Triglav national park historical maps analysis

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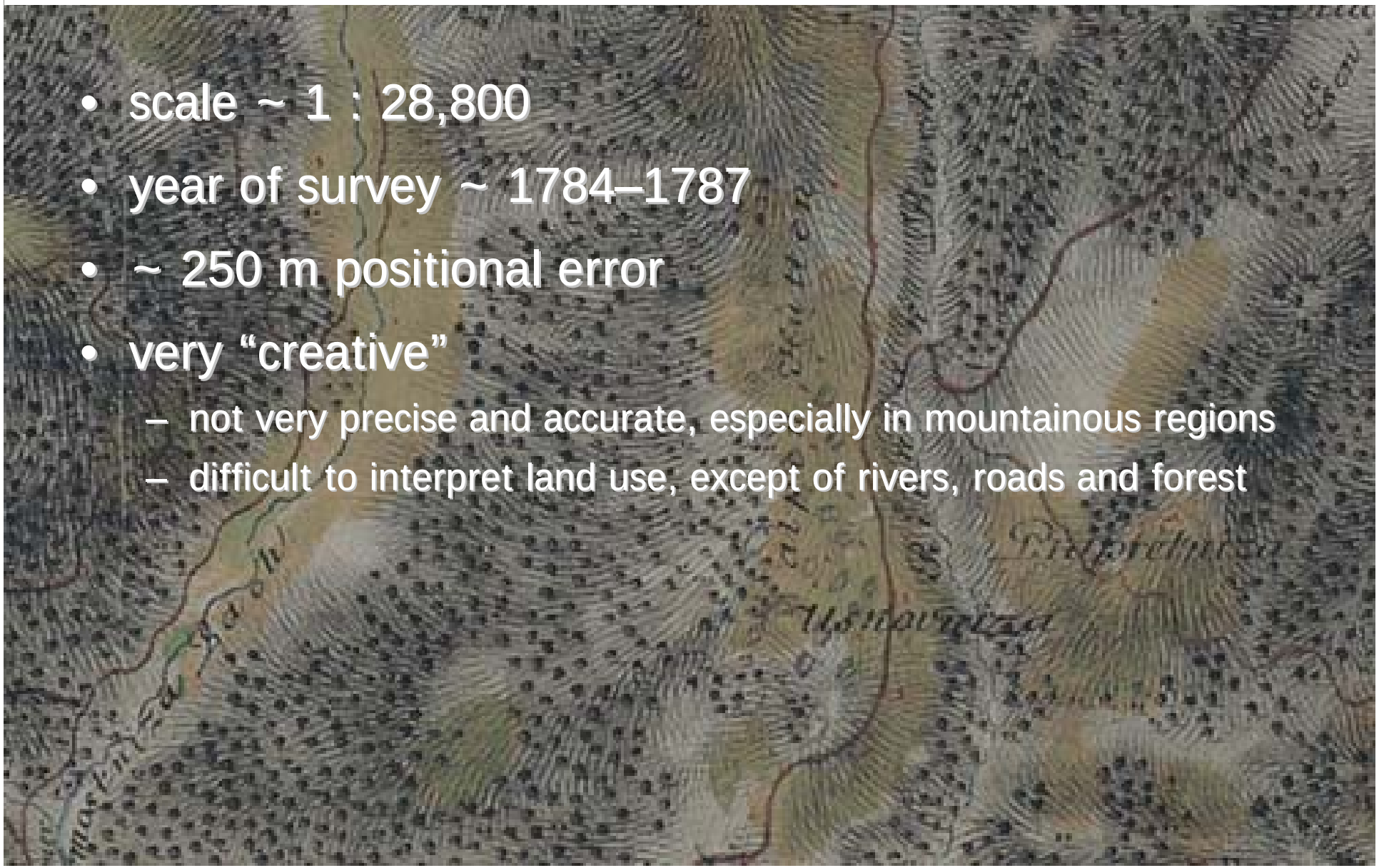
Presentation outlook

- Triglav National Park historical maps
- georeferencing method
- problems encountered
- land use backward editing method

- **S**patial **I**nformation **S**ystems for **T**ransnational **E**nvironmental **Ma**nagement of **P**rotected **A**reas **R**egions in **C**ADSES

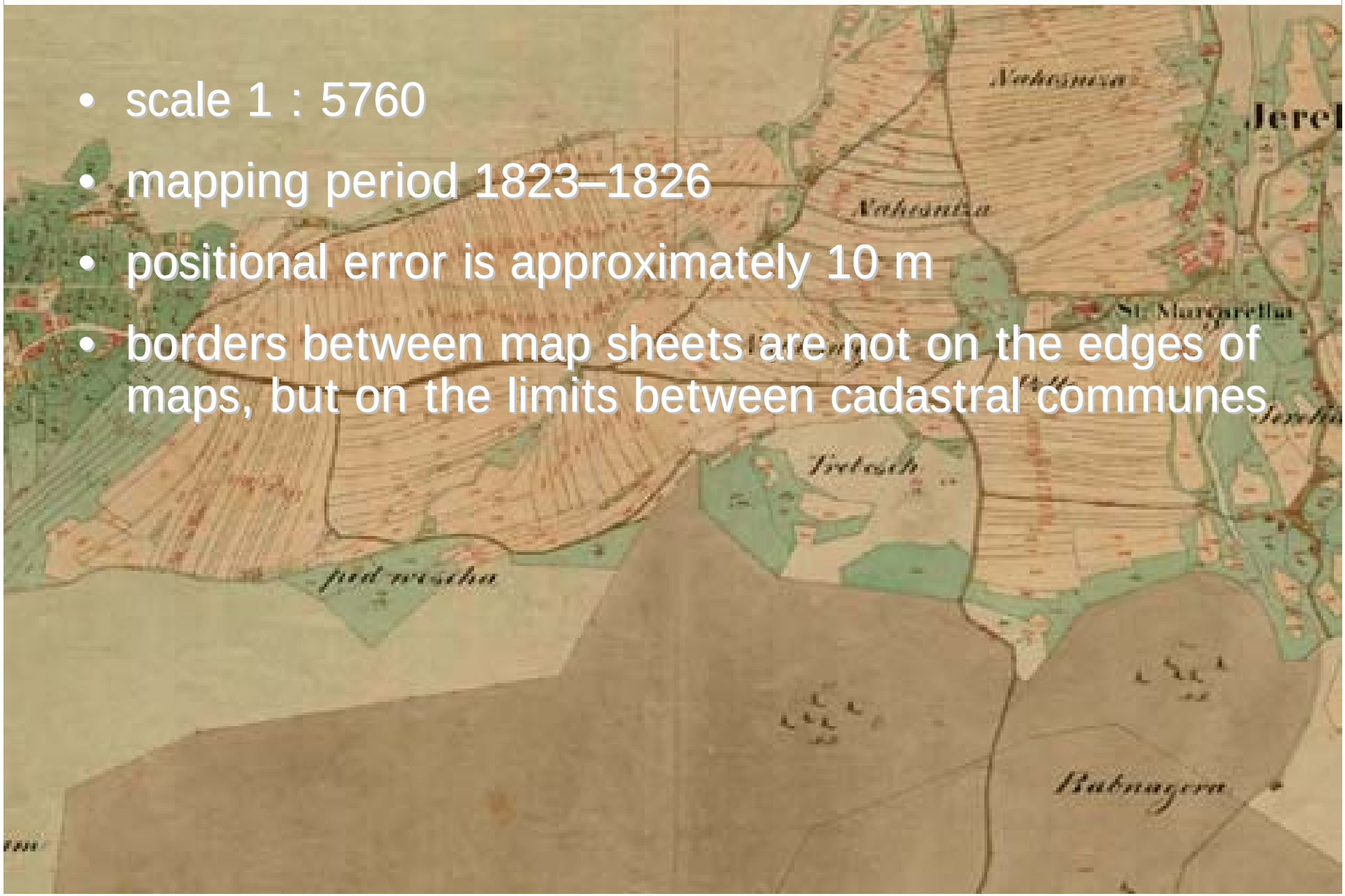
  SISTEMaPARC, INTERREG IIIB

1st Josephine military survey maps



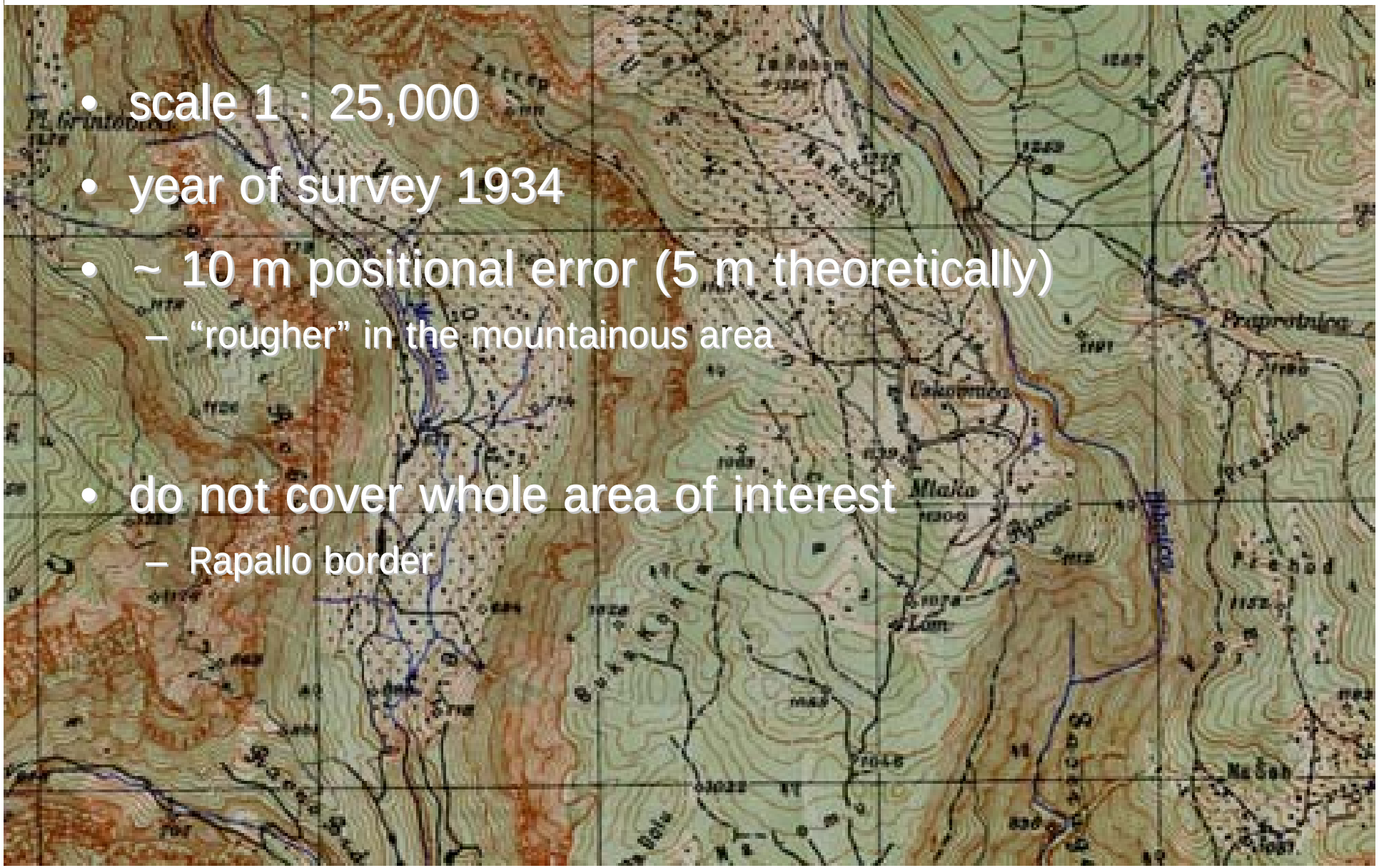
- scale ~ 1 : 28,800
- year of survey ~ 1784–1787
- ~ 250 m positional error
- very “creative”
  - not very precise and accurate, especially in mountainous regions
  - difficult to interpret land use, except of rivers, roads and forest

Franciscan cadastre maps



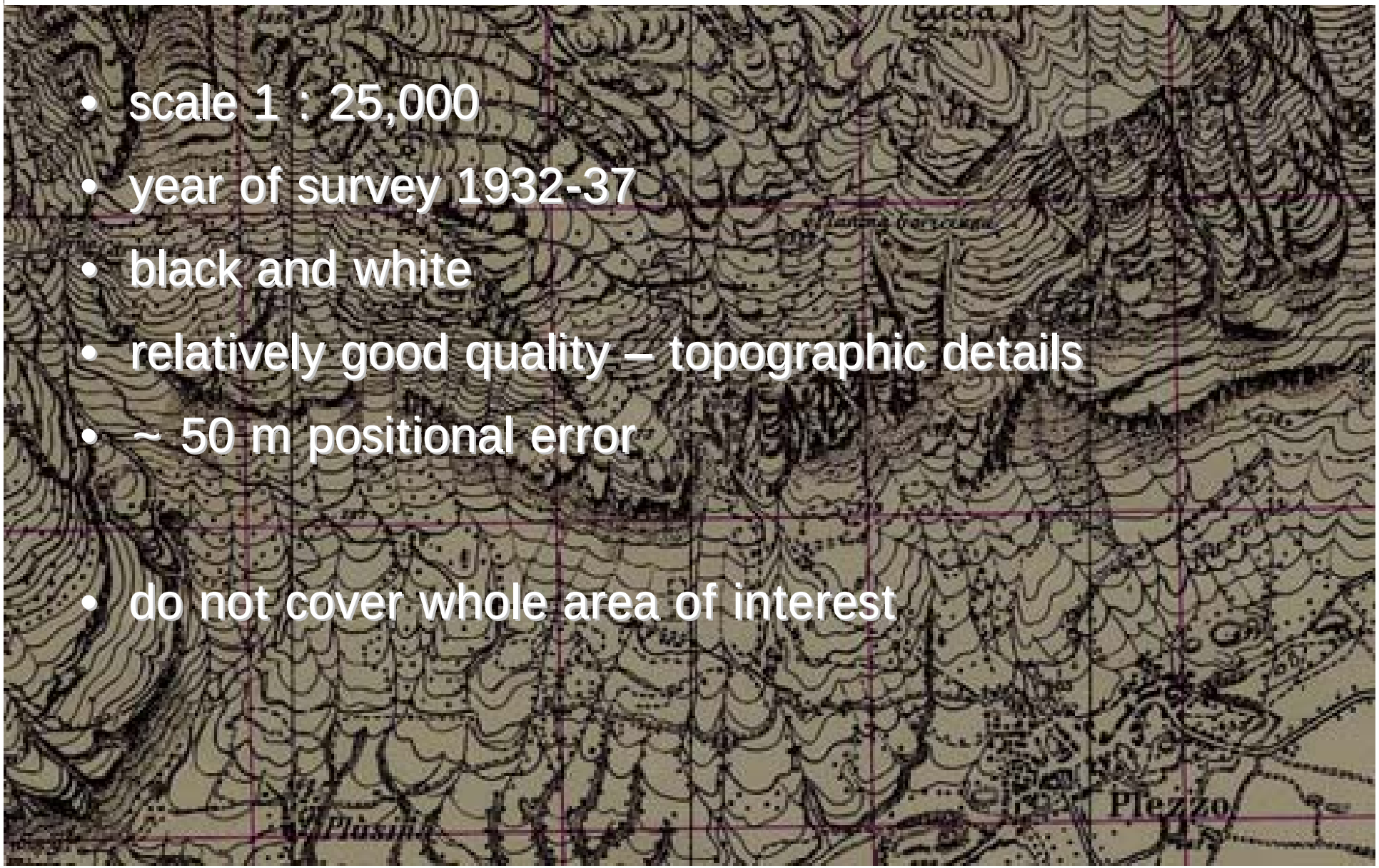
- scale 1 : 5760
- mapping period 1823–1826
- positional error is approximately 10 m
- borders between map sheets are not on the edges of maps, but on the limits between cadastral communes

Yugoslav maps



- scale 1 : 25,000
- year of survey 1934
- ~ 10 m positional error (5 m theoretically)
  - “rougher” in the mountainous area
- do not cover whole area of interest
  - Rapallo border

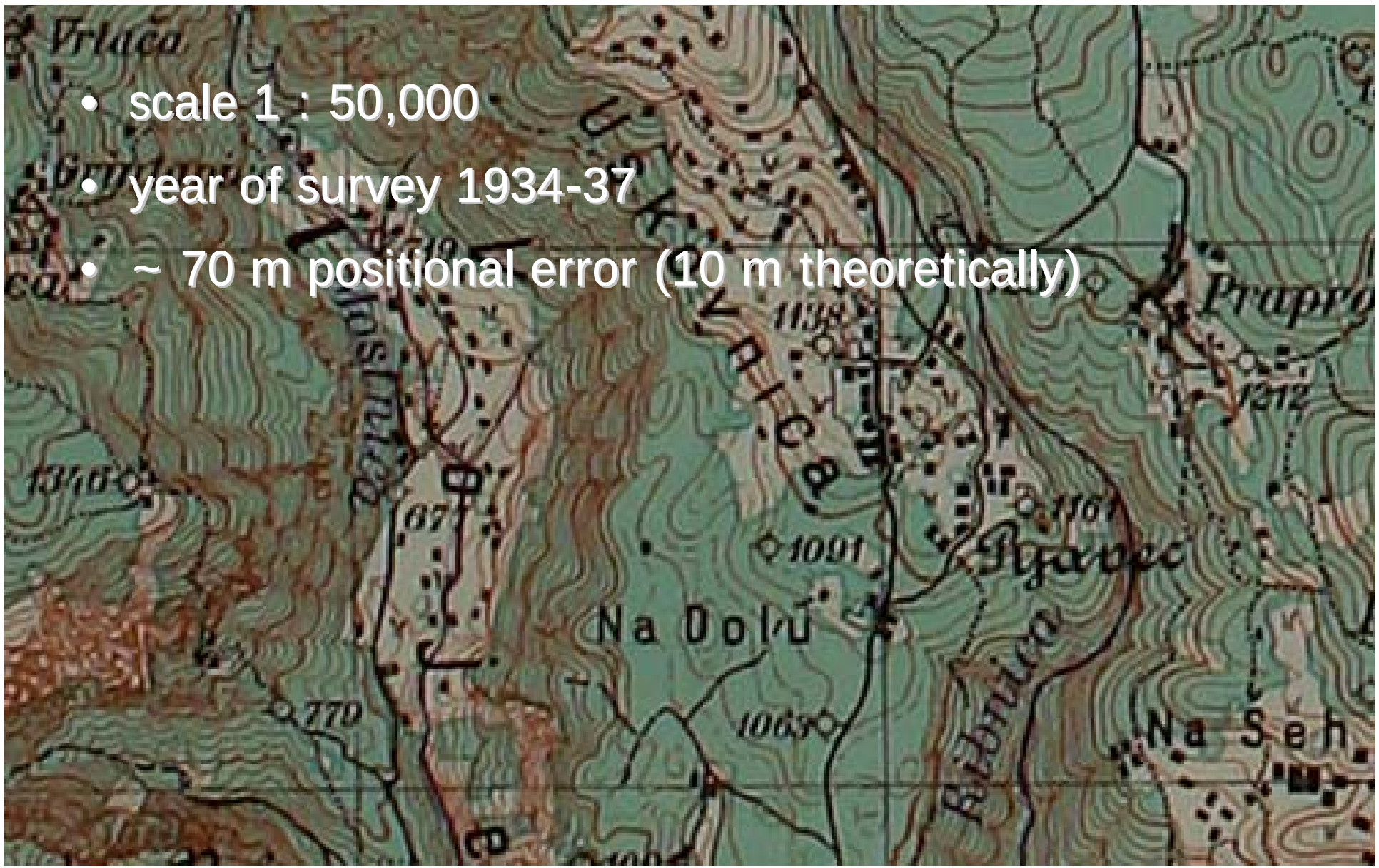
Italian maps



- scale 1 : 25,000
- year of survey 1932-37
- black and white
- relatively good quality – topographic details
- ~ 50 m positional error

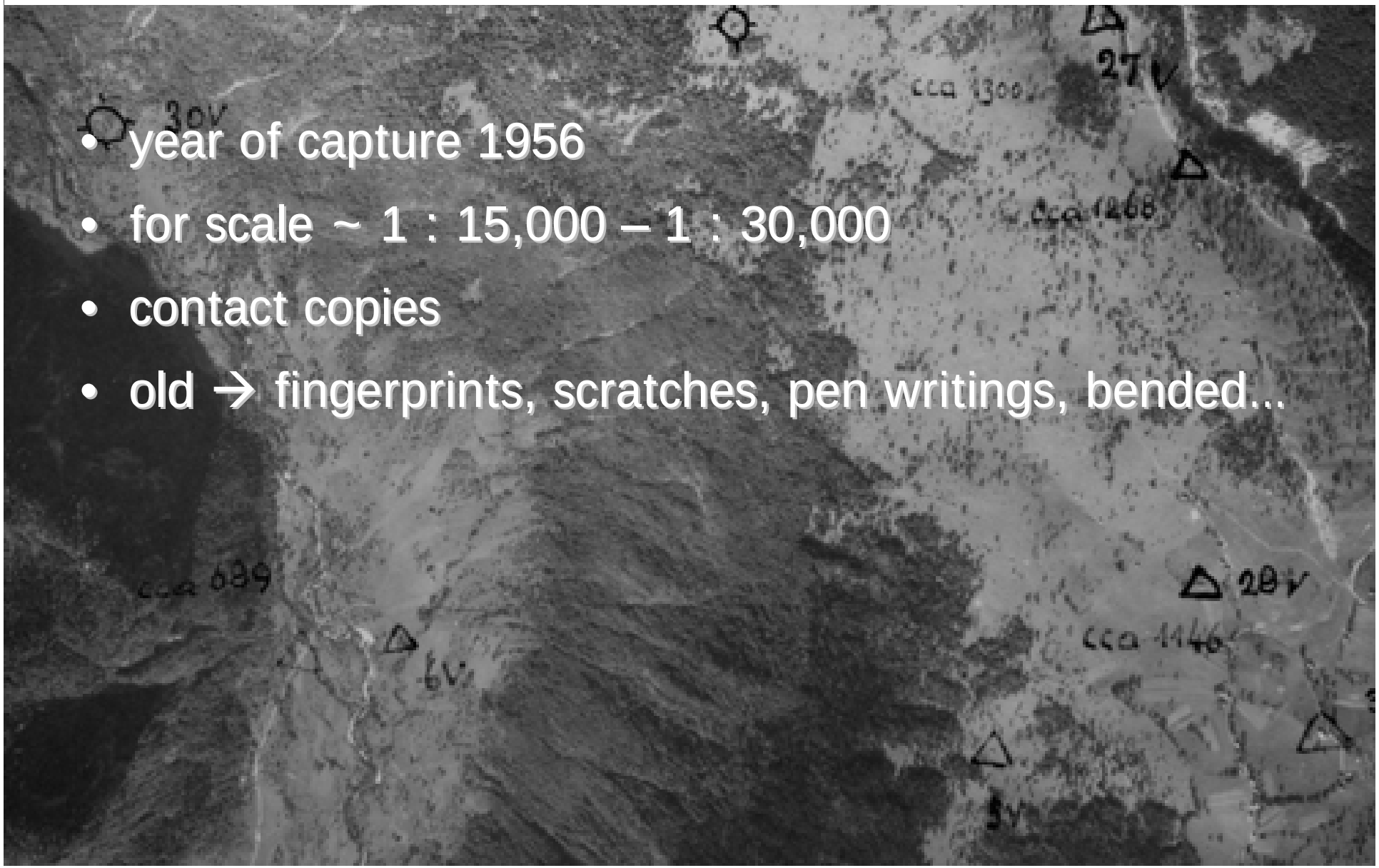
- do not cover whole area of interest

Yugoslav maps



- scale 1 : 50,000
- year of survey 1934-37
- ~ 70 m positional error (10 m theoretically)

Aerial photographs



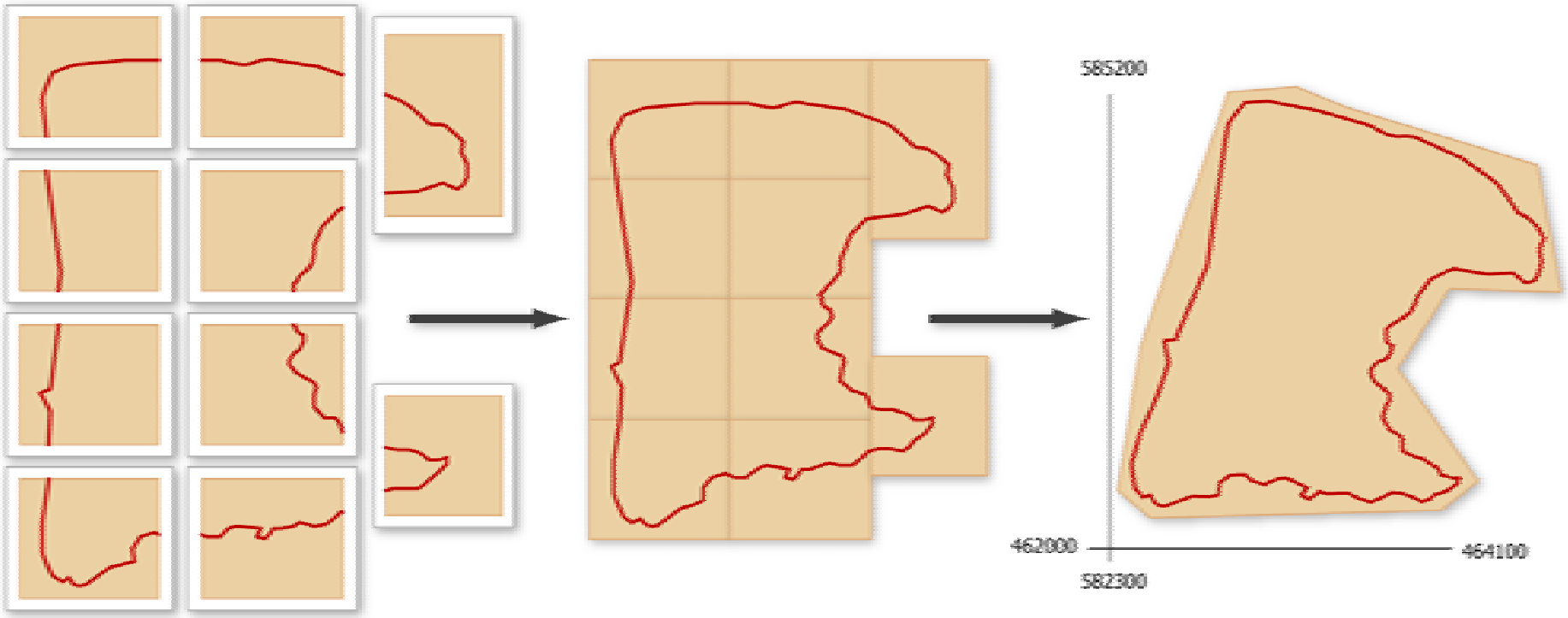
- year of capture 1956
- for scale ~ 1 : 15,000 – 1 : 30,000
- contact copies
- old → fingerprints, scratches, pen writings, bended...

Georeferencing

- small number of control points
- even the ones that exist are graphically distorted, generalised (shifted) and uncertain
- German, Italian or Slovenian toponyms
- mountainous area
- area of interest was on the border of triangulation for all datasets
- many coordinate systems (at least four countries)
- difficult homogenization for analyses – different cartography, semantically different

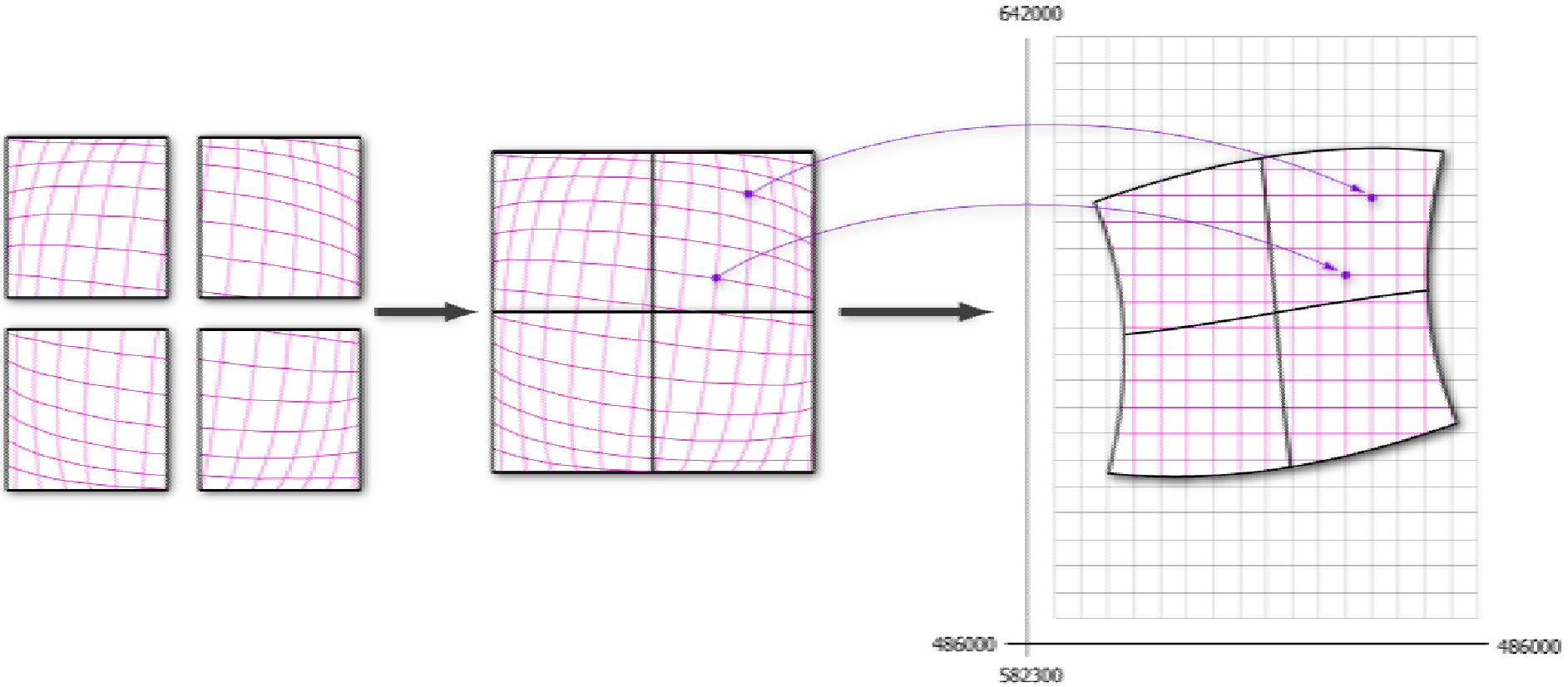
Georeferencing method

- Josephine military maps and Franciscan cadastre maps were first combined and later georeferenced



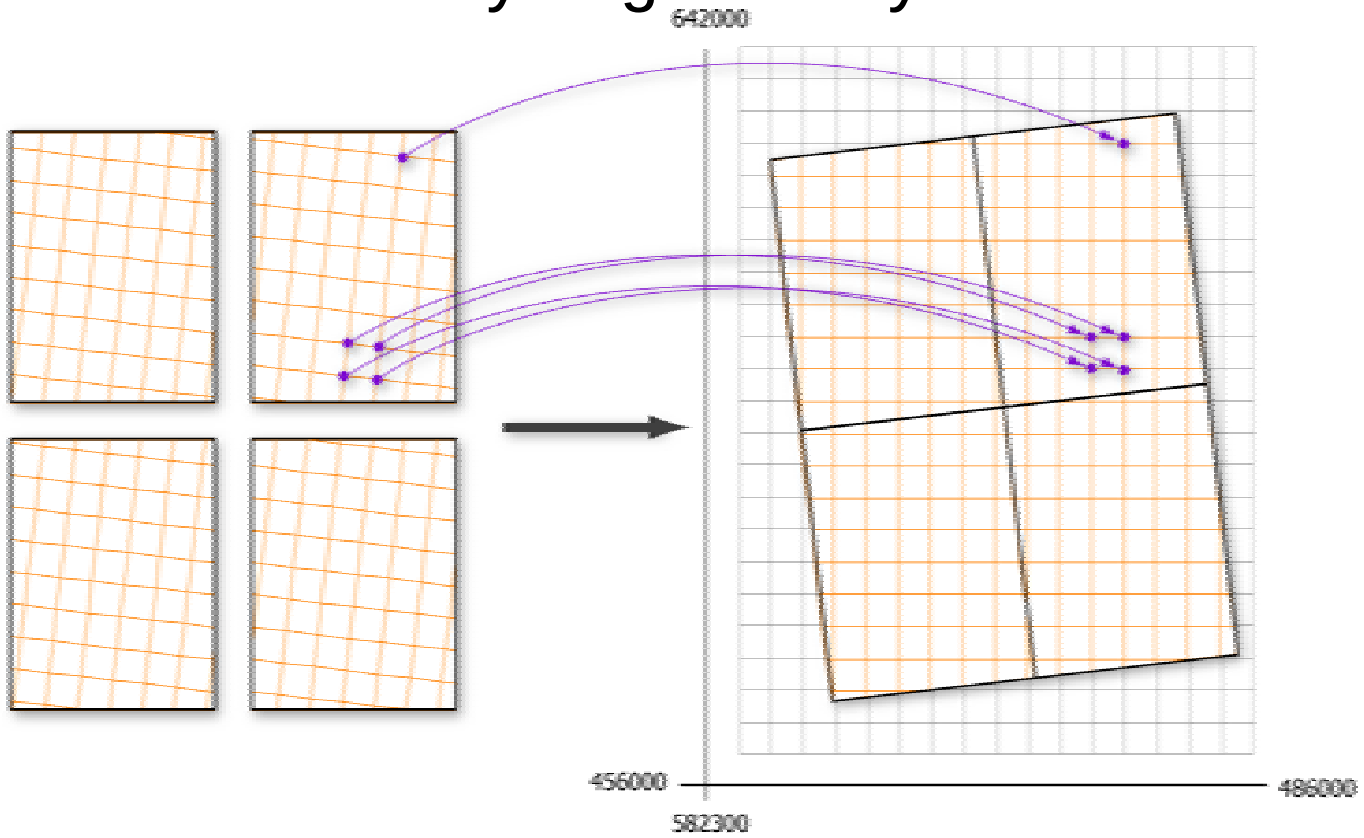
Georeferencing method

- Italian maps were combined according to printed grid and later georeferenced to fit the target coordinate system



Georeferencing method

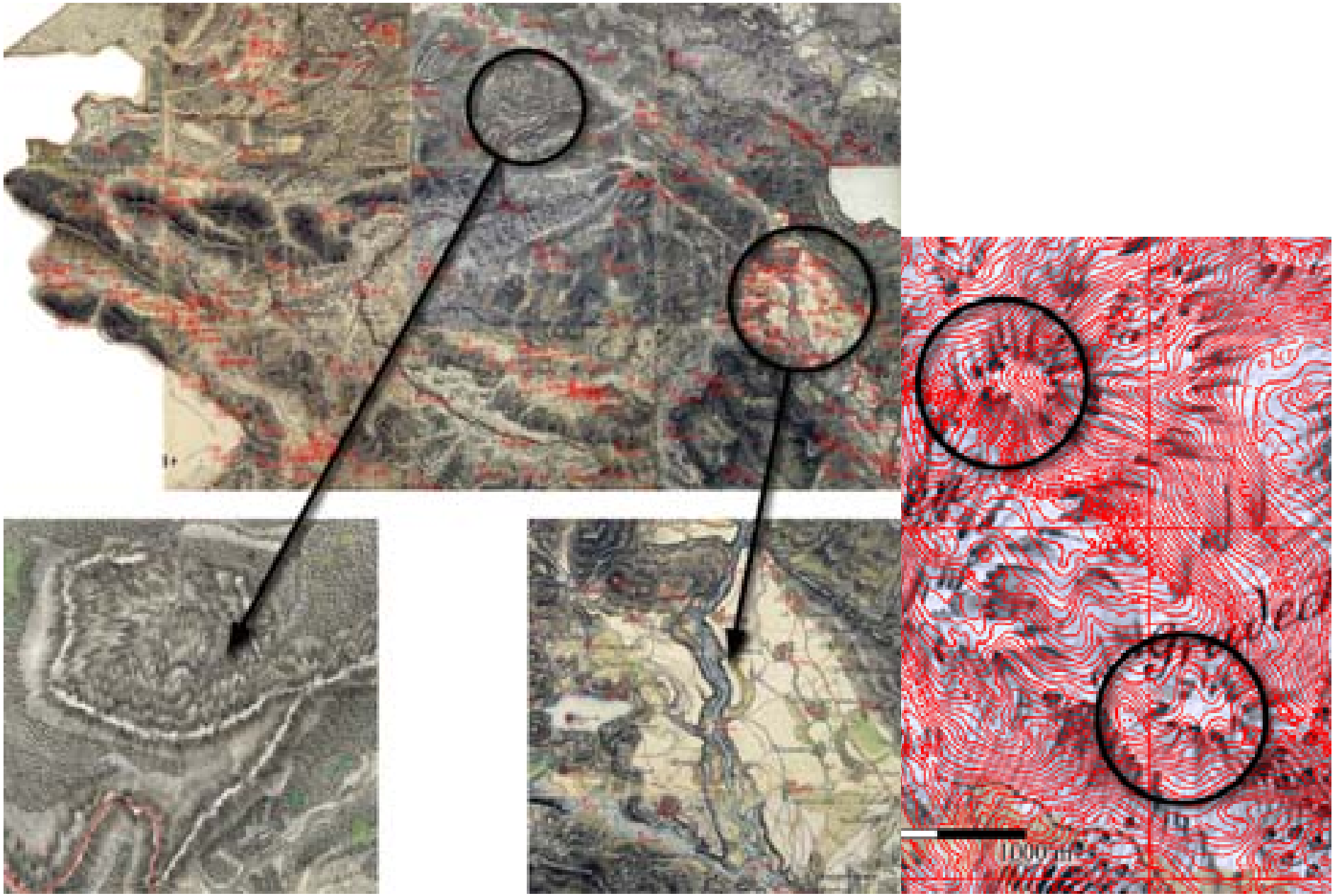
- Yugoslav maps were combined and georeferenced at the same time
- Yugoslav 1 : 50,000 maps were later georeferenced again due to relatively large non-systematic error



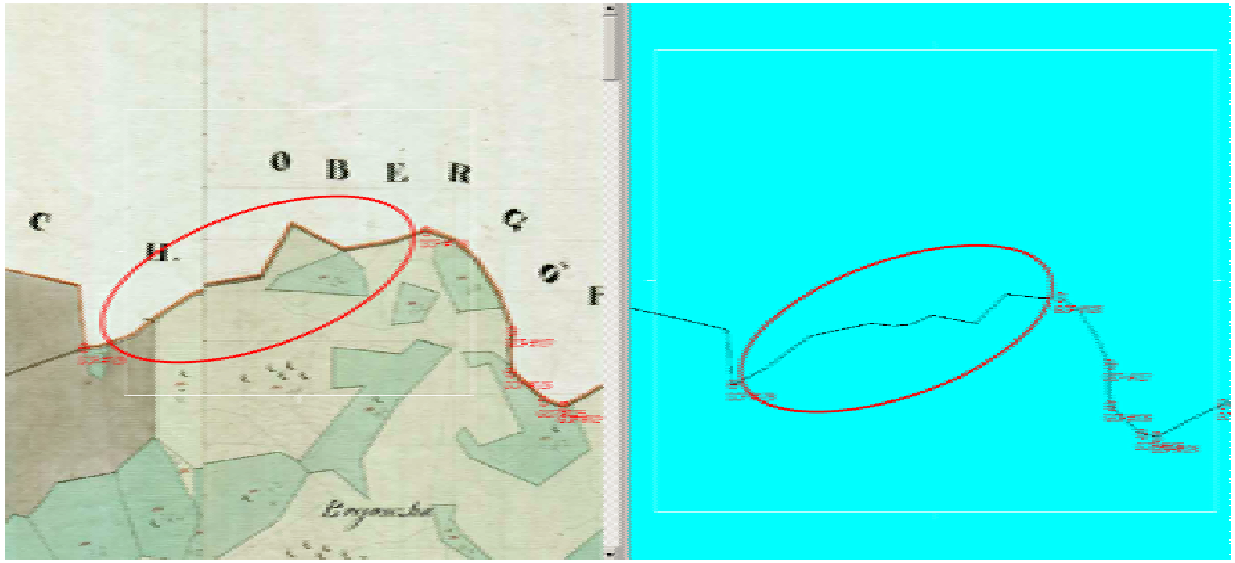
Quality control

- maps were tested against contemporary maps of similar scale (they were adopted as nominal ground)
- test points were randomly selected, but we tried to cover the whole map area
  - rivers
  - peaks
  - roads and railways (not on the Josephine military maps)
  - or: points in “empty” area

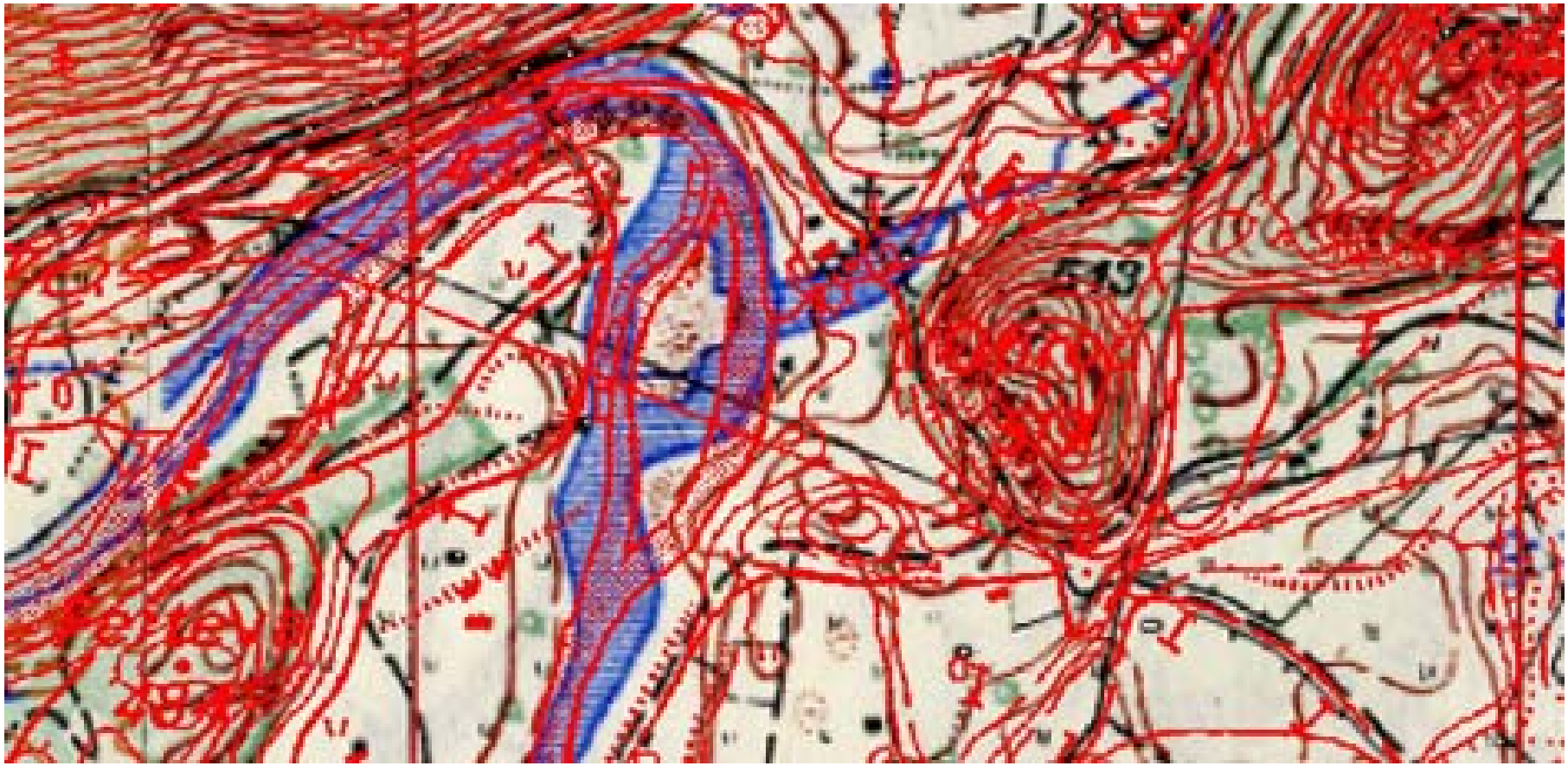
Problems – lack of reference points



Problems – borders changing



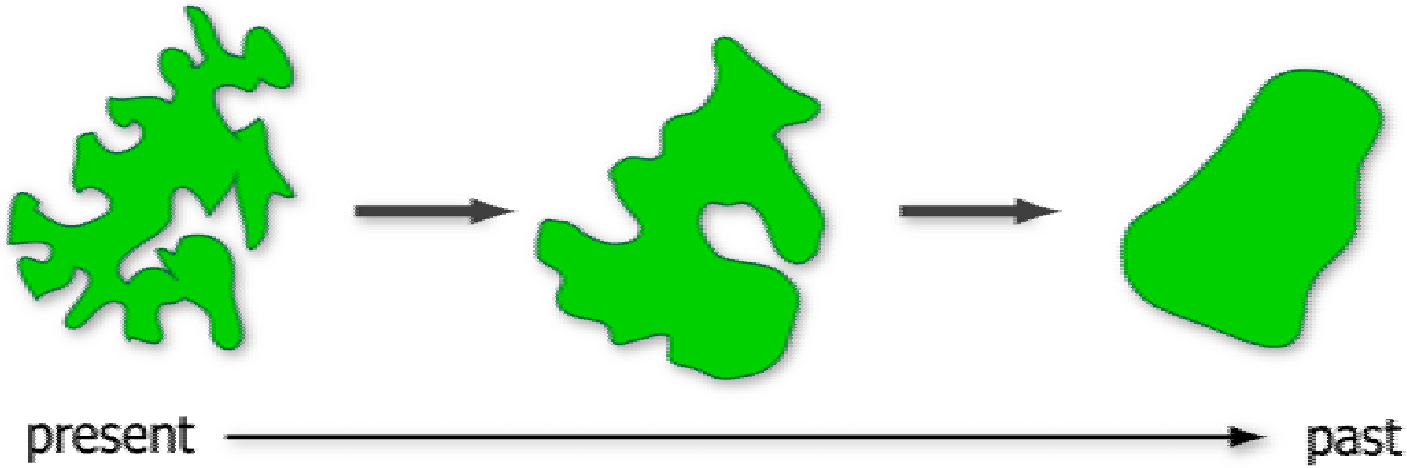
Problems – features changing (natural)



Problems – inhomogeneous maps

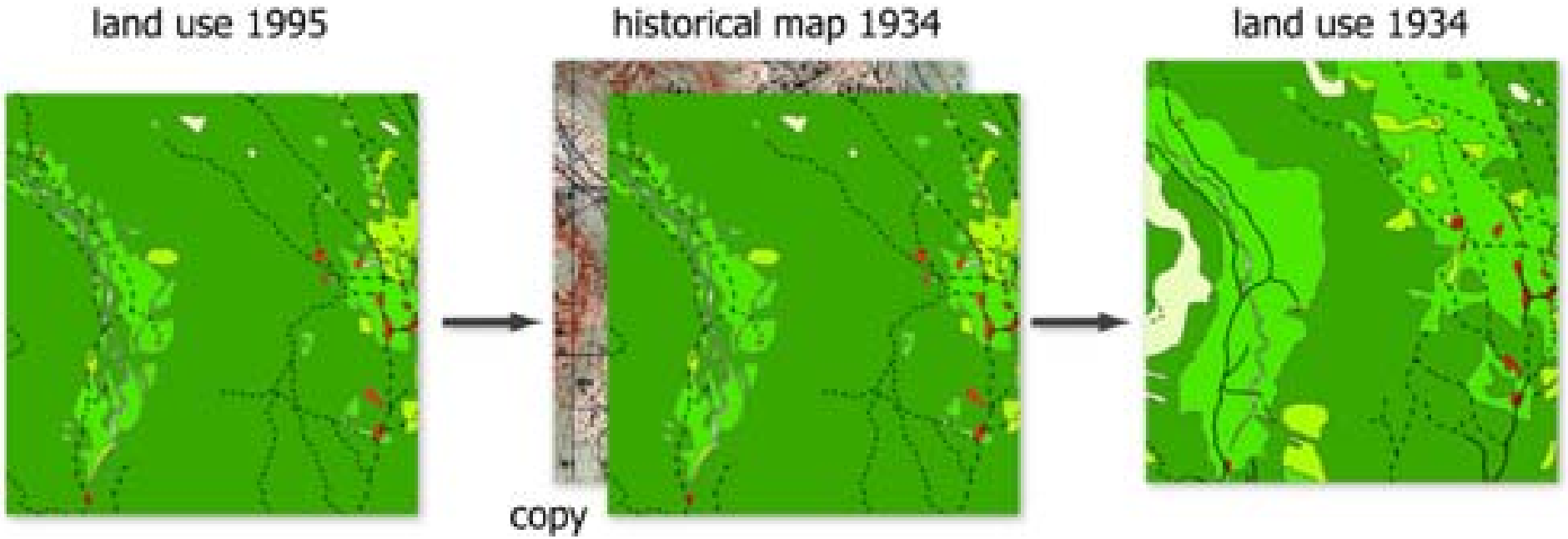
Time scale, map technology development

- similar scale / different time scale
  - thematically different (legend keys)
  - different quality of different themes (mapping of land use is lower quality than rivers, peaks, roads, settlements)
  - different surveying methods
  - different views on generalisation
  - different quality
  - → different fuzziness / subjectivity

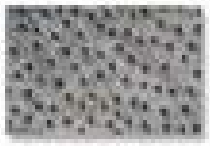
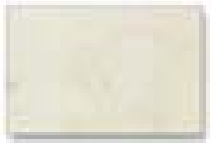


Backward editing method

- Corine nomenclature



Different legend keys (nomenclature)

	Josephine military topography	Franciscan cadastre	Italian 1:25,000	Yugoslav 1:25,000
transitional woodland shrub				
forest				
bare rocks				
urban fabric				
pastures				
inland waters				

Conclusions

- quality → different, inhomogeneous
- legend (data catalogue) problems
- understanding
  - data (acquisition and measurements methods, possible errors – systematical, gross, random)
  - projections, zones, shifts
  - problems
- GIS-based analysis
  - applying wide knowledge
  - reverse editing
- …