

# **SEMI-AUTOMATED ROCK DEPICTION METHODS FOR LARGE SCALE TOPOGRAPHIC MAPS**

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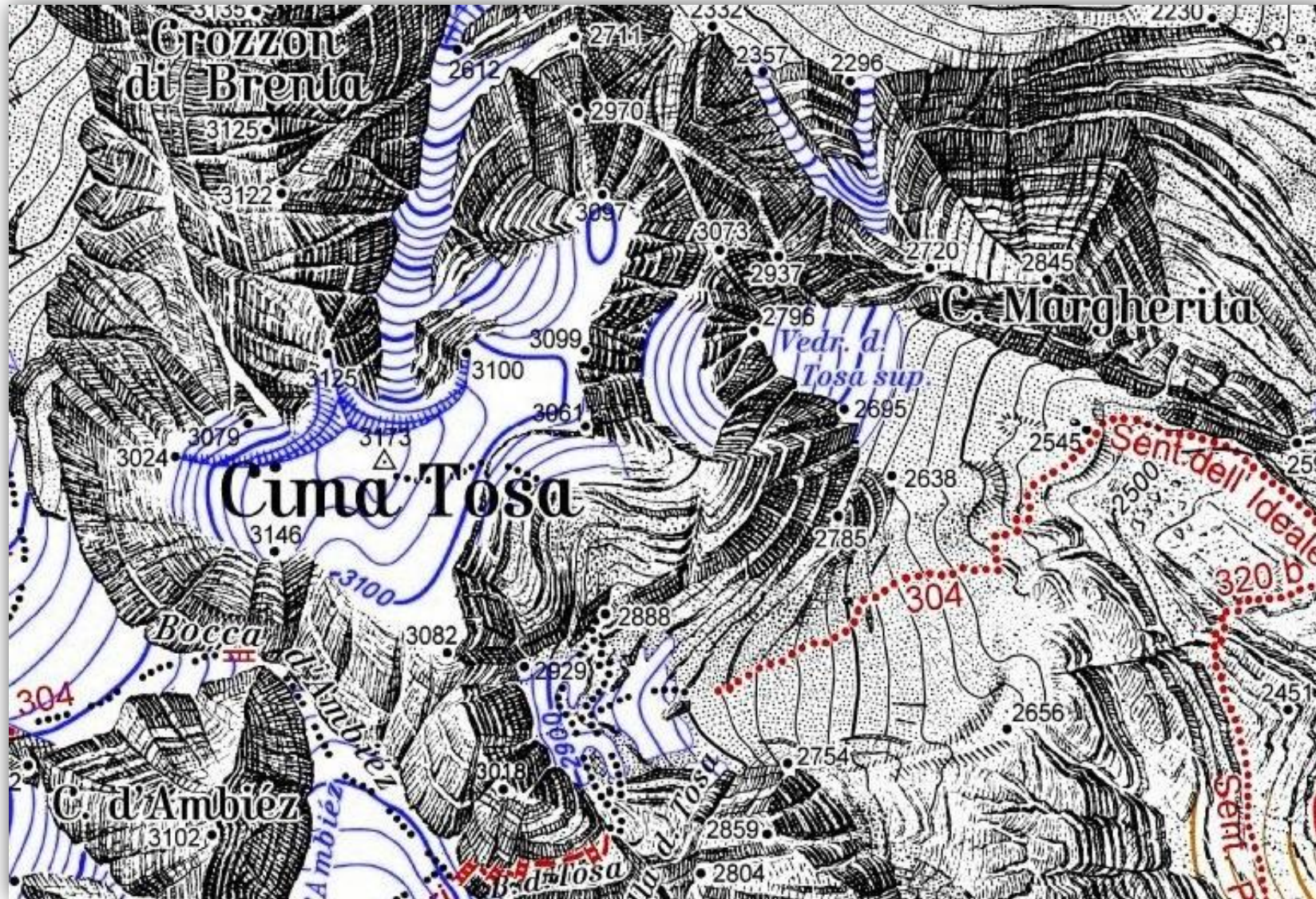
# Content

- Objectives and restrictions
- Background: Manually drawn rock depictions
- Principles and elements
- Method
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  - Data Generation
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# Objectives

- Creating rock depiction primary from DEM
- Large scales (1 : 25.000 / 1 : 50.000)
- Semi-automated method
  - Combination of automated processes and manual steps
- Based on principles and elements of known manual methods
- **Restrictions**
  - No detection of edges and rock boundary
  - Not trying to copy or reproduce

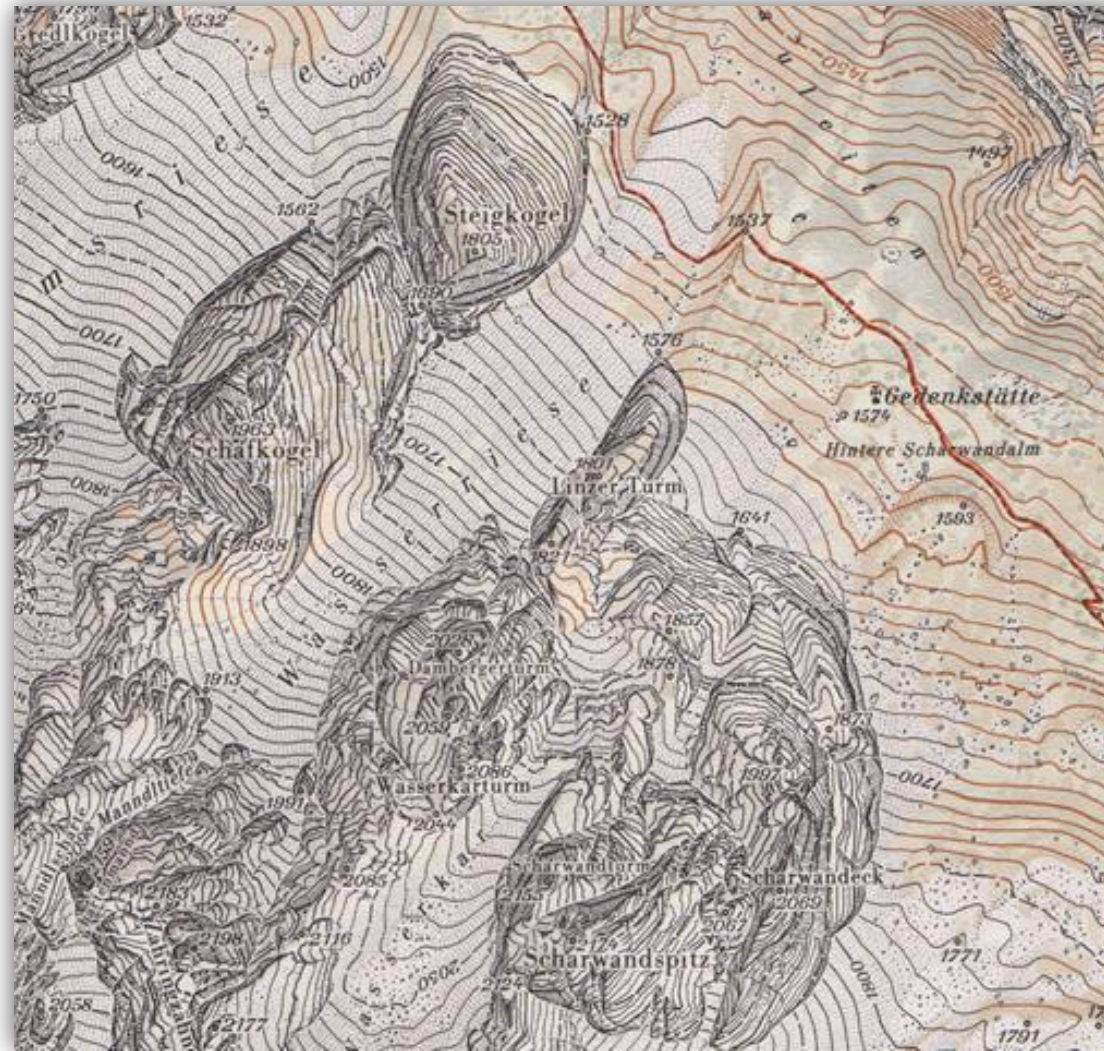
# Manually drawn rock depictions



Brenta 1:25.000 (Aegerter) ÖAV



# Manually drawn rock depictions



Gosaukamm 1:10.000 (Brandstätter) ÖAV

# Manually drawn rock depictions

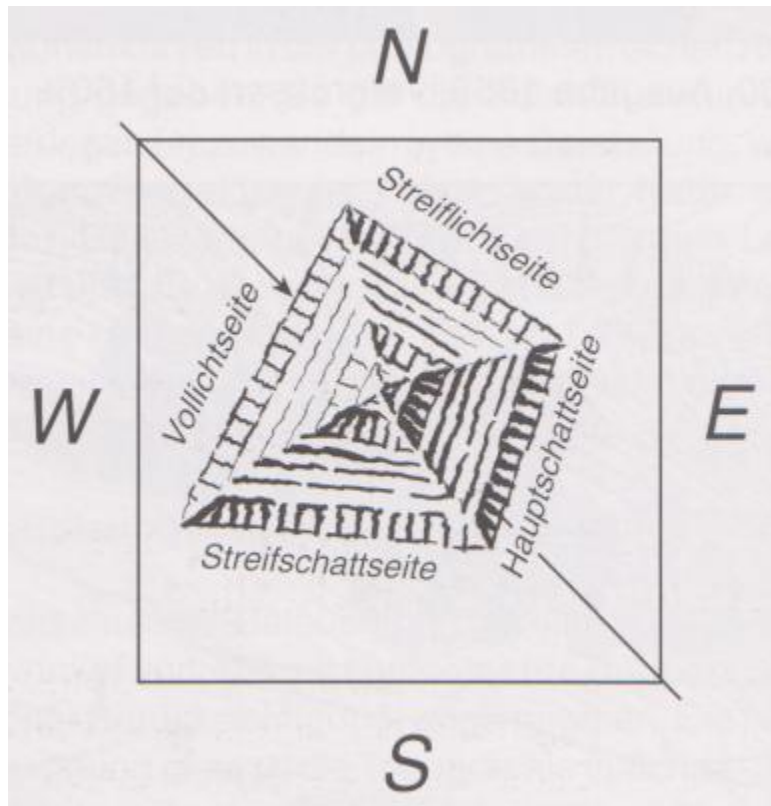


Schweizer Landeskarte 1:25.000

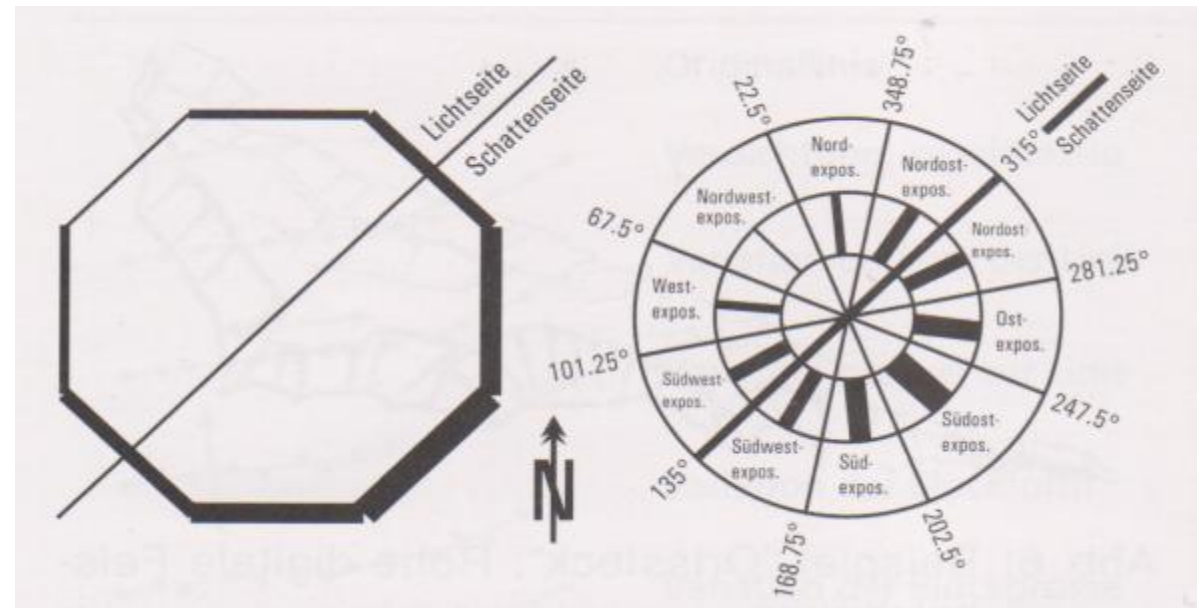
# Principles and elements

- Horizontal and vertical lines / hachures
  - Steep slopes: replace horizontal with vertical lines („Scharungersatz“ - ÖAV Brandstätter)
    - Drawing elements depending on slope value
  - Shadow hachuring (Swiss Method)
    - Variation of stroke depending on aspect
- „crumpled“ Lines
  - Variation of color and patterns of all elements
- Rock boundary / relief edges (→ manually added)

# Shadow hachuring

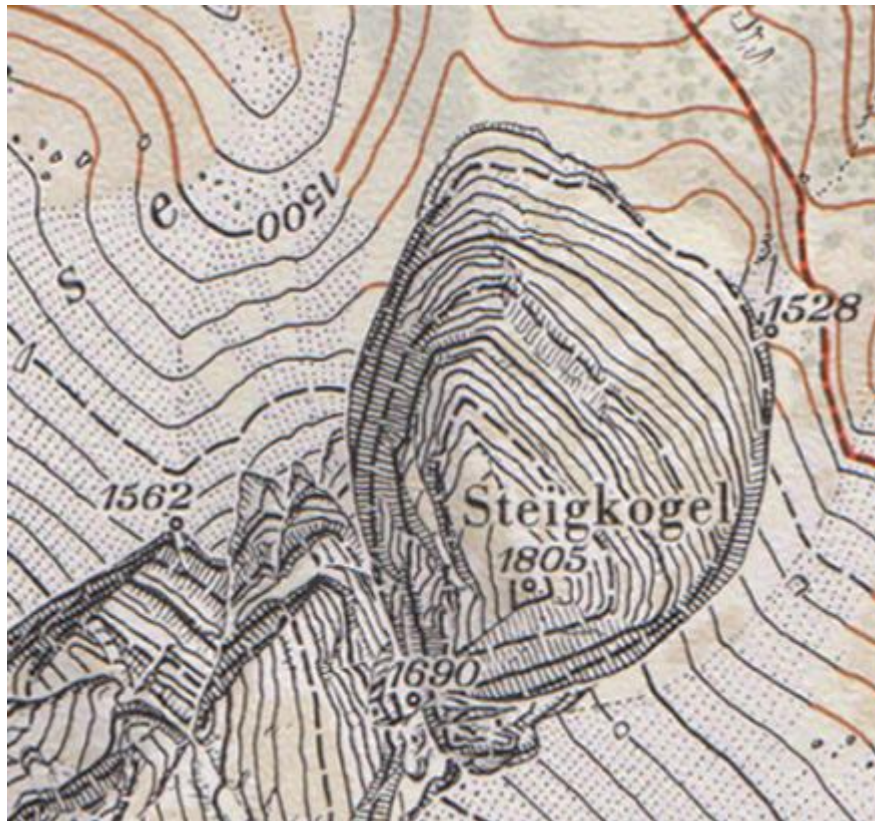


Gilgen; 1998



Hurni; 1998

# Steep slopes: Vertical hachures / lines



Gilgen; 1998



# Process of automation

- Base data: DEM (10m)
- Generating Data
  - GIS functions (GDAL, Python)
- „Cartographic depiction “
  - Manipulation of graphic variables (→ Line patterns, styles, colors)
  - Cartogr. tool (mapyrus)
- Graphic revision, post-processing
  - Graphic library (ImageMagick)

**Raster**

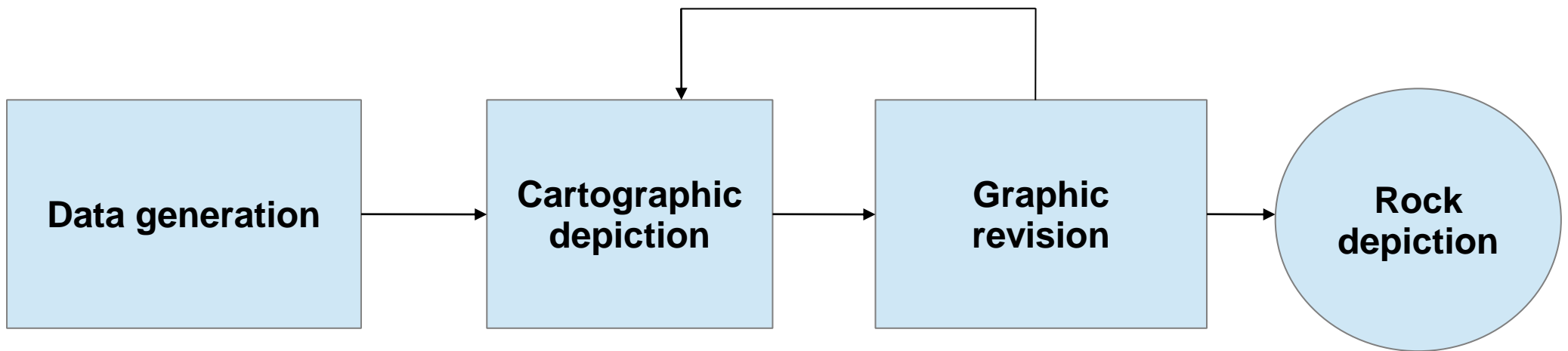


**Vector**

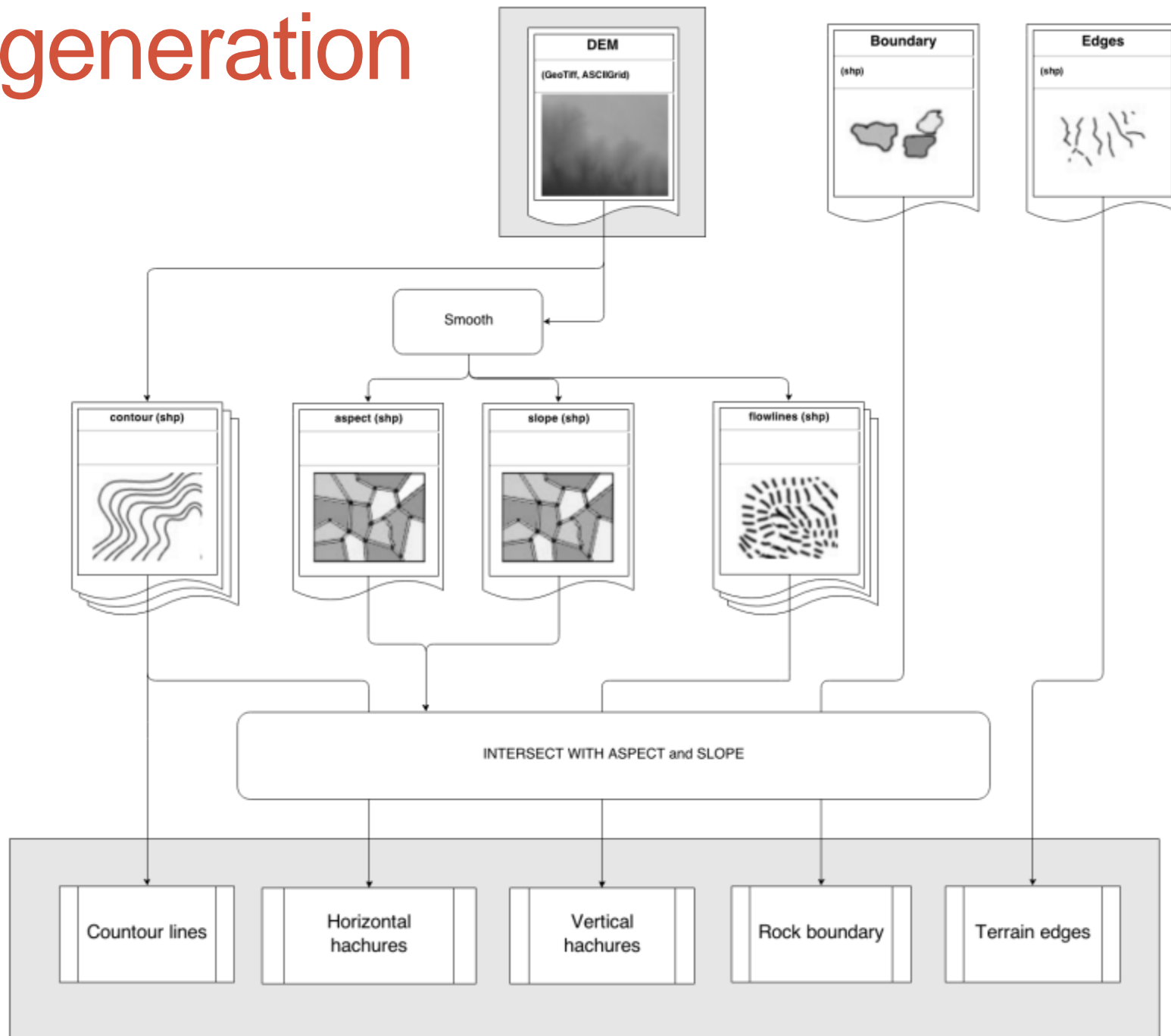


**Raster**

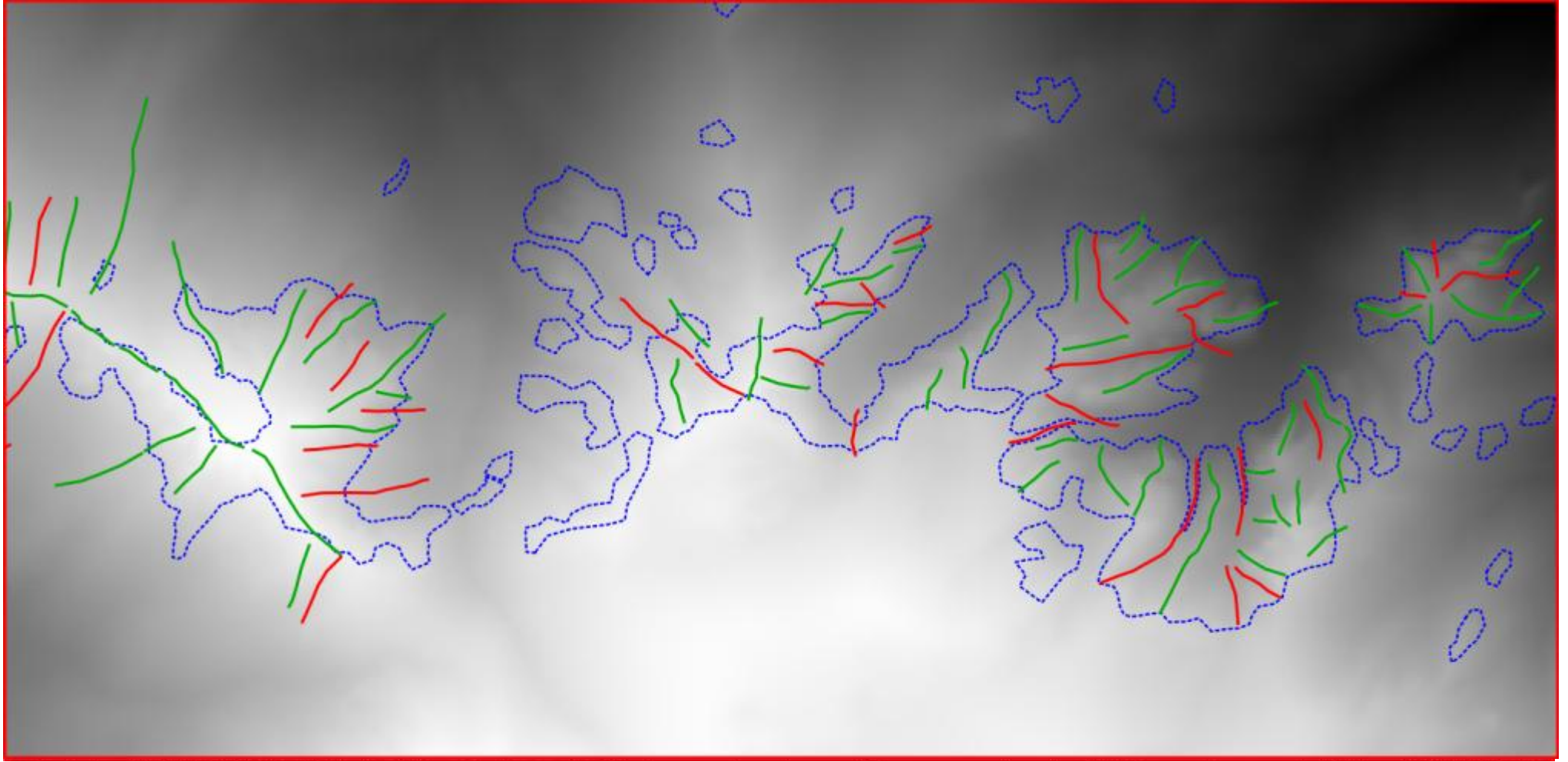
# Process of automation



# Data generation



# Data generation



Eingabe logged in as admin | Logout

Parametereingabe Felstdarstellung

Darstellung laden: 0 - default  
1 - template 2.1  
2 - test\_HL  
3 - test\_EDGE  
4 - test\_ABG Laden Löschen Templates

Darstellung: default  überschreiben

Kurzbeschreibung: Standardtemple für Felstdarstellung

Horizontalschraffen:

	Bedingung					Strichstärke								Farbe	Muster		
	0-9.99	10-29.99	30-49.99	50-69.99	70-90	NW	W	SW	SW	S	SO	O	NO			NC	
<input checked="" type="checkbox"/> 10 m	Ja	Ja	Nein	Nein	Nein	0.07	0.06	0.07	0.09	0.09	0.1	0.18	0.15	0.09	0.0	383838	sin_ran1
<input checked="" type="checkbox"/> 20 m	Nein	Nein	Ja	Nein	Nein	0.07	0.06	0.07	0.09	0.09	0.1	0.18	0.15	0.09	0.0	575757	sin_ran1
<input checked="" type="checkbox"/> 50 m	Nein	Nein	Nein	Ja	Ja	0.07	0.06	0.07	0.09	0.09	0.1	0.18	0.15	0.09	0.0	949494	sin_ran1

Vertikalschraffen:

	Hangneigung					Exposition								Farbe	Muster		
	Bedingung					Strichstärke											
	0-9.99	10-29.99	30-49.99	50-69.99	70-90	NW	W	SW	SW	S	SO	O	NO	NC			
<input type="checkbox"/> 10_50 m	Nein	Nein	Nein	Nein	Nein										FFFFFF	-	
<input type="checkbox"/> 20_50 m	Nein	Nein	Nein	Nein	Nein										FFFFFF	-	
<input checked="" type="checkbox"/> 10_100 m	Nein	Nein	Nein	Ja	Nein	0.05	0.04	0.05	0.06	0.06	0.08	0.12	0.1	0.06	0.0	212121	rand_zig
<input checked="" type="checkbox"/> 20_100 m	Nein	Nein	Ja	Nein	Nein	0.06	0.05	0.06	0.08	0.08	0.1	0.16	0.15	0.08	0.0	ABABAB	-

Felsabgrenzung:

	Hangneigung					Exposition								Farbe	Muster		
	Bedingung					Strichstärke											
	0-9.99	10-29.99	30-49.99	50-69.99	70-90	NW	W	SW	SW	S	SO	O	NO	NC			
<input checked="" type="checkbox"/> abg	Ja	Ja	Ja	Ja	Ja	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	616161	sin_ran1

Kanten:

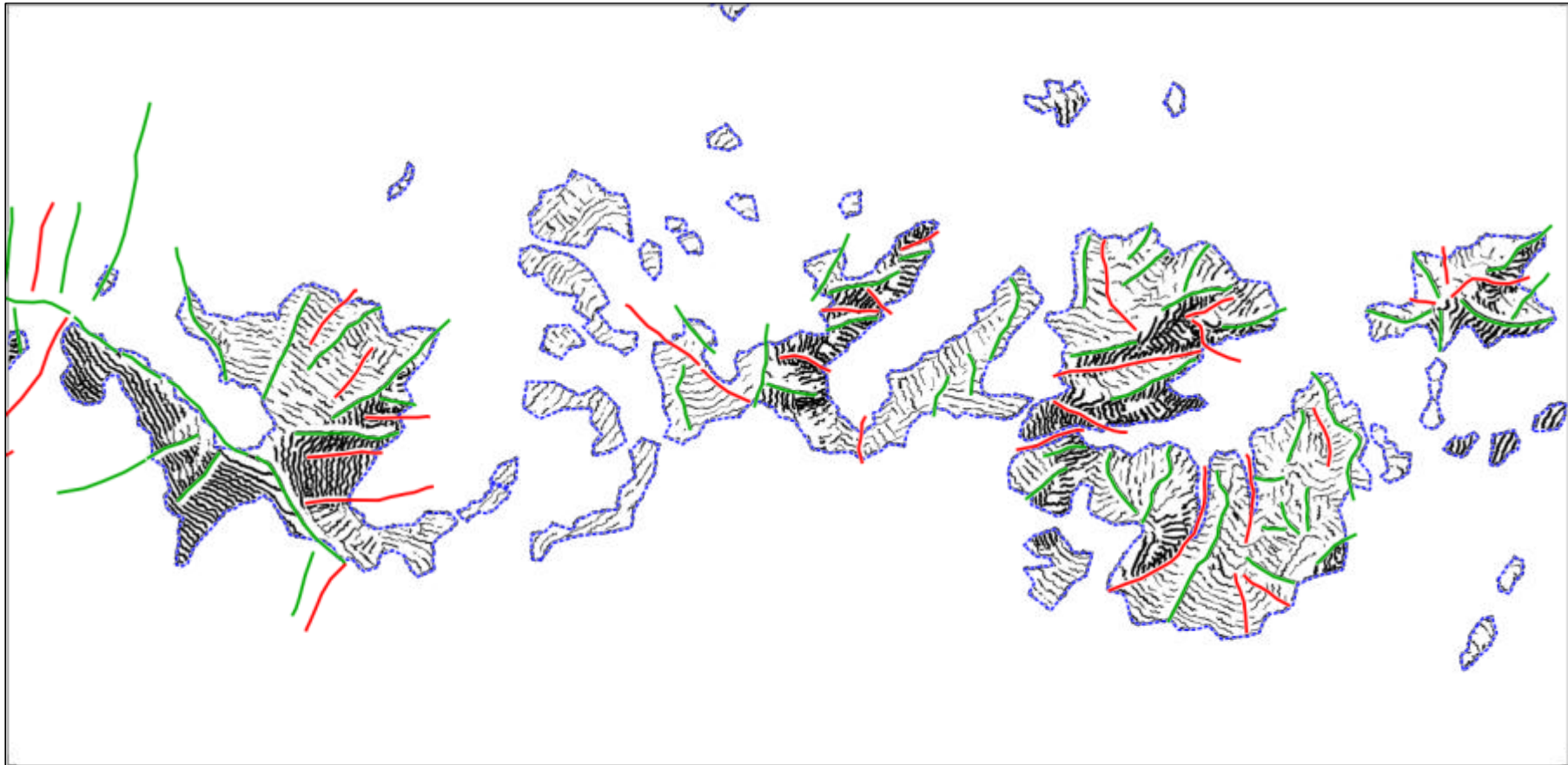
	Hangneigung					Exposition								Farbe	Muster		
	Bedingung					Strichstärke											
	0-9.99	10-29.99	30-49.99	50-69.99	70-90	NW	W	SW	SW	S	SO	O	NO	NC			
<input checked="" type="checkbox"/> pos	Ja	Ja	Ja	Ja	Ja	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	000000	edge_p1
<input checked="" type="checkbox"/> neg	Ja	Ja	Ja	Ja	Ja	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	FFFFFF	edge_n1
<input type="checkbox"/> undef	Nein	Nein	Nein	Nein	Nein											FFFFFF	-

Speichern  Datei schreiben  PDF erzeugen Reset

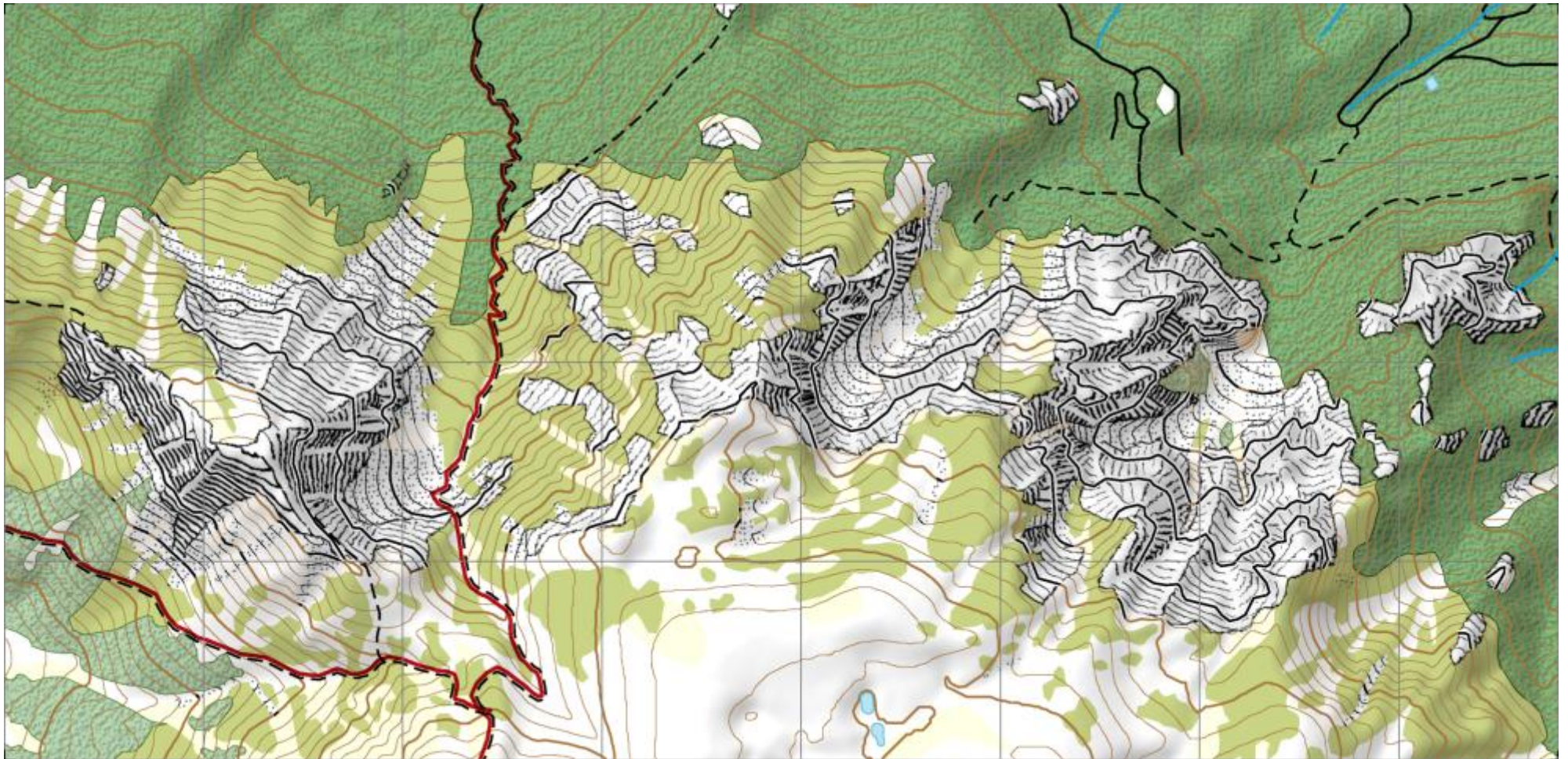
# Outcome



# Details

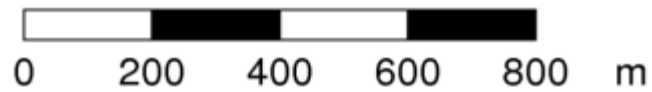
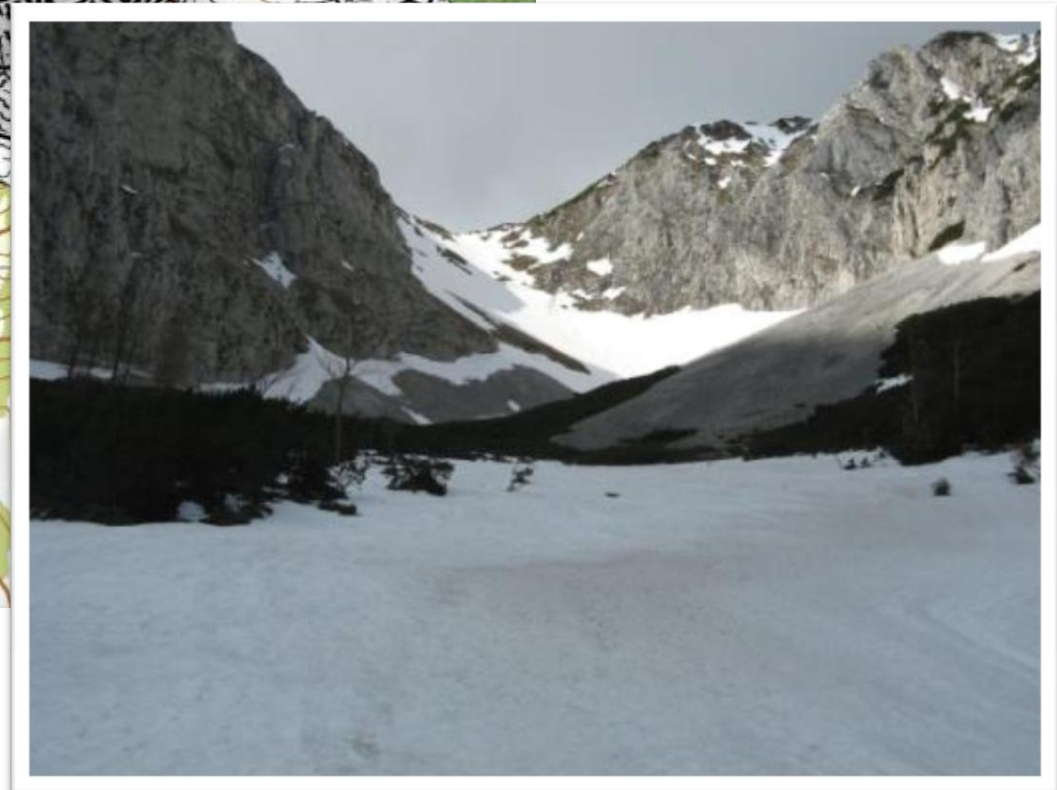
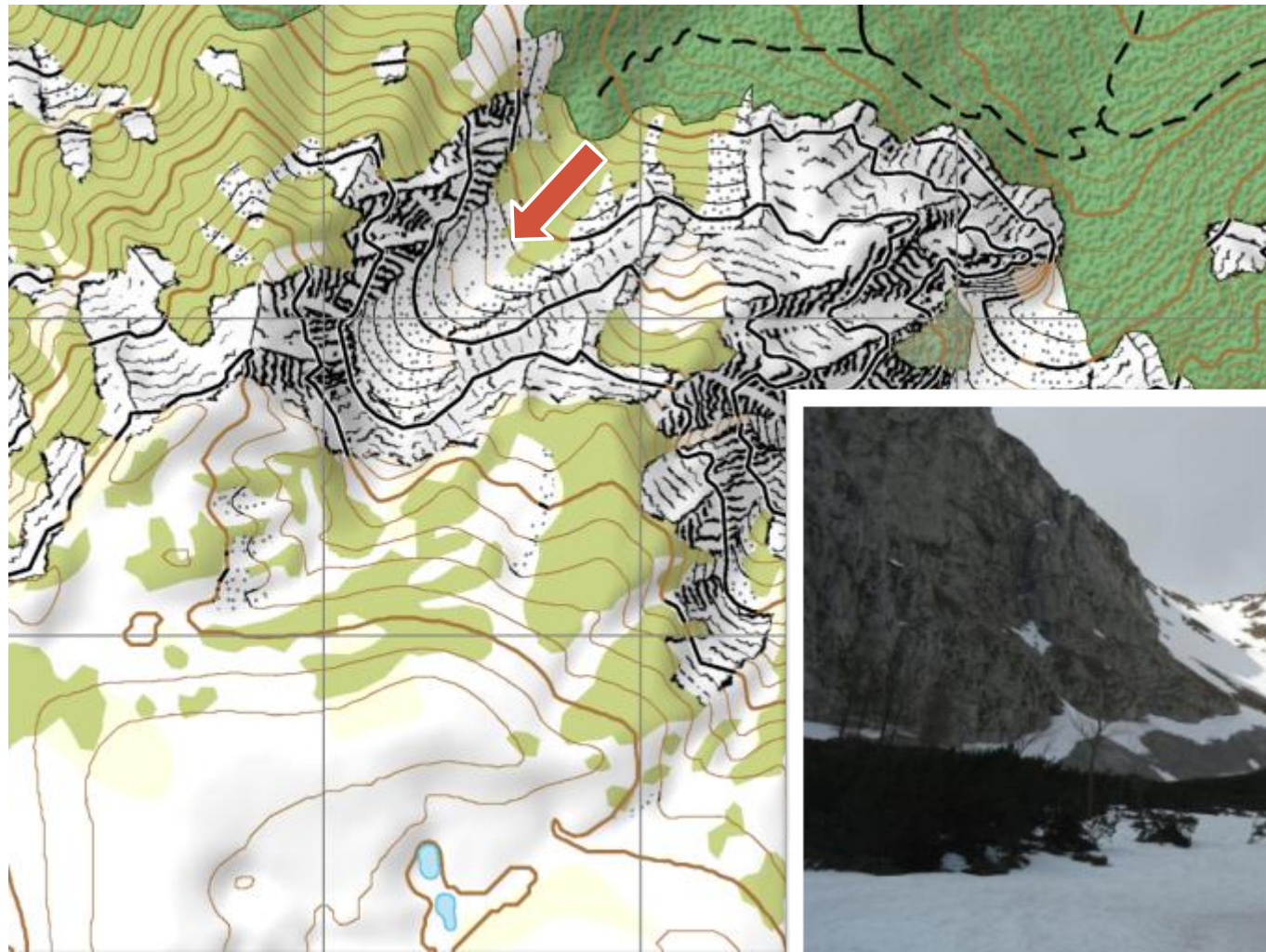


# Map Samples Veitsch-Nord



0 200 400 600 800 m

# Details



# Problems: Plain slopes



- Different line patterns
- Adding (minor) edges or other relief elements / details (gullies)
- Similar problem with flat slopes

# Comparison

