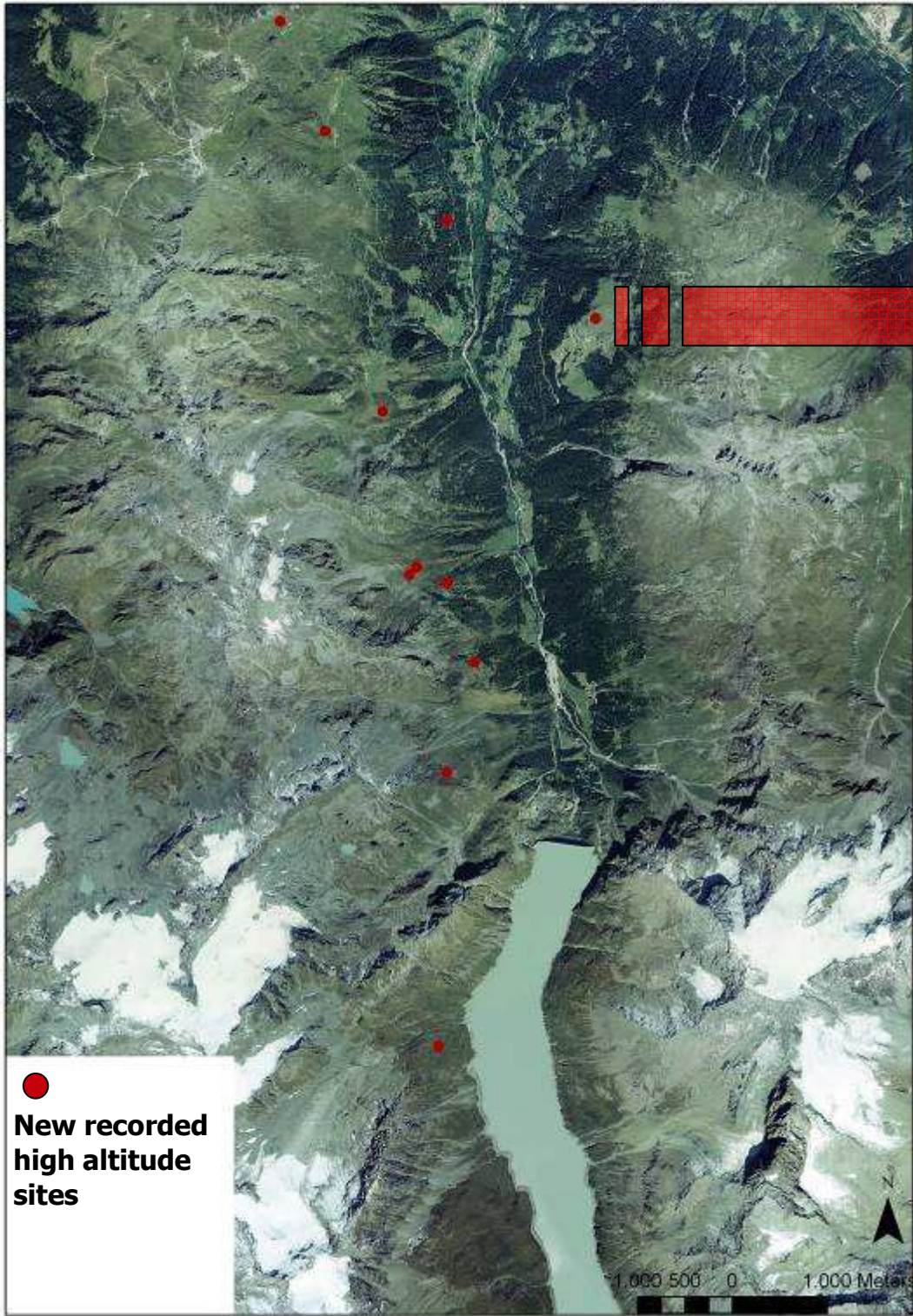


-Middle altitude multi-phase permanent agro-pastoral settlement (1)

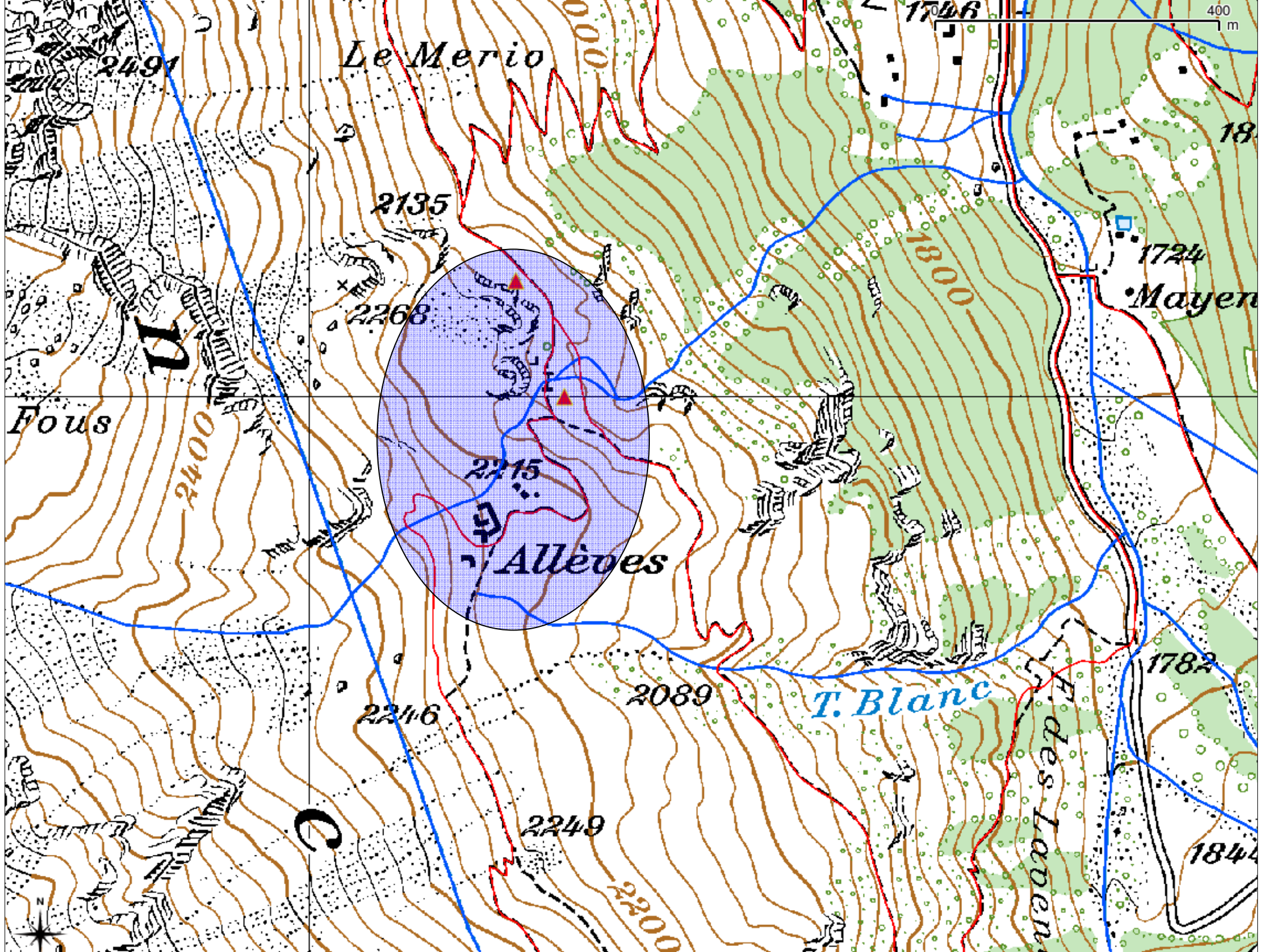
-High altitude seasonal pastoral post-medieval infrastructures (2)

-Transhumance-related paths (3)









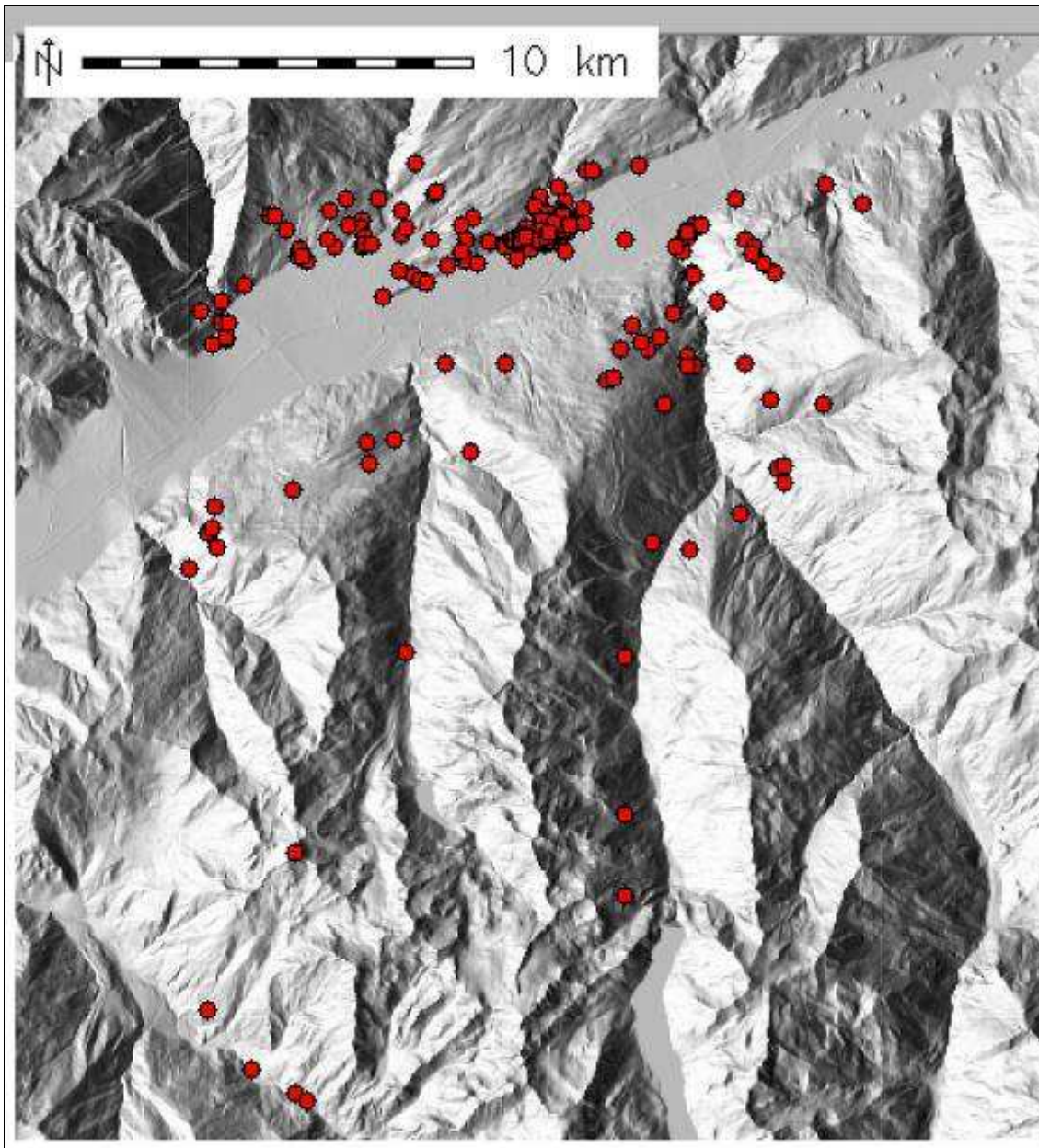
GIS-based modeling procedure

**RASTER-BASED MODEL:
COST SURFACES**

**SITE CATCHMENT
ANALYSIS**

**ITERATIVE SIMULATION
OF LANDUSE**

Building the raster model

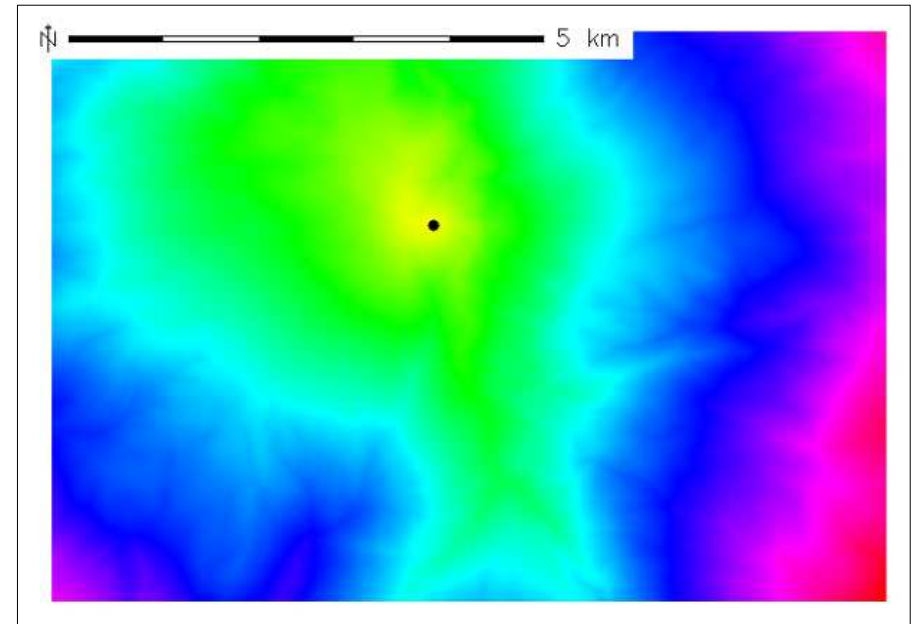


- Importing ASCII xyz files to raster;
- Extracting vector points from raster;
- Creating DTM using interpolation algorithm (RST)

***DTM-Shaded* and sample-sites**

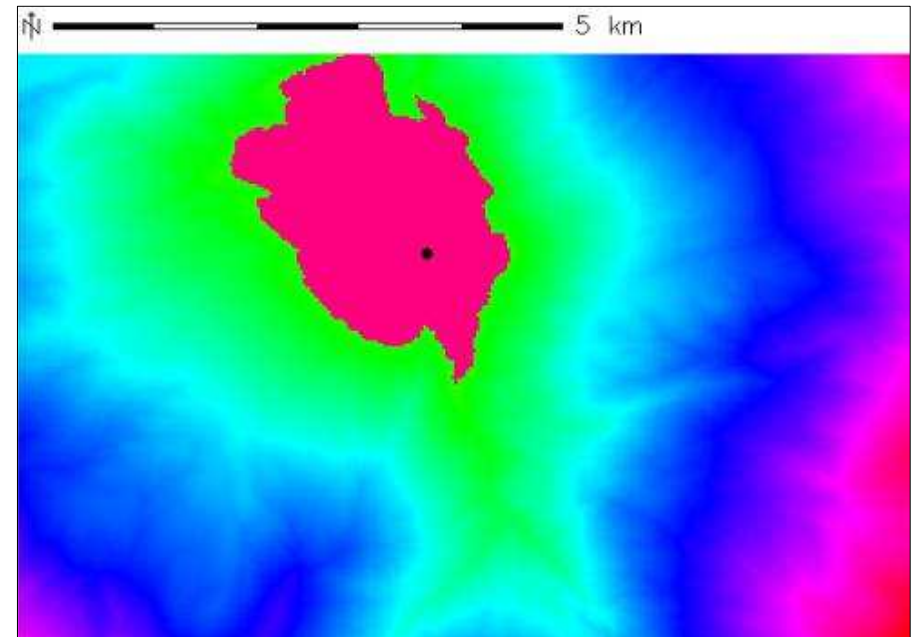
1) Topography- based ground-model Creating a cumulative cost surface from the site as vector point

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



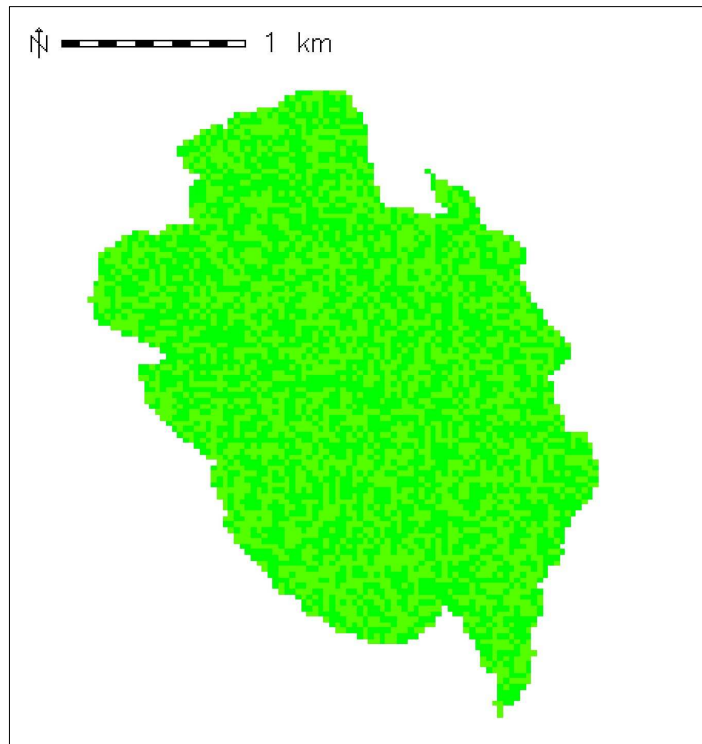
Modeling high mountain pastoral degree of exploitation

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

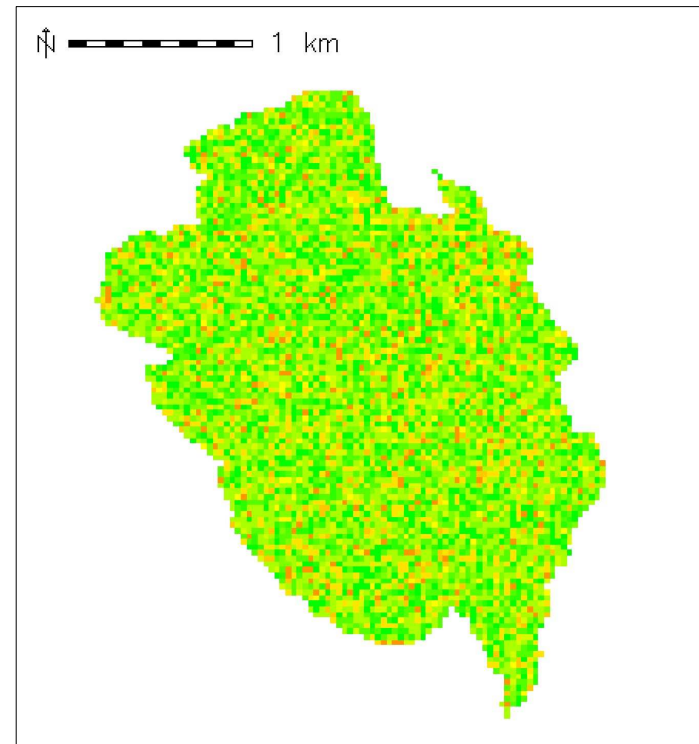
<http://trac.osgeo.org/grass/browser/grass-addons/LandDyn>

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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*:

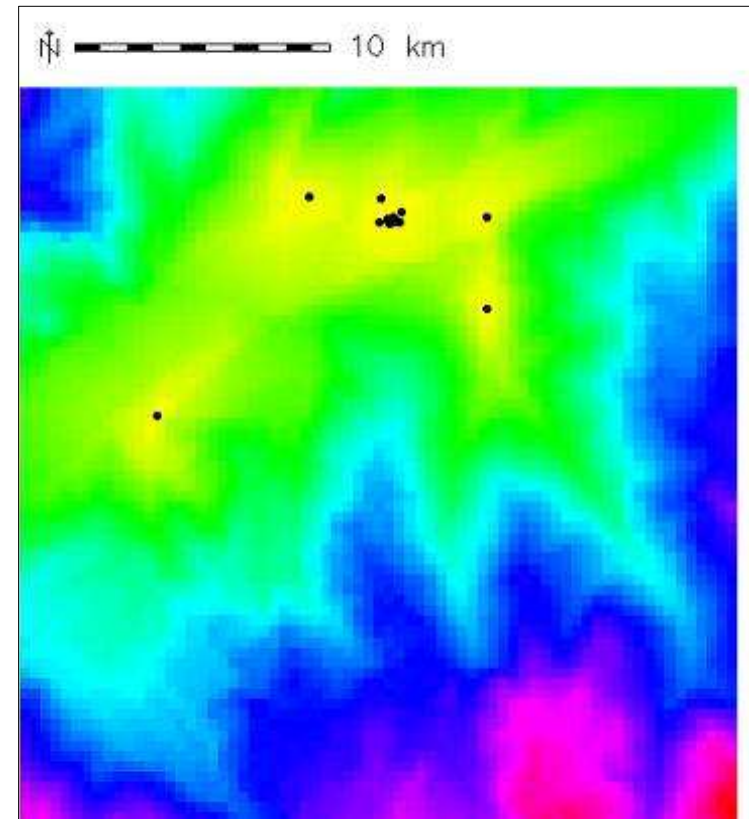
<http://trac.osgeo.org/grass/browser/grass-addons/LandDyn>

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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

r.agropast



simulates the landuse activities of agropastoralists around sites (vector points) using cost distances. Module requires r.walk.

Options model_parameters Output

Optional initial landscape (Coded 0-21. If no map specified, an initial landscape of value 21 (mature woodland) is used):	(inituse: string, optional)
	
Average mature woodland edible biomass (kg/ha/year):	(fbmas: integer, required)
350	
Average shrubland edible biomass (kg/ha/year):	(sbmas: integer, required)
200	
Average grassland edible biomass (kg/ha/year):	(gbmas: integer, required)
100	
Average weight of forage one goat for one year (kg):	(gweight: integer, required)
584	
Average weight of forage for one sheep for year (kg):	(sweight: integer, required)
894	
Number of herd animals you wish to have graze:	(number: integer, required)
30	
ratio of goats to sheep (ie. enter 1 for 1 goat to n sheep):	(gratio: integer, required)
1	
ratio of sheep to goats (ie. enter 1 for n goats to 1 sheep):	(sratio: integer, required)
1	
Intensity of grazing (amount by which landcover is decreased after grazing):	(effect: integer, required)
1	
Optional straight-line maximum distance for one-way flock movements away from the starting point (integer meters) (simulation will end when catchment exceeds this value in all four cardinal directions):	(dist: integer, optional)
number of iterations ("years") to run:	(loop: integer, required)
20	

r.agropast -k -f -l elev=DTM vect=SITES frict=landuse a=0.72 b=6.0 c=1.9998 d=-1.9998 lambda=0.3 slope_factor=-0.2125 step_size=10 prfx=agropast001 fbmas=350 sbmas=200 gbmas=100 gweight=584 sweight=894 number=30 gratio=1 sratio=1 effect=1 loop=20

Run

Help

Clear

Close

THANK YOU FOR YOUR ATTENTION!