

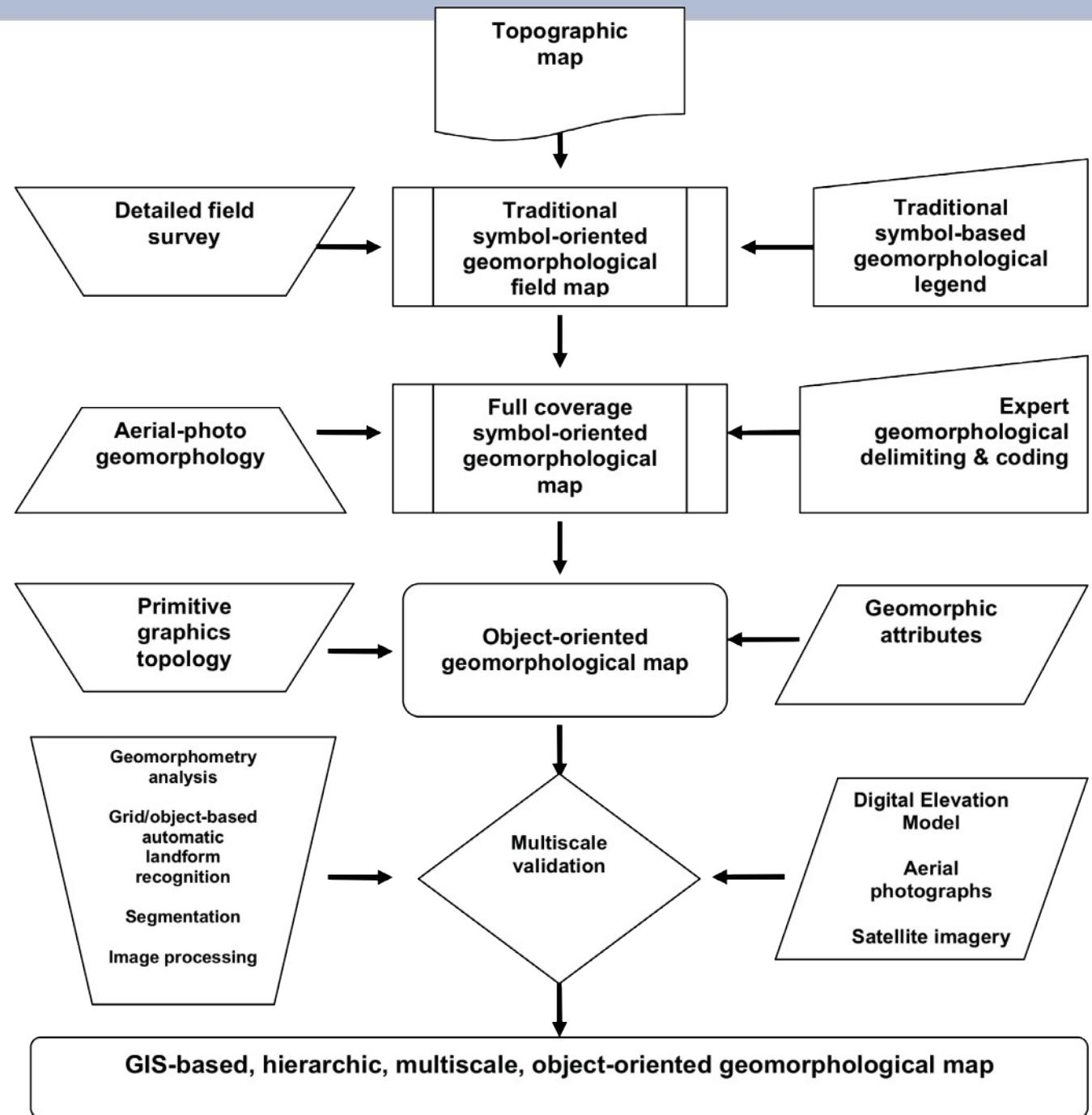
Geomorphological mapping

Work flow

Plan

1. Work flow for geomorphological mapping
 - Field mapping
 - Computer mapping
2. Digital data for GM
3. GIS and GM
4. Case study

Work-flow for GM



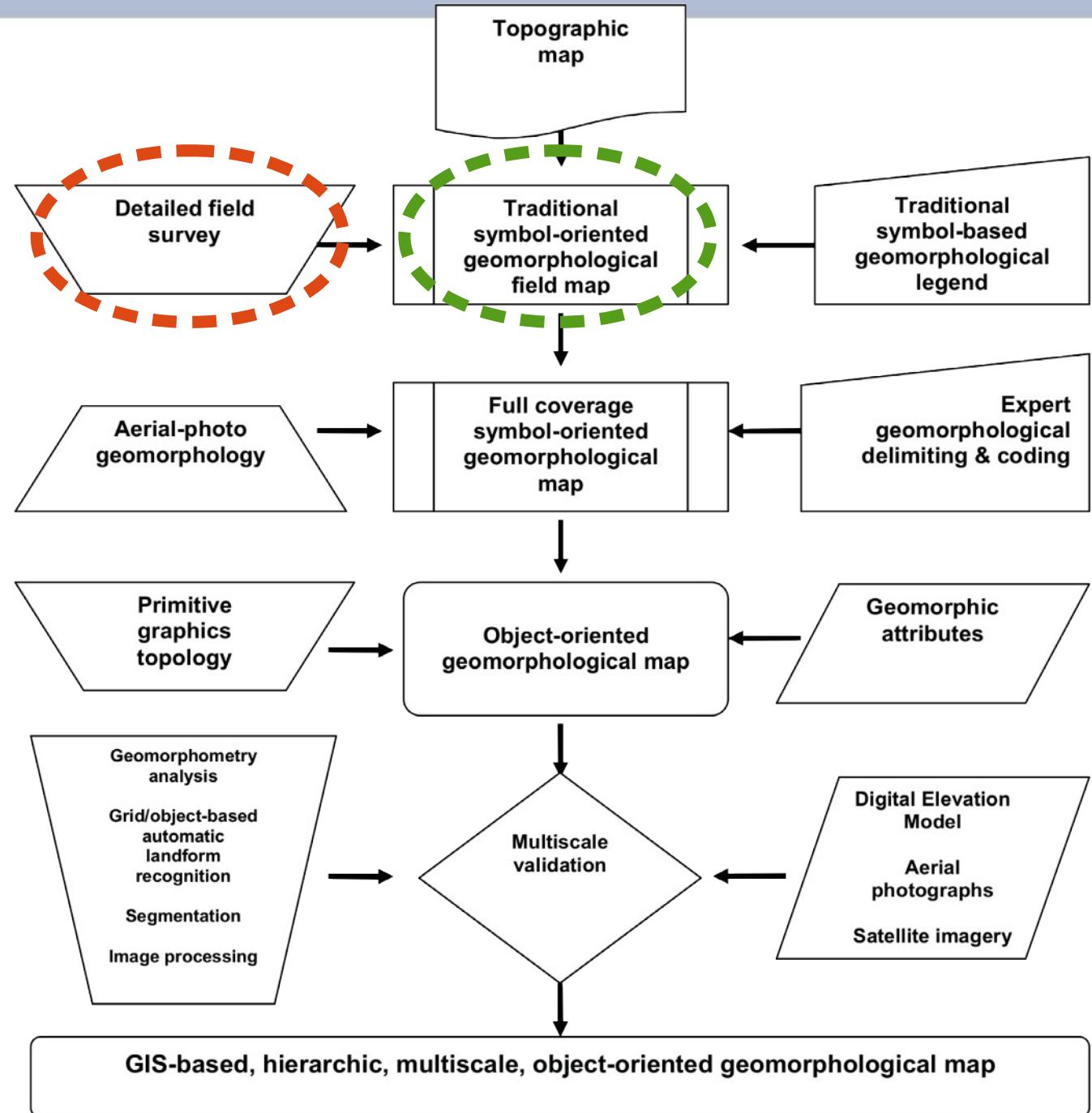
Field mapping

For large-scale GM, field survey is essential:

- To get information on lithology and granulometry
- To discover hidden landforms or detail morphologies
- To check the interpretation of older maps or digital data

Work-flow for GM

Field survey



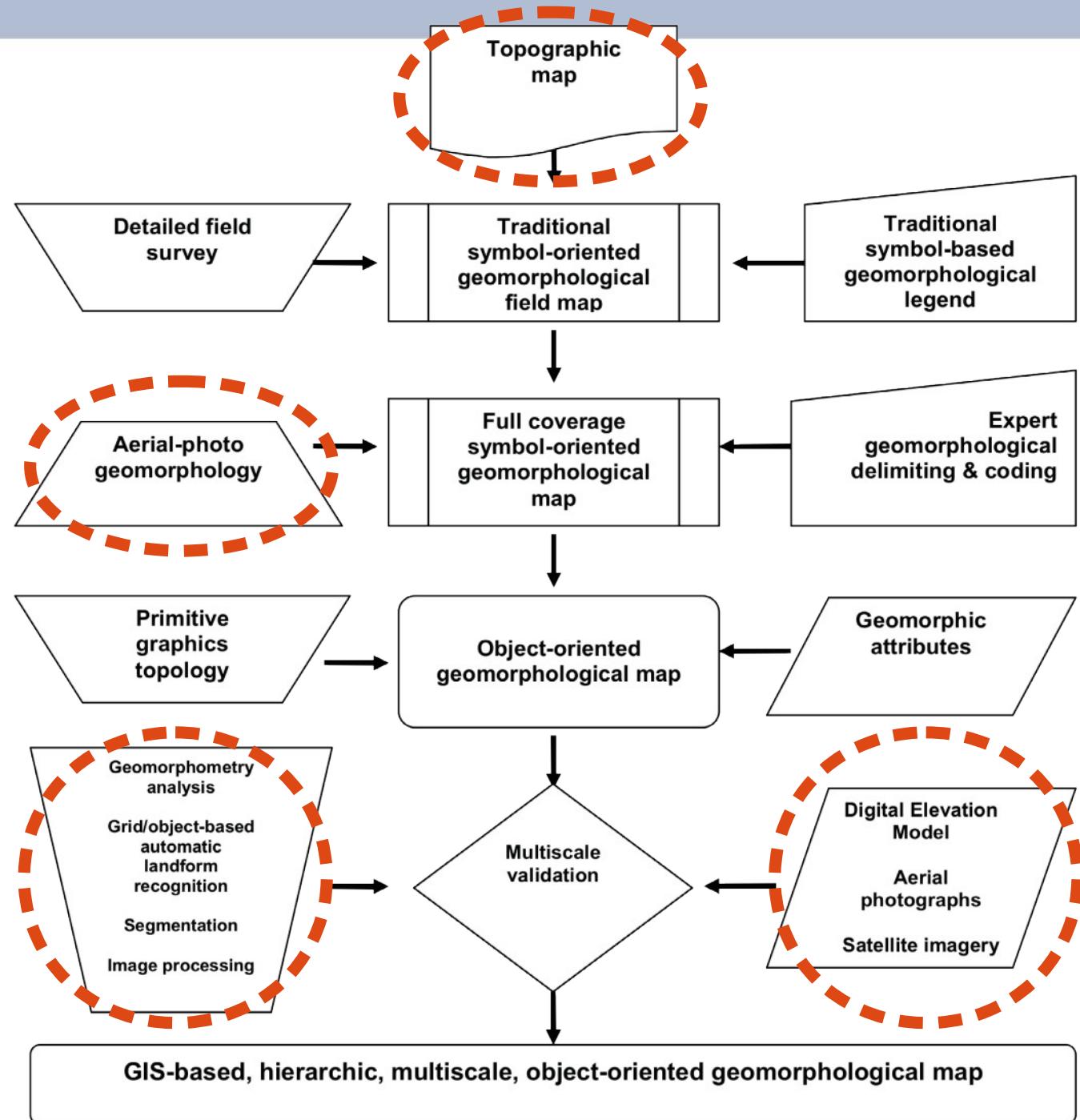
Computer mapping on digital data

Large-scale GM is mostly based on systematic field survey, but the interpretation of digital data should be a supporting tool:

- To set up the geomorphological framework of the area
- To check the correct cartographic design of the features mapped on the field
- To perform the final revision of the field-based GM

Work-flow for GM

Digital data



Computer mapping on digital data

GPS is used for field data collection: cartography of landforms (e.g. Mobile Mapper) or displacement data (with differential GPS)

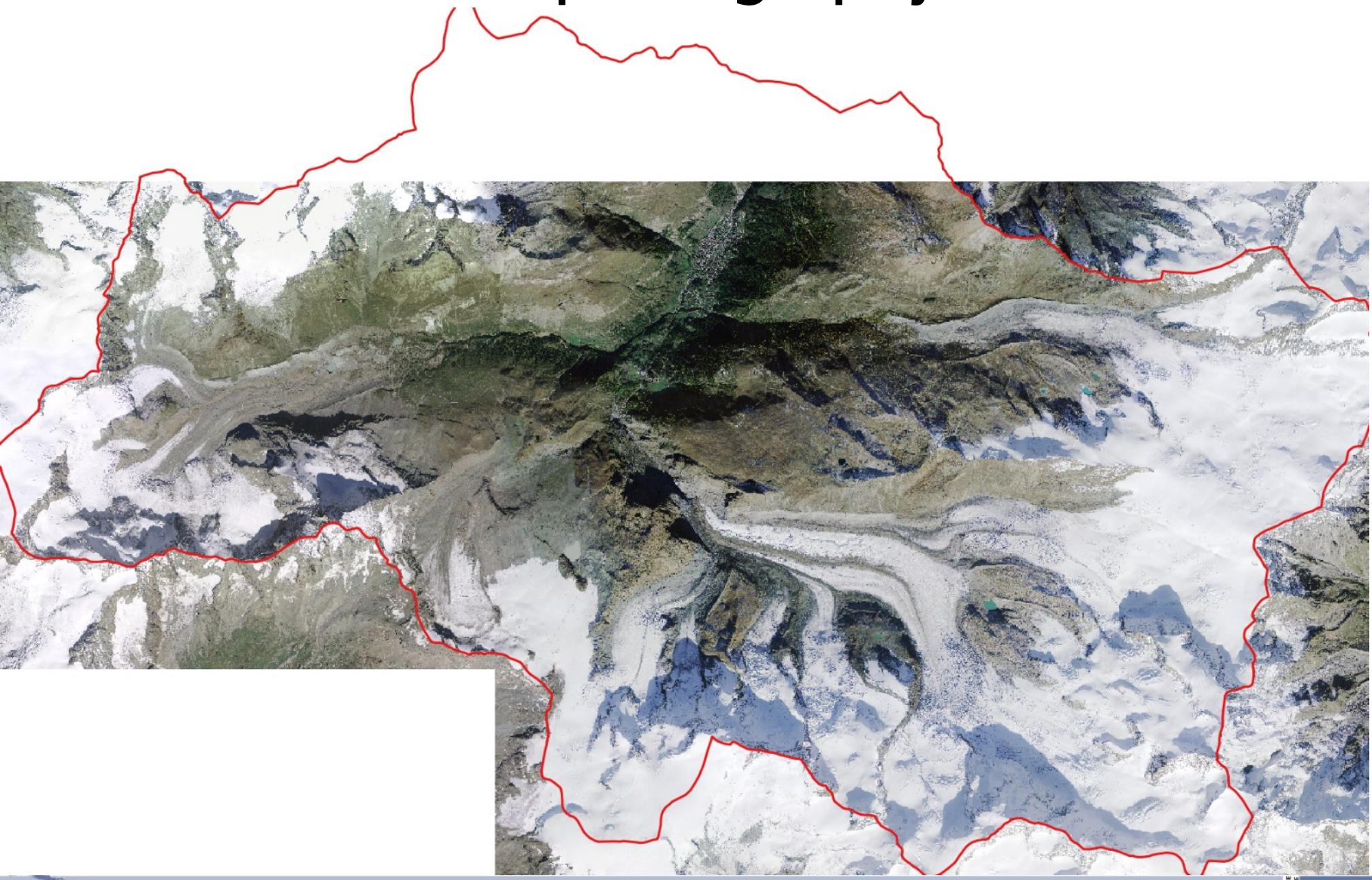
Satellite imagery for small- and medium-scale maps (GeoEye-1: 0.5m resolution!), **aerial photography** for larger scales.

Since the 1970s, geomorphological mapping is obsolete without aerial and satellite imagery.

Digital elevation model (DEM) for 3D visualization and morphometric analysis (slope, slope aspect, breaks, roughness). Two high-resolution DEMs can be also used for the calculation of displacement and deformation rates.

DEMs are sometimes used for automatic GM.

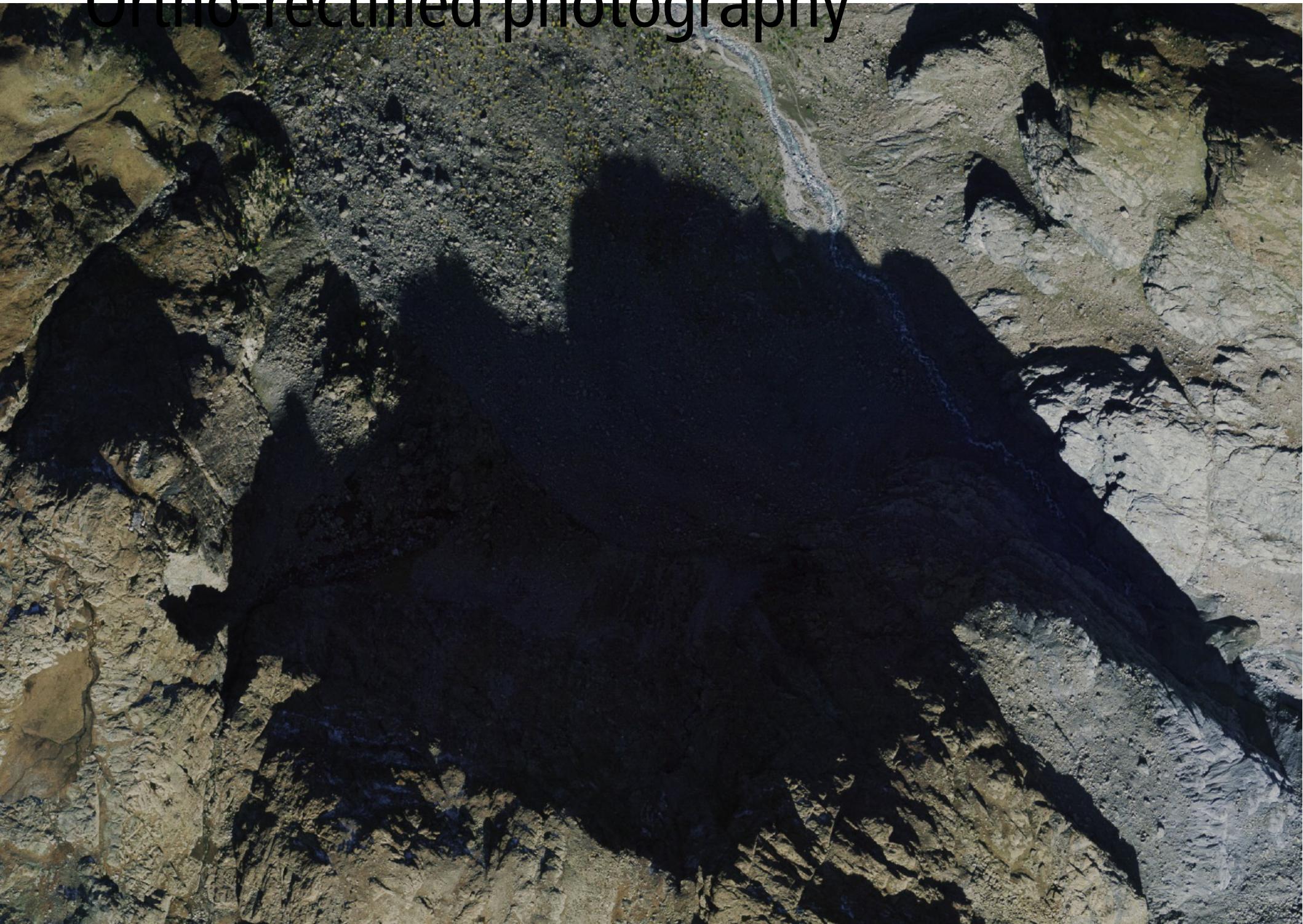
Ortho-rectified photography



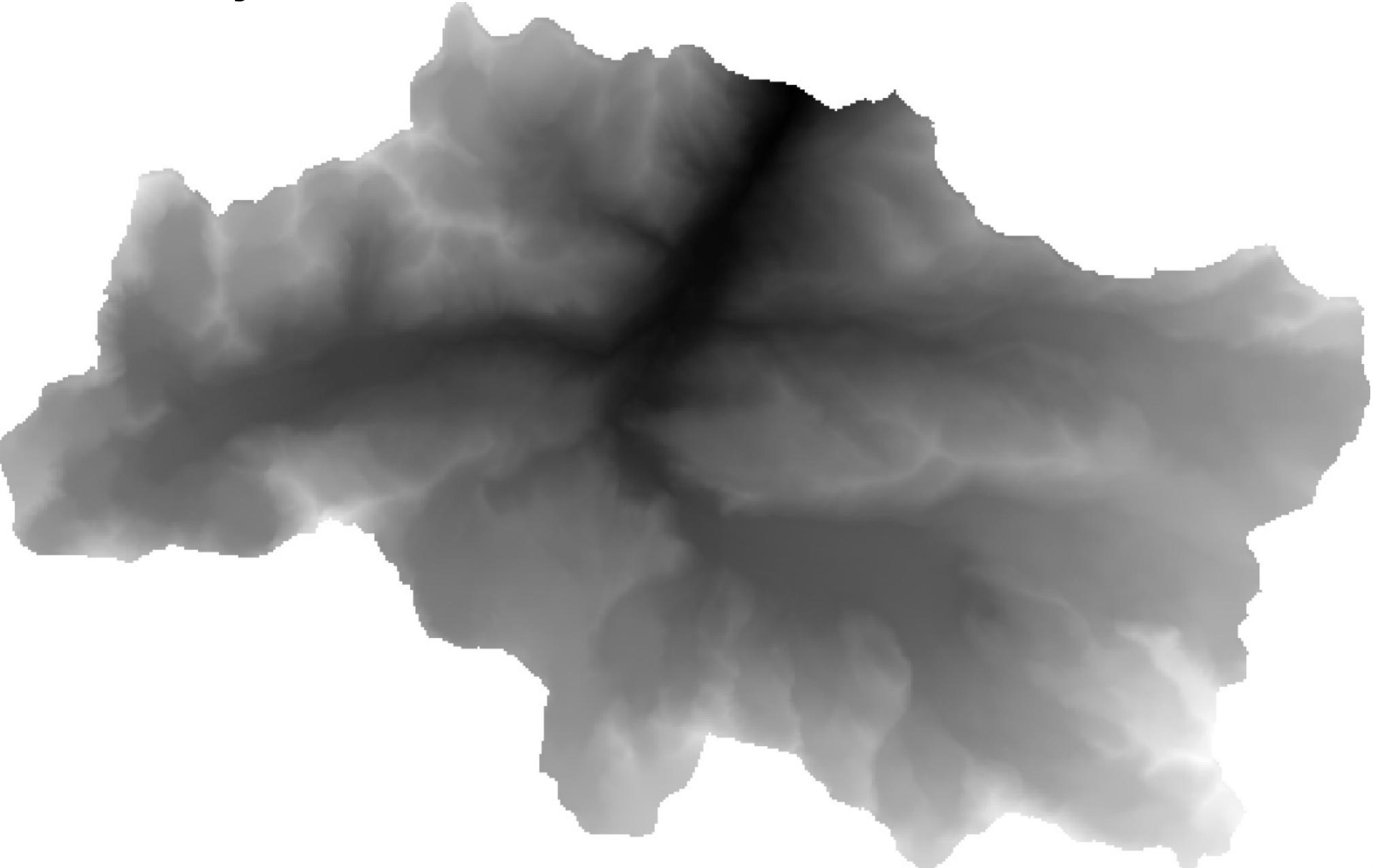
Ortho-rectified photography



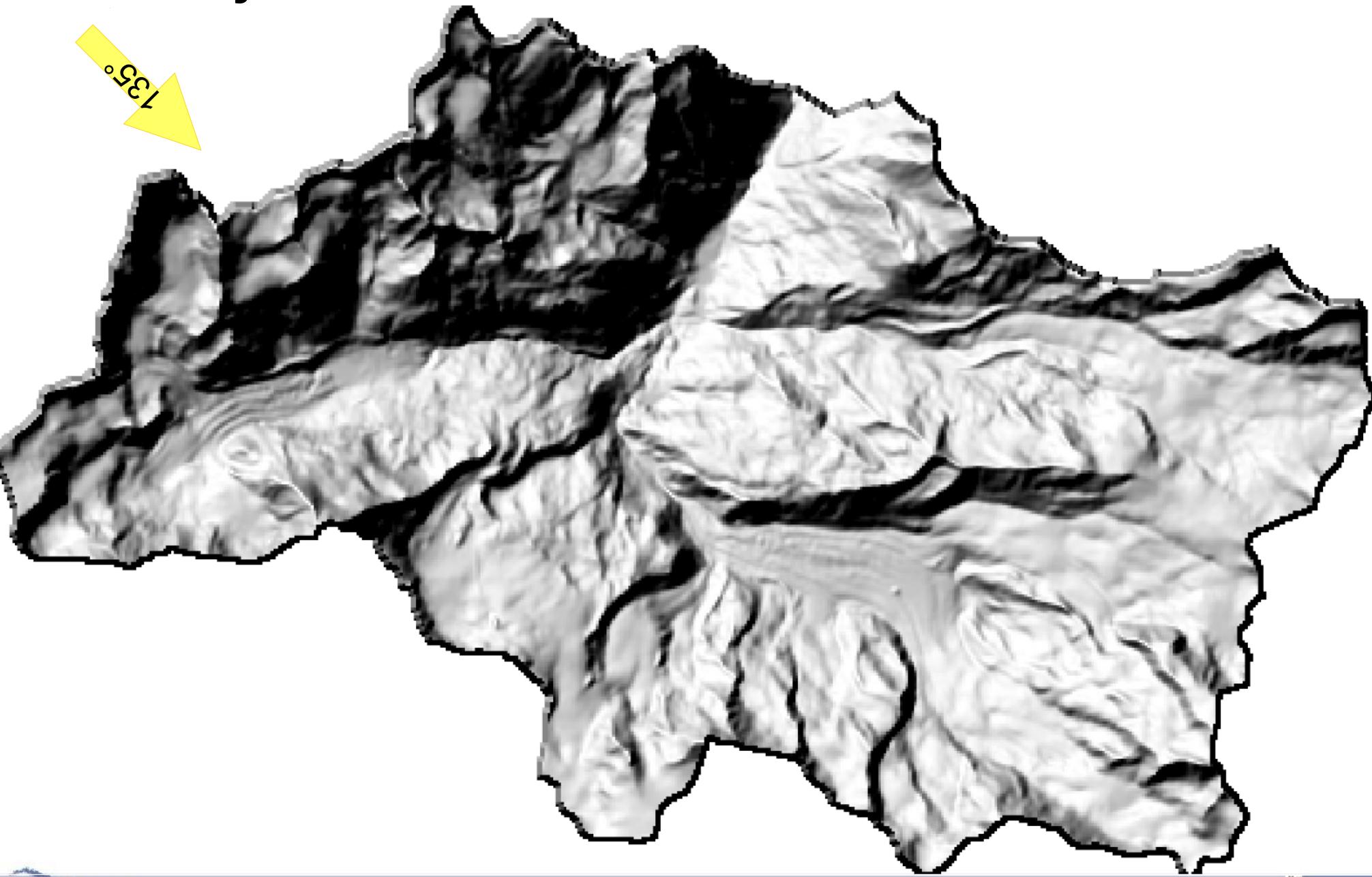
Ortho-rectified photography



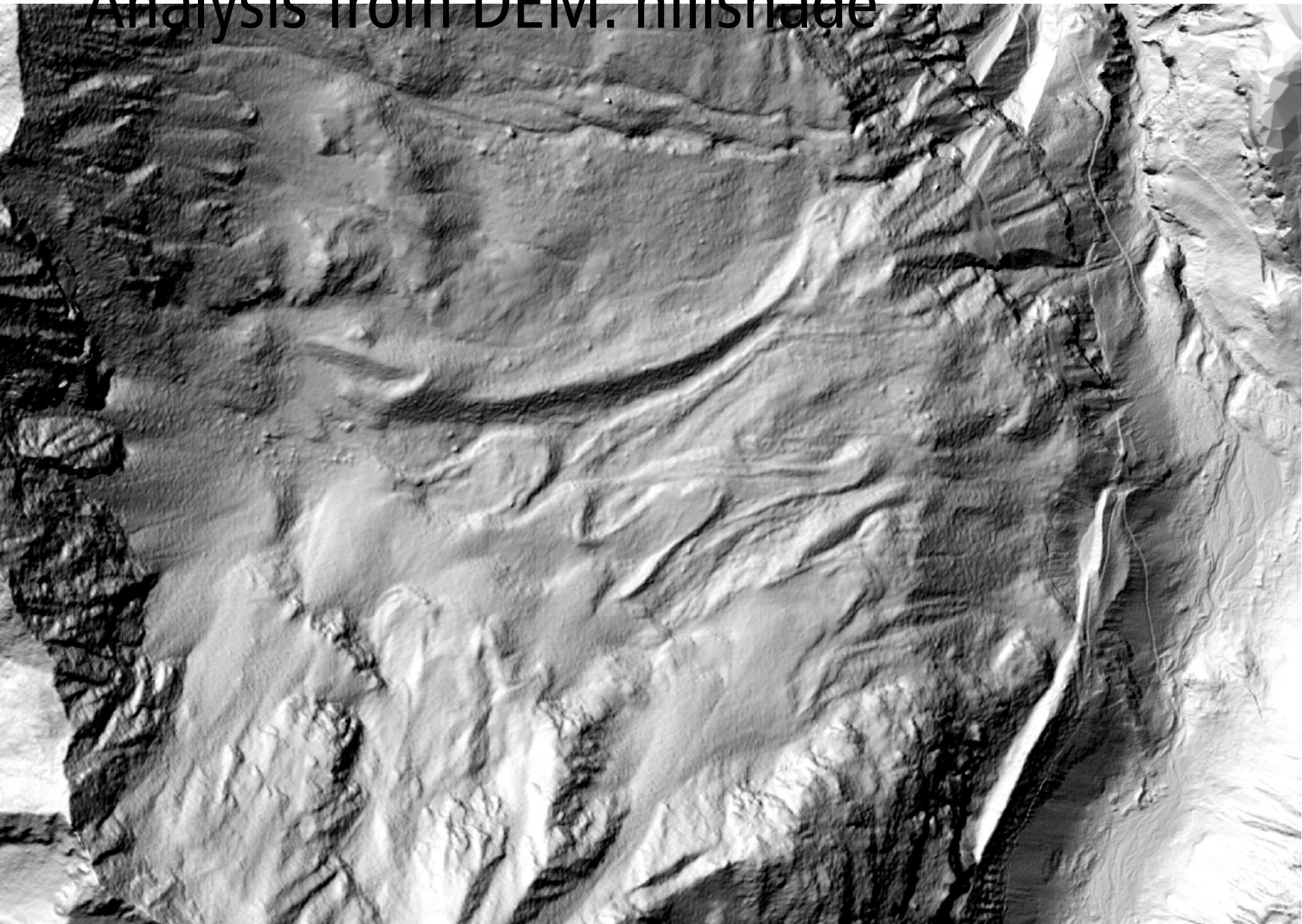
Analysis from DEM



Analysis from DEM: hillshade



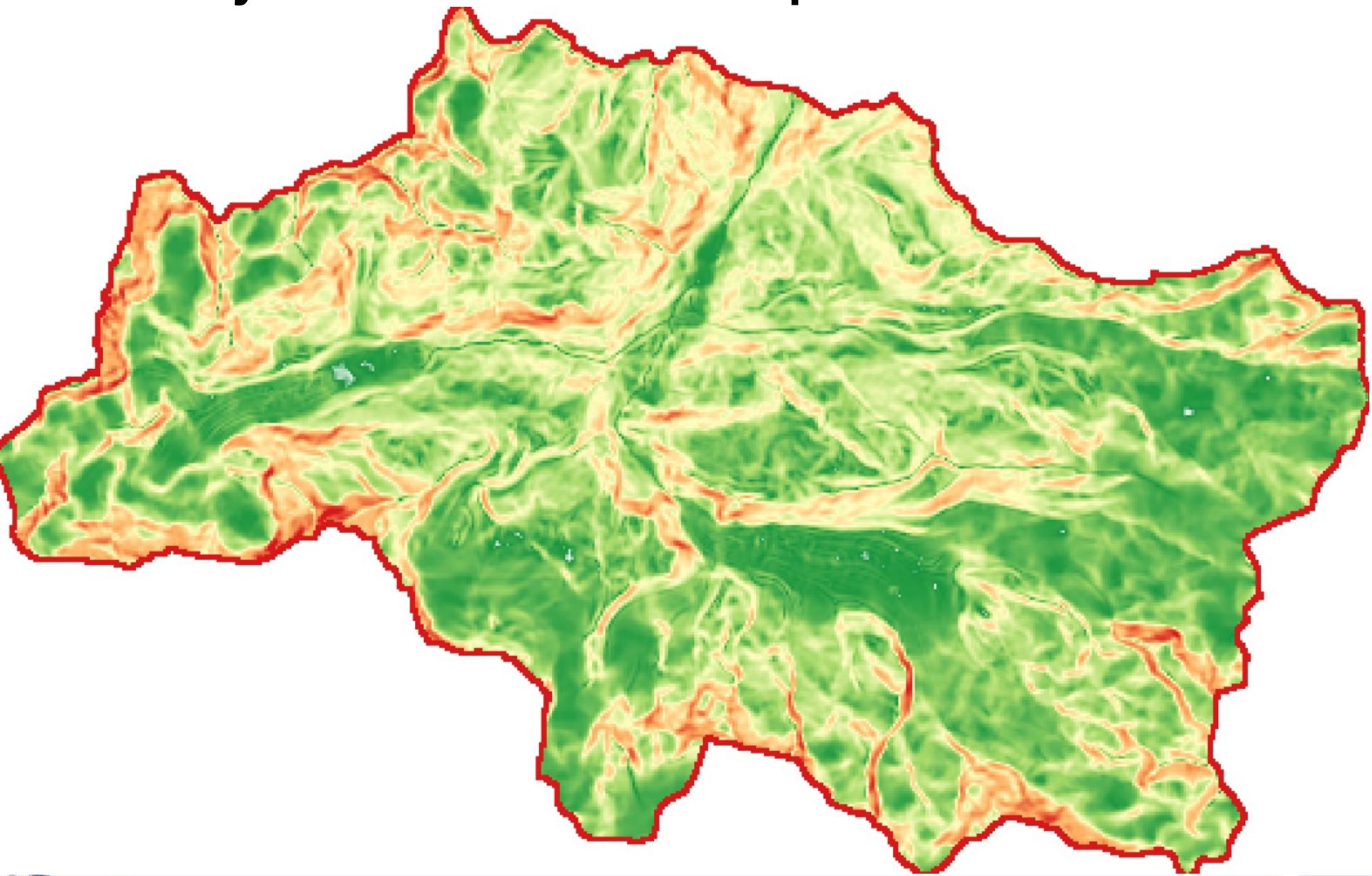
Analysis from DEM: hillshade



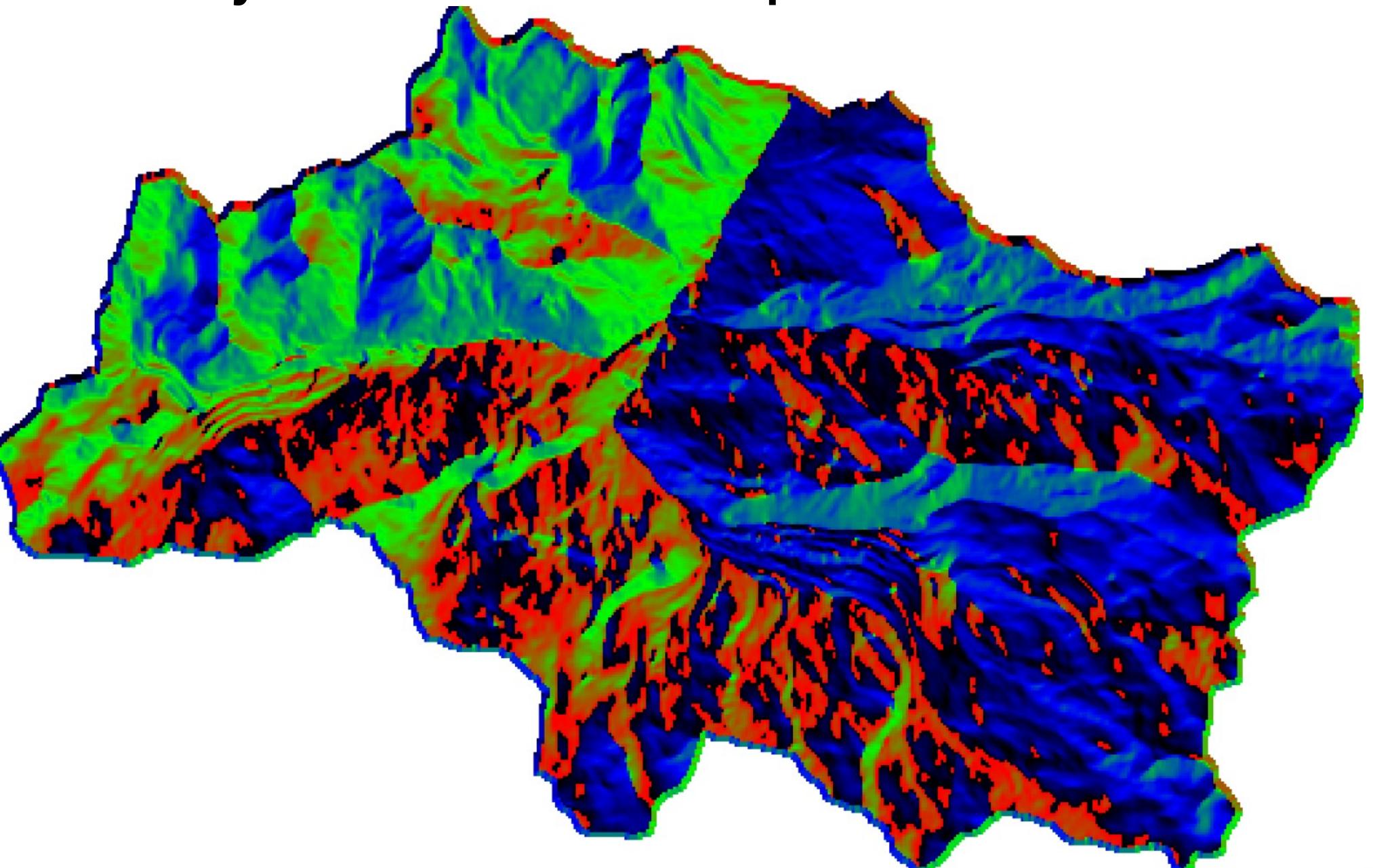
Analysis from DEM: hillshade



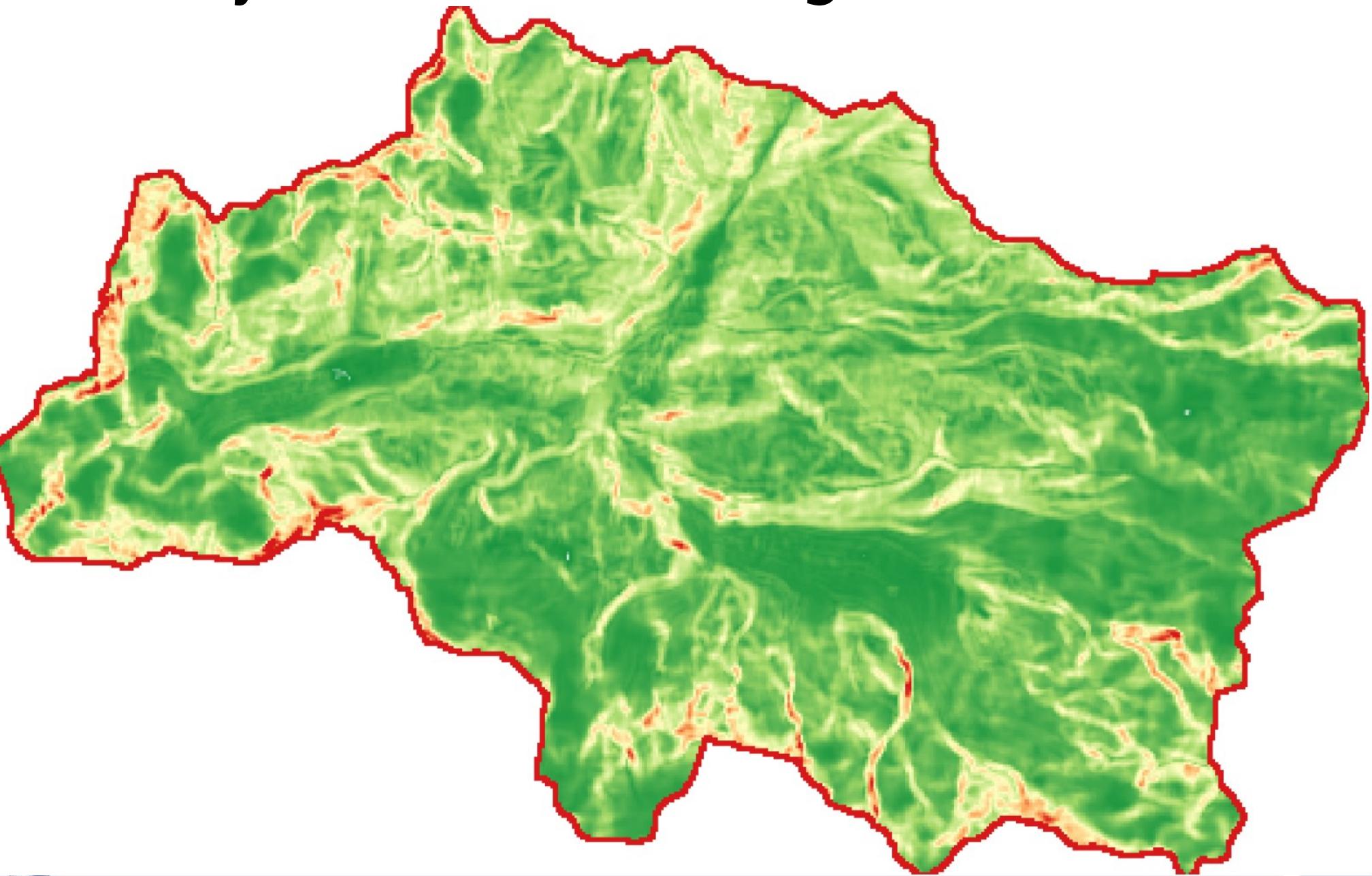
Analysis from DEM: slope



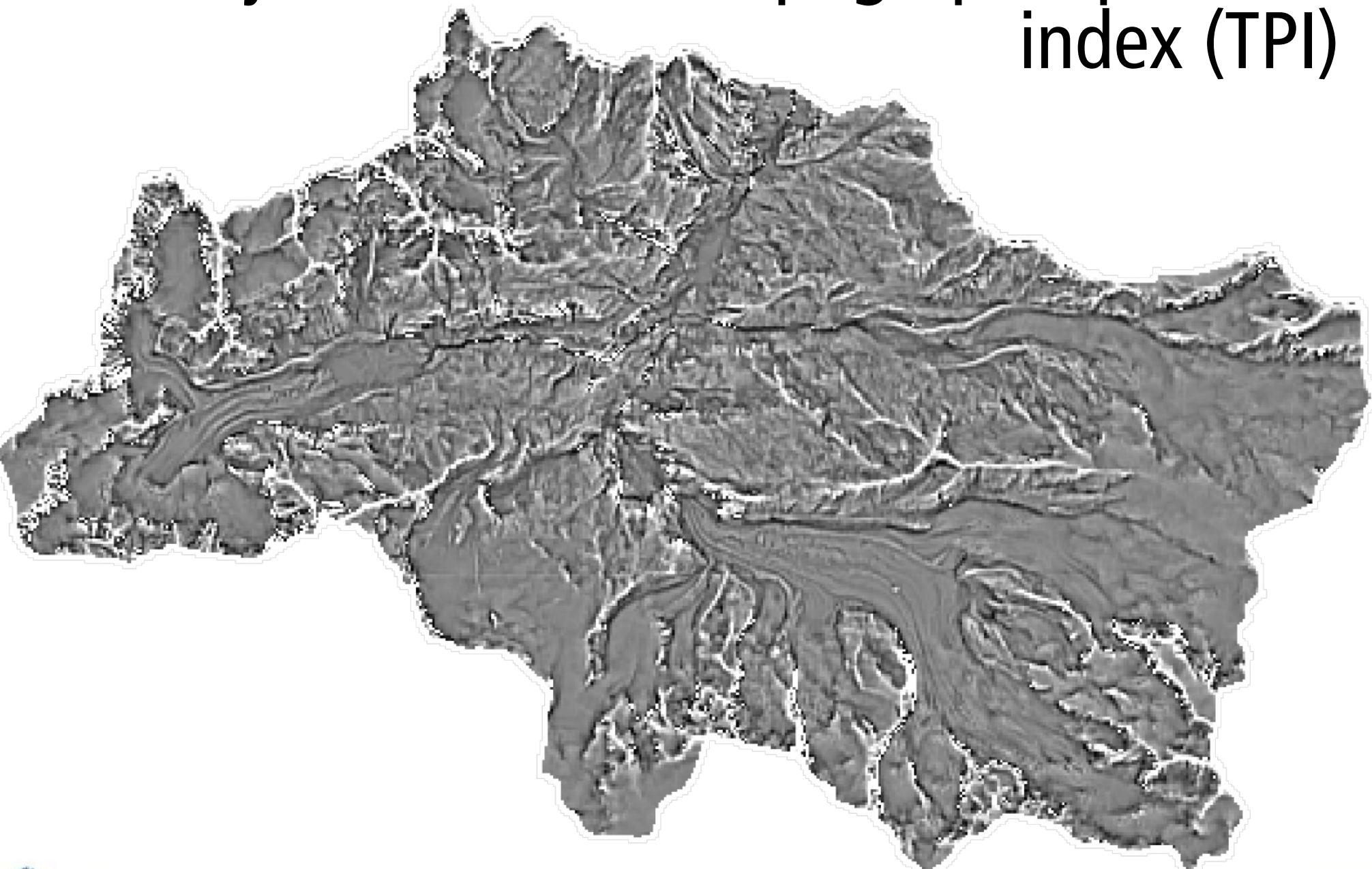
Analysis from DEM: aspect



Analysis from DEM: roughness



Analysis from DEM: topographic position index (TPI)



Analysis from DEM: example

Ewertowski &
Rzeszewski, 2006

06.2016

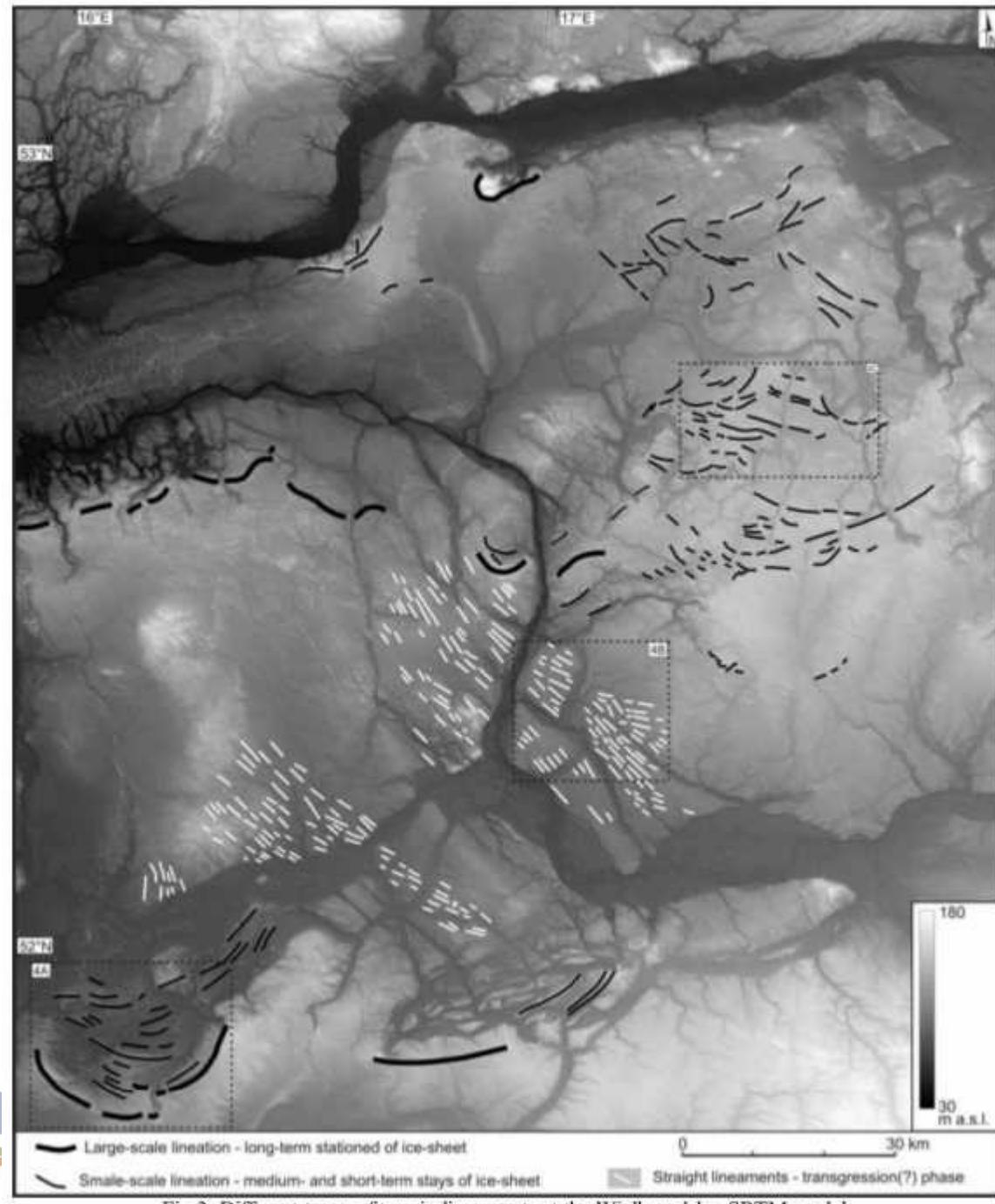


Fig.3. Different types of terrain lineaments at the Wielkopolska. SRTM model.

Analysis from DEM: example

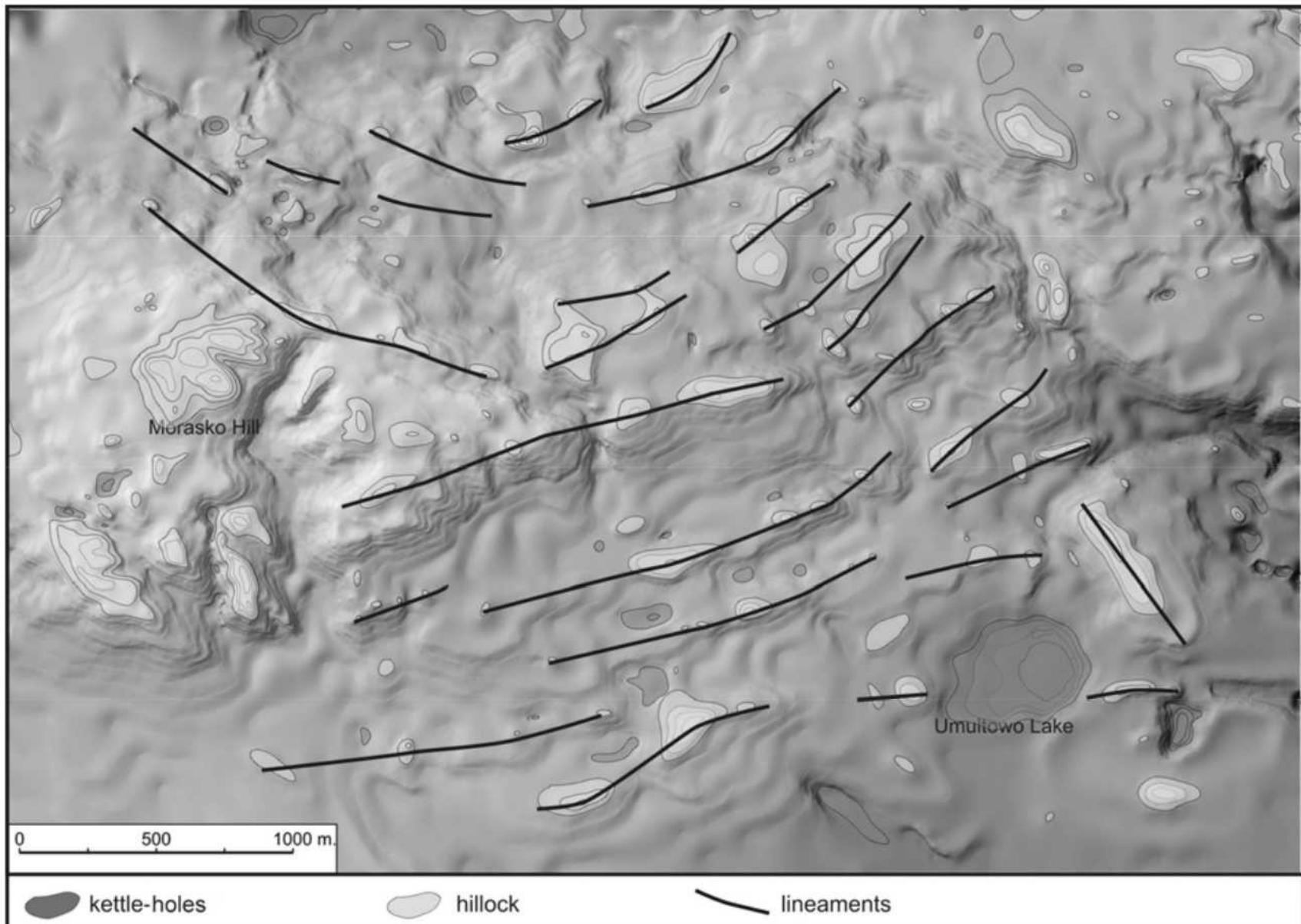
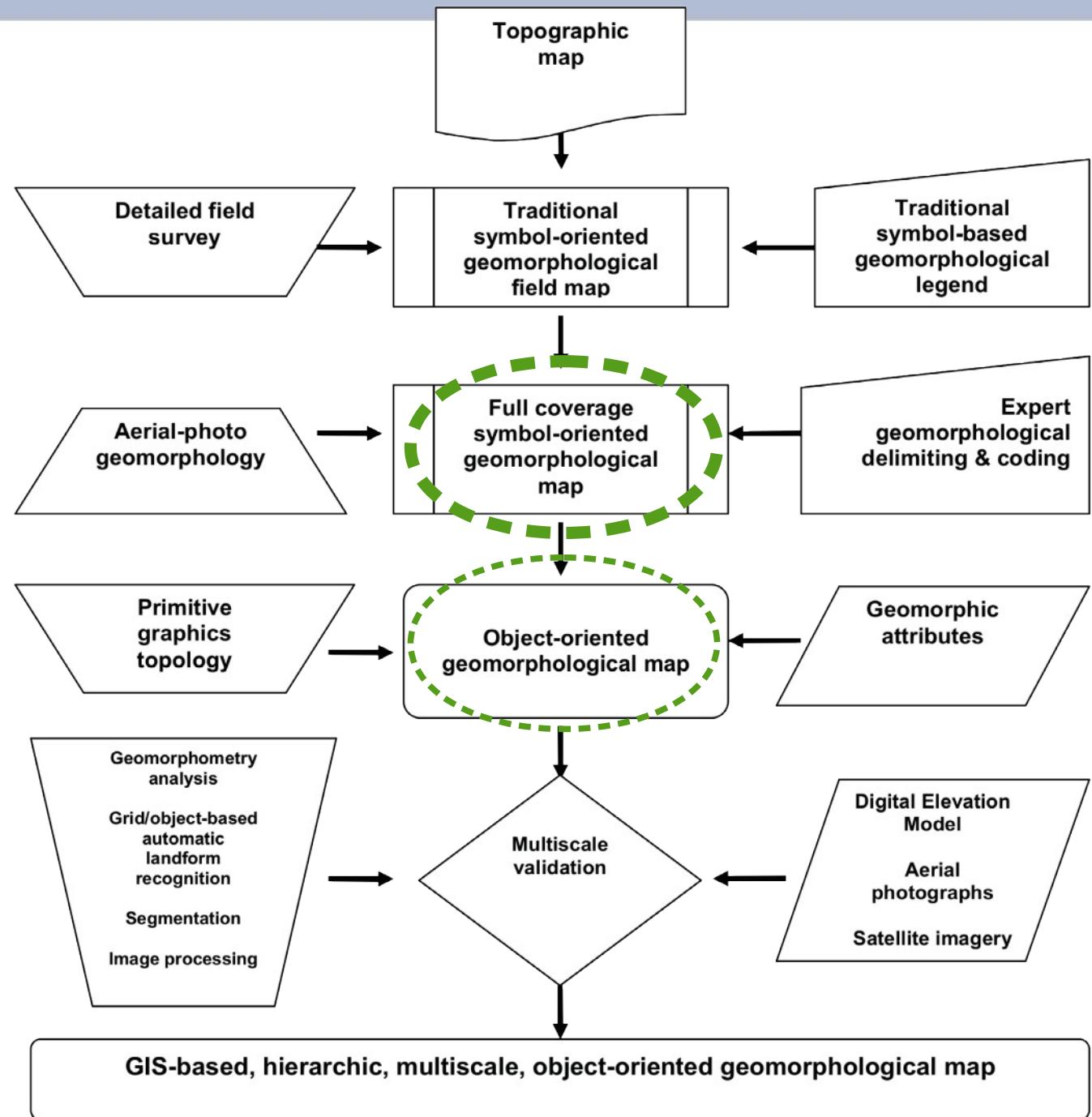


Fig. 10: Forms after decay or ice-cored moraines ridges. TOPO model. Morasko test area

Work-flow for GM

GIS



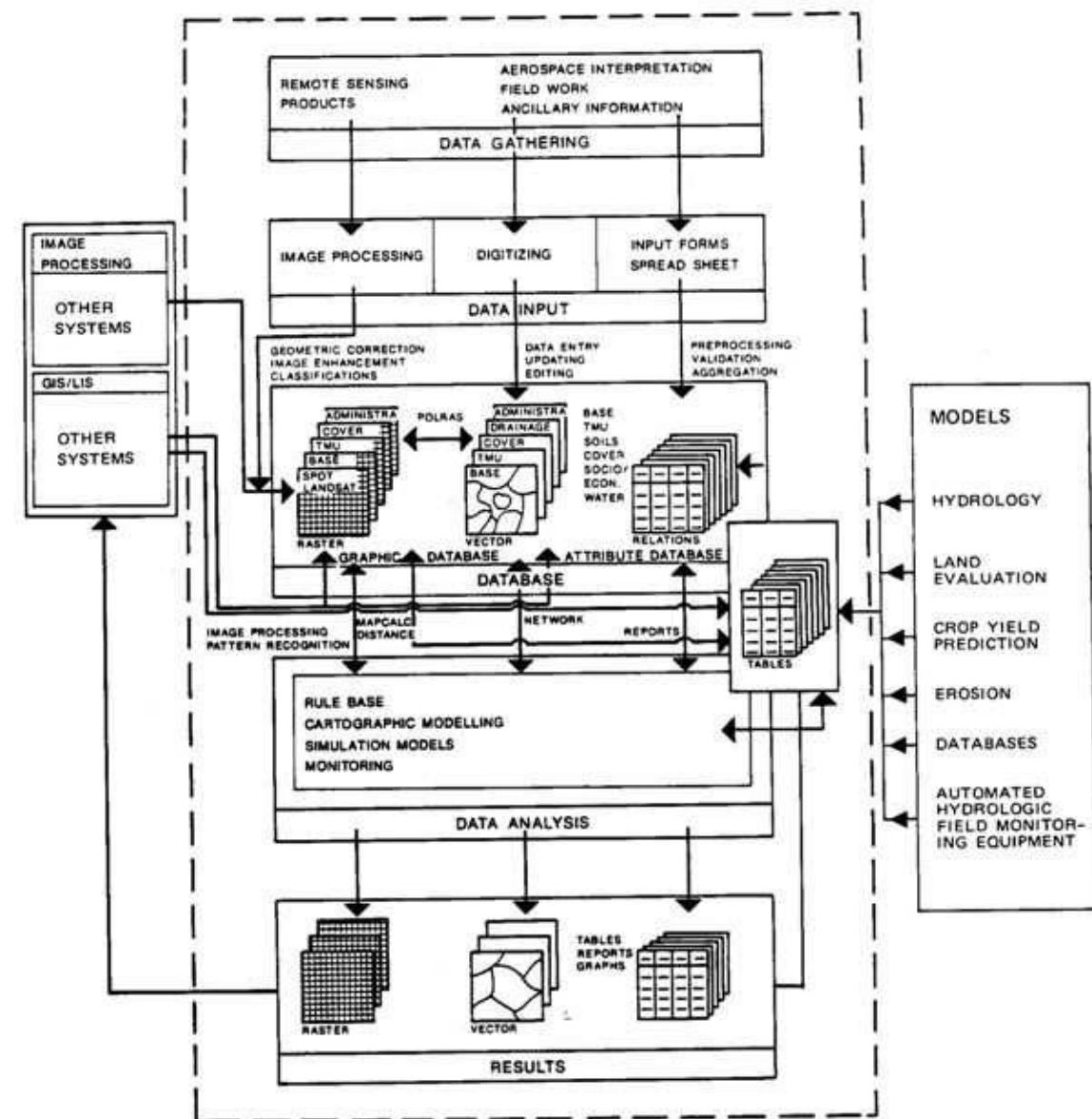
Gemorphological Information System

Map production

1. with graphic programs (like Corel Draw or Adobe Illustrator):
 - + beautiful maps, advanced symbology
 - + ready to print
 - no easy update (“one-shot maps”)
 - no data structure (> no generalization, no sharing of data...)
2. with GIS softwares (like ArcGIS, MapInfo, QuantumGIS)
 - + integration of all kind of data, linked by geolocalization
 - + possible use of geospatial analysis
 - + (more or less strong) data structure > multi-purposes
 - basic symbology, not so beautiful maps

Work-flow for GM

GIS



Case study









Echelle actuelle : 1:10'000

Coord. [m] : 571596 / 118346

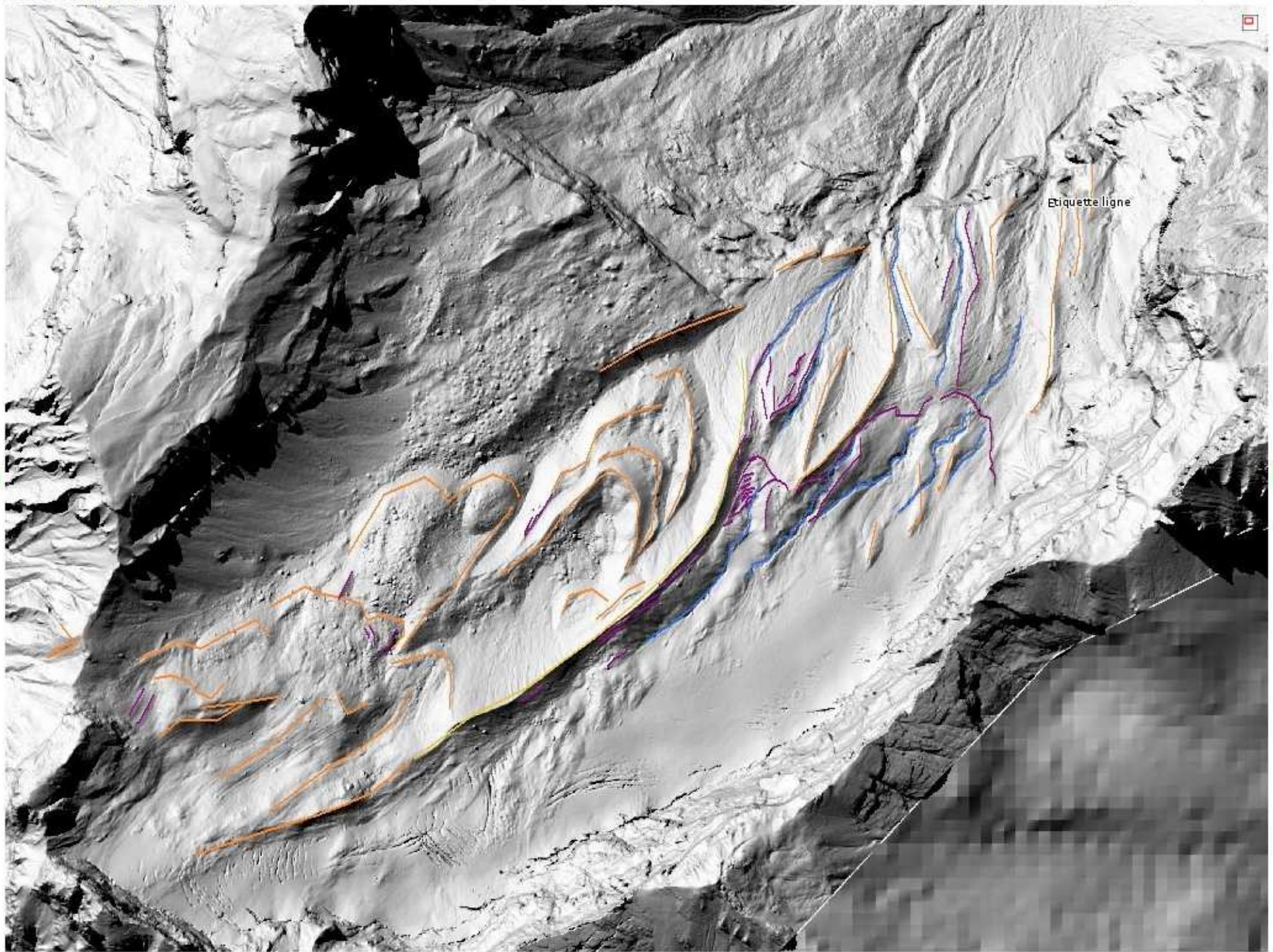
© Etat de Vaud, swisstopo
Informations dépourvues de foi publique

Etiquette ligne



Echelle actuelle : 1:10'000

Coord. [m] : 573443 / 117628









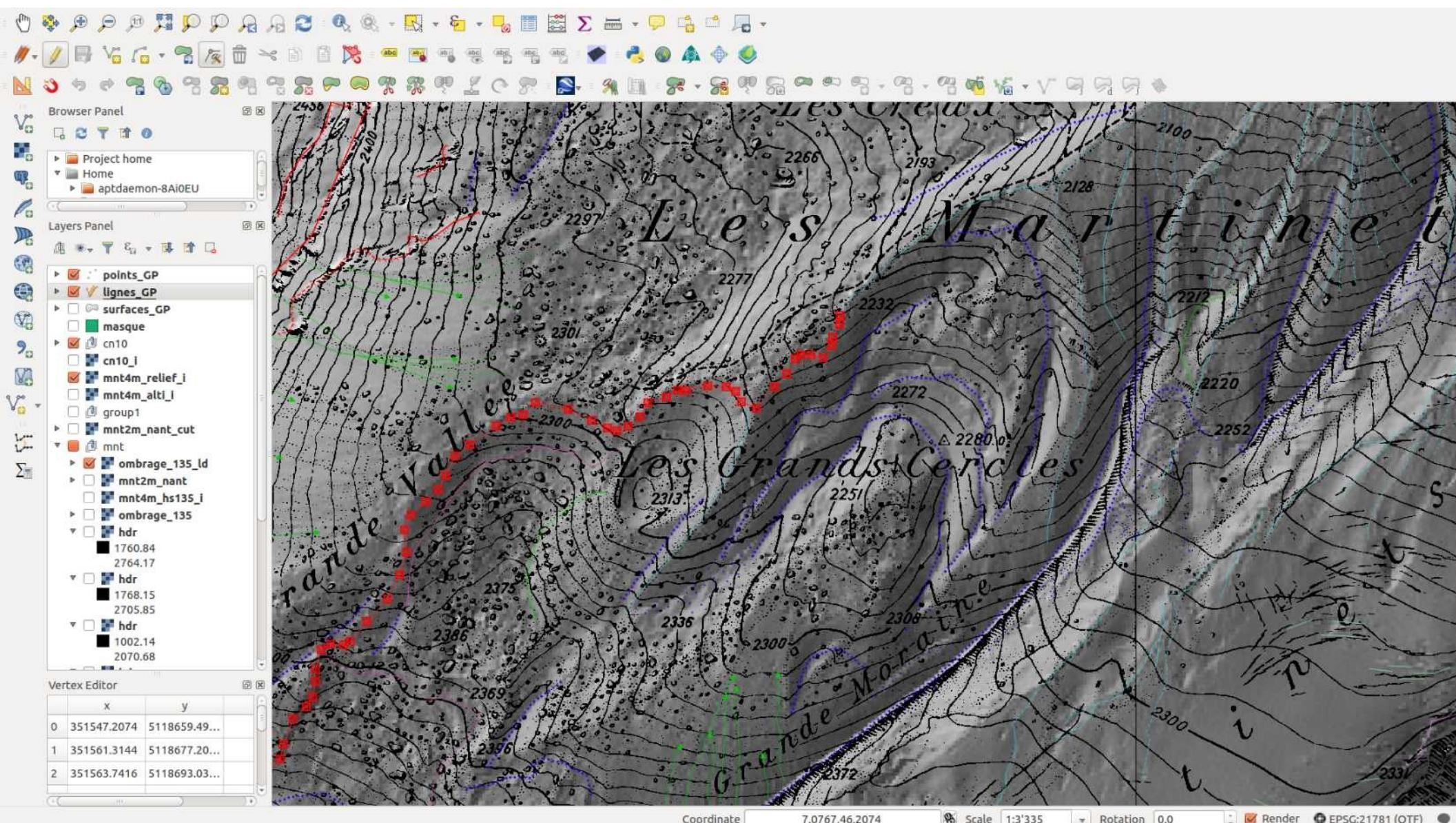


06.2016

Geomorphological mapping



34



General

Style

Labels

Fields

Rendering

Display

Actions

Joins

Diagrams

Metadata

Variables

Rule-based

Label	Rule	Min. scale
<input checked="" type="checkbox"/>	(no filter)	
<input checked="" type="checkbox"/>	"FORM" = 'accumulation' AND "PROCESS" = 'ANT'	
<input checked="" type="checkbox"/>	"FORM" = 'accumulation' AND "PROCESS" = 'FLU'	
<input checked="" type="checkbox"/>	"FORM" = 'accumulation' AND "PROCESS" = 'GRA'	
<input checked="" type="checkbox"/>	"FORM" = 'accumulation' AND "PROCESS" = 'PGL'	
<input checked="" type="checkbox"/>	"FORM" = 'alluvial fan'	
<input checked="" type="checkbox"/>	"FORM" = 'glacier'	
<input checked="" type="checkbox"/>	"FORM" = 'glacier covered'	
<input checked="" type="checkbox"/>	"FORM" = 'karren covered'	
<input checked="" type="checkbox"/>	"FORM" = 'moraine'	
<input checked="" type="checkbox"/>	"FORM" = 'neve'	

<input checked="" type="checkbox"/>	rockfall	"FORM" = 'rockfall'
<input checked="" type="checkbox"/>	rockglacier	"FORM" = 'rockglacier'
<input checked="" type="checkbox"/>	rockslide	"FORM" = 'rockslide'
<input checked="" type="checkbox"/>	scree	"FORM" = 'scree'
<input checked="" type="checkbox"/>	scree covered	"FORM" = 'scree covered'
<input checked="" type="checkbox"/>	soil on bedrock	"FORM" = 'soil on bedrock'

	Id	RuleID_1	PROCESS	FORM	ANGLE
<input checked="" type="checkbox"/>	532	0	134 FLU	accumulation	NULL
	537	0	122 FLU	alluvial fan	NULL
	544	0	9 FLU	accumulation	NULL
	545	0	122 FLU	alluvial fan	NULL
	548	0	122 FLU	alluvial fan	NULL
	15	0	29 GLA	till	NULL
	23	0	29 GLA	till	NULL
	47	0	133 GLA	moraine	NULL
	53	0	133 GLA	moraine	NULL
Layer tr	65	0	29 GLA	till	NULL
Layer bl	73	0	133 GLA	moraine	NULL

Draw Show All Features
 Con...

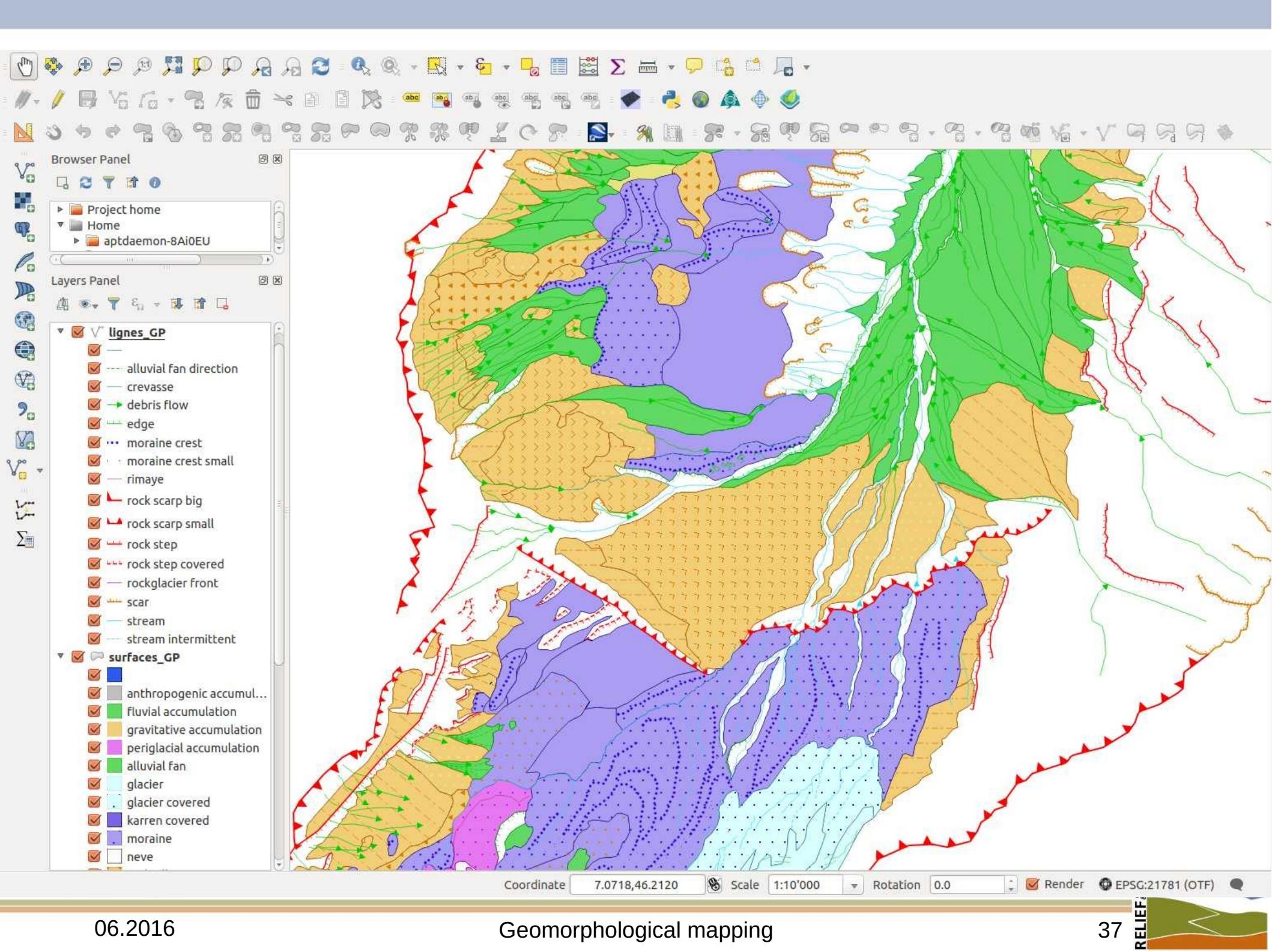
Help

Style

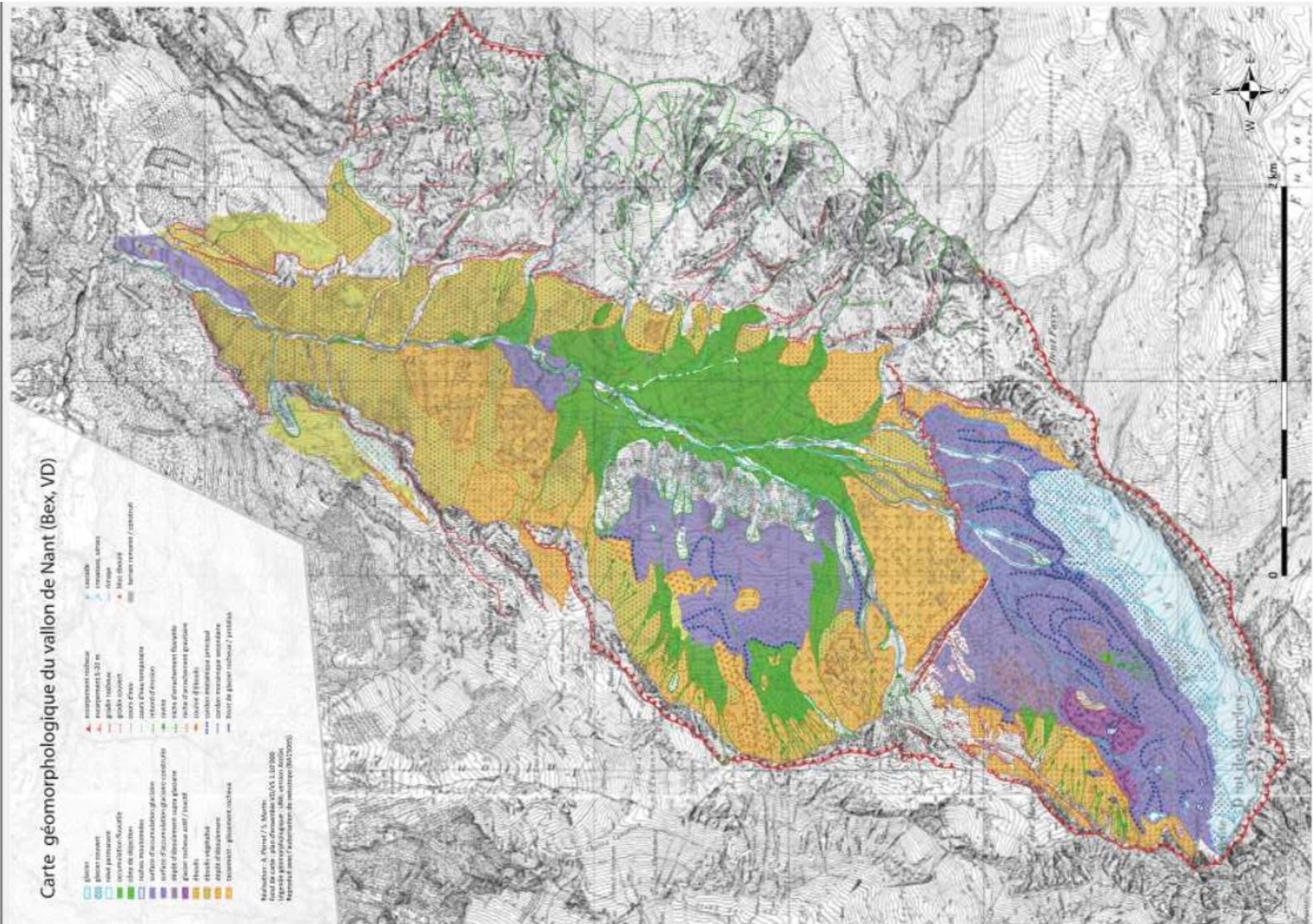
Apply

Cancel

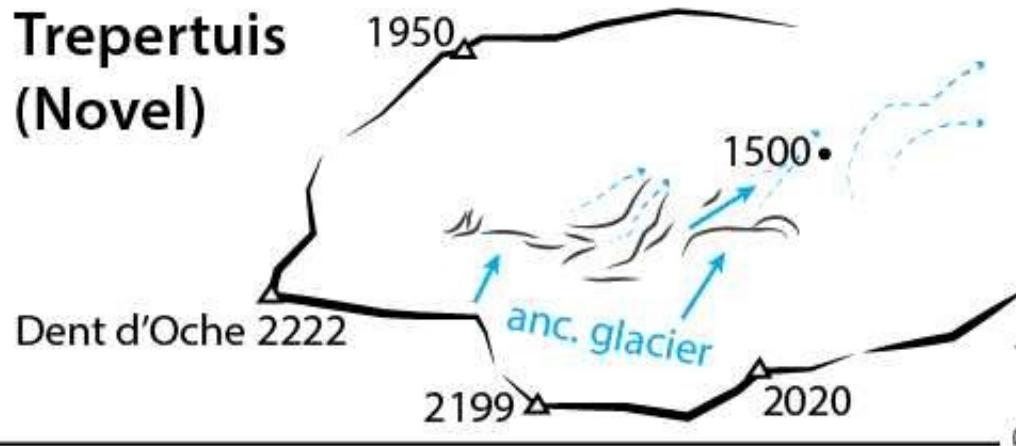
OK



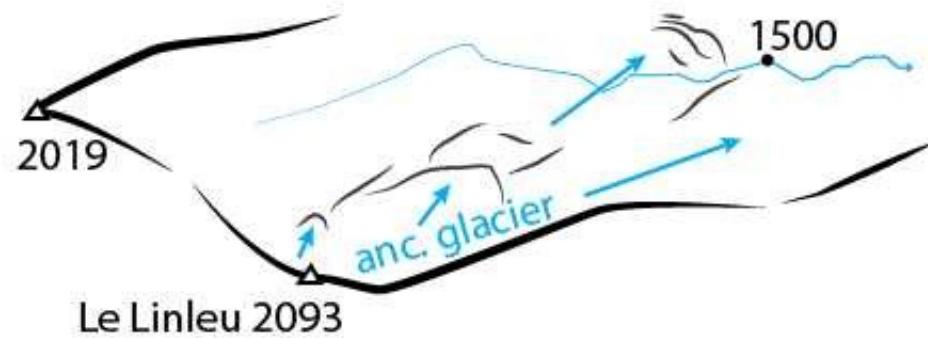
Carte géomorphologique du vallon de Nant (Bex, VD)



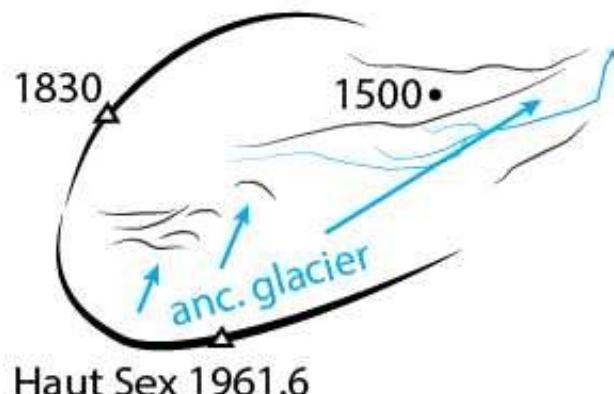
Trepertuis (Novel)



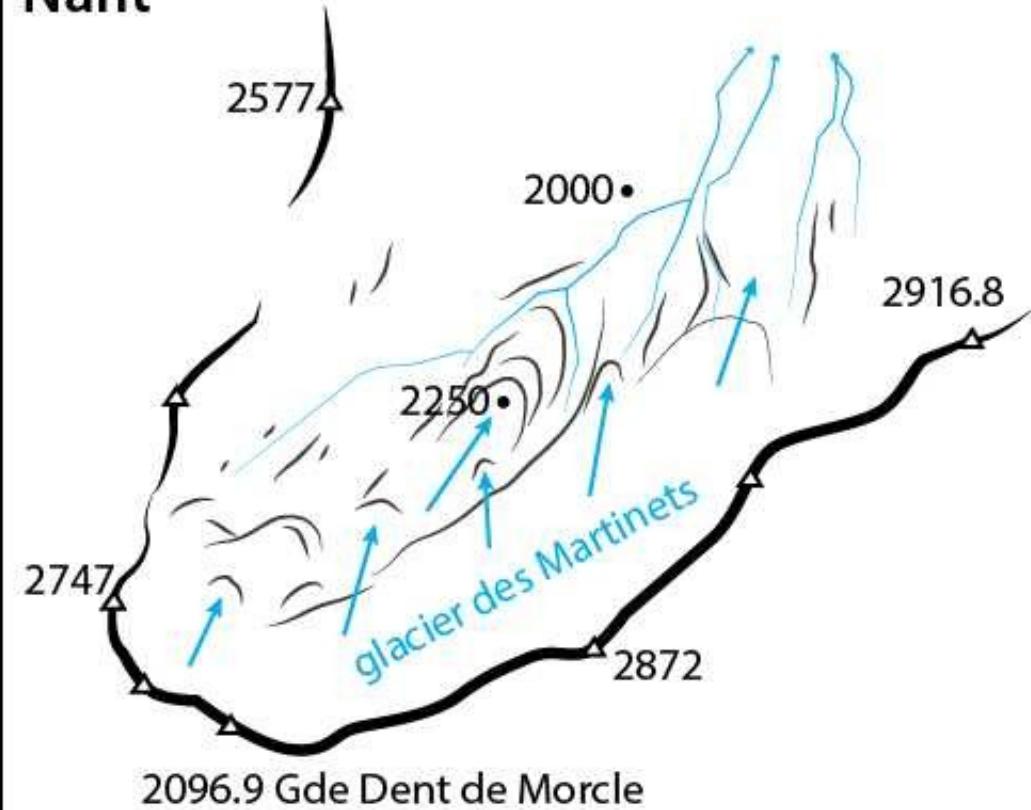
Savalène



Recon



Nant



cartographie des cordons morainiques: A. Perret

- ligne crête, sommet
- cordon morainique
- direction d'écoulement du glacier
- cours d'eau (temporaire)



0 0.5 1 2 km

