Presentation outlook

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

Spatial Information Systems for Transnational Environmental Management of Protected Areas Regions in CADSES

SI STEM aPARC, INTERREG III B
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)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Josephine military topography</th>
<th>Franciscan cadastre</th>
<th>Italian 1:25,000</th>
<th>Yugoslav 1:25,000</th>
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<tbody>
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</table>
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

• ...