



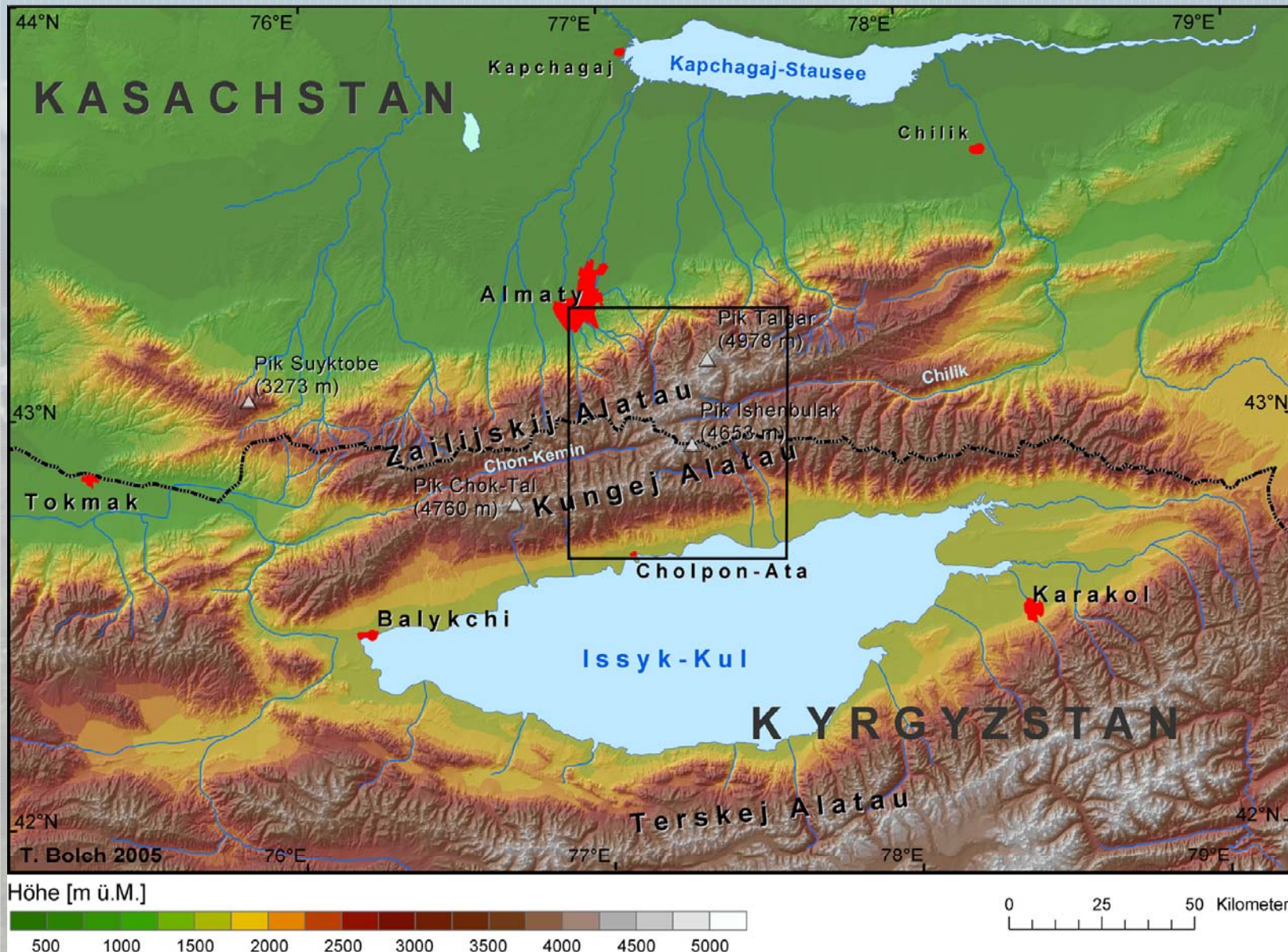
Using remote sensing and GIS to identify and monitor potentially dangerous glacial lakes in northern Tien Shan

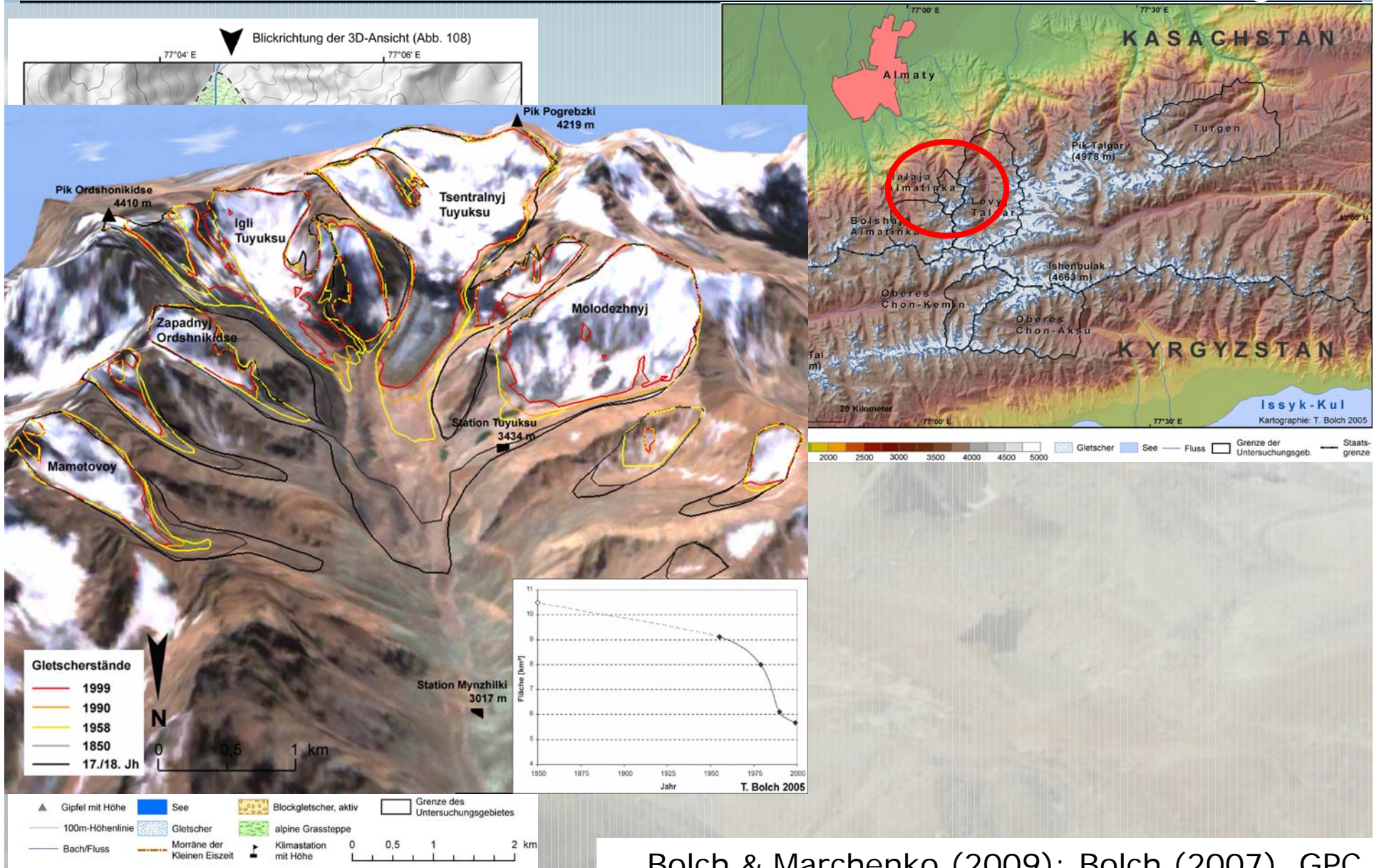


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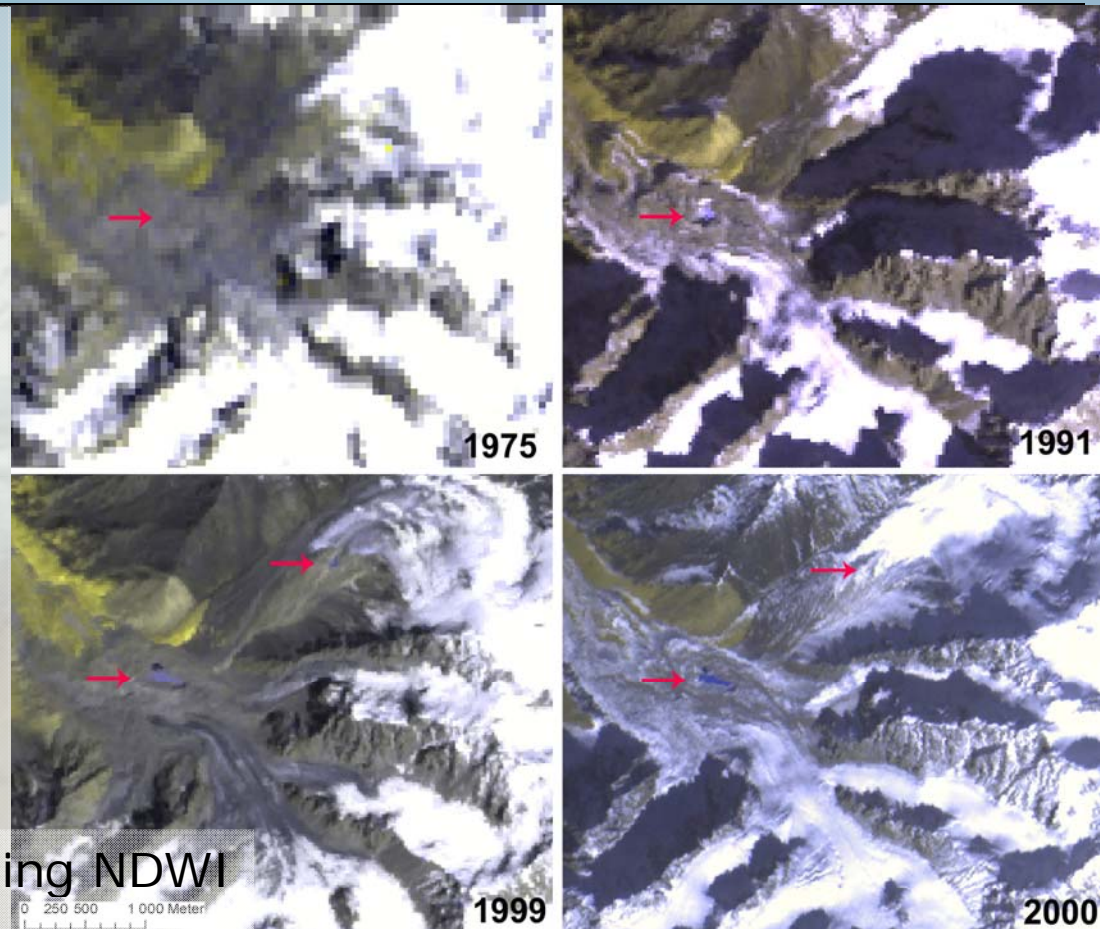
Bolch & Marchenko (2009); Bolch (2007), GPC

Data (Low Cost)

- 1972: Corona KH4B
- 1972: Landsat MSS
- 1975: Landsat MSS
- 1991: Landsat TM
- 2000: Landsat ETM+
- 2000/2001: ASTER
- 2007/2008: Landsat SLCoff
- SRTM3/ASTER DEM

Lake Detection

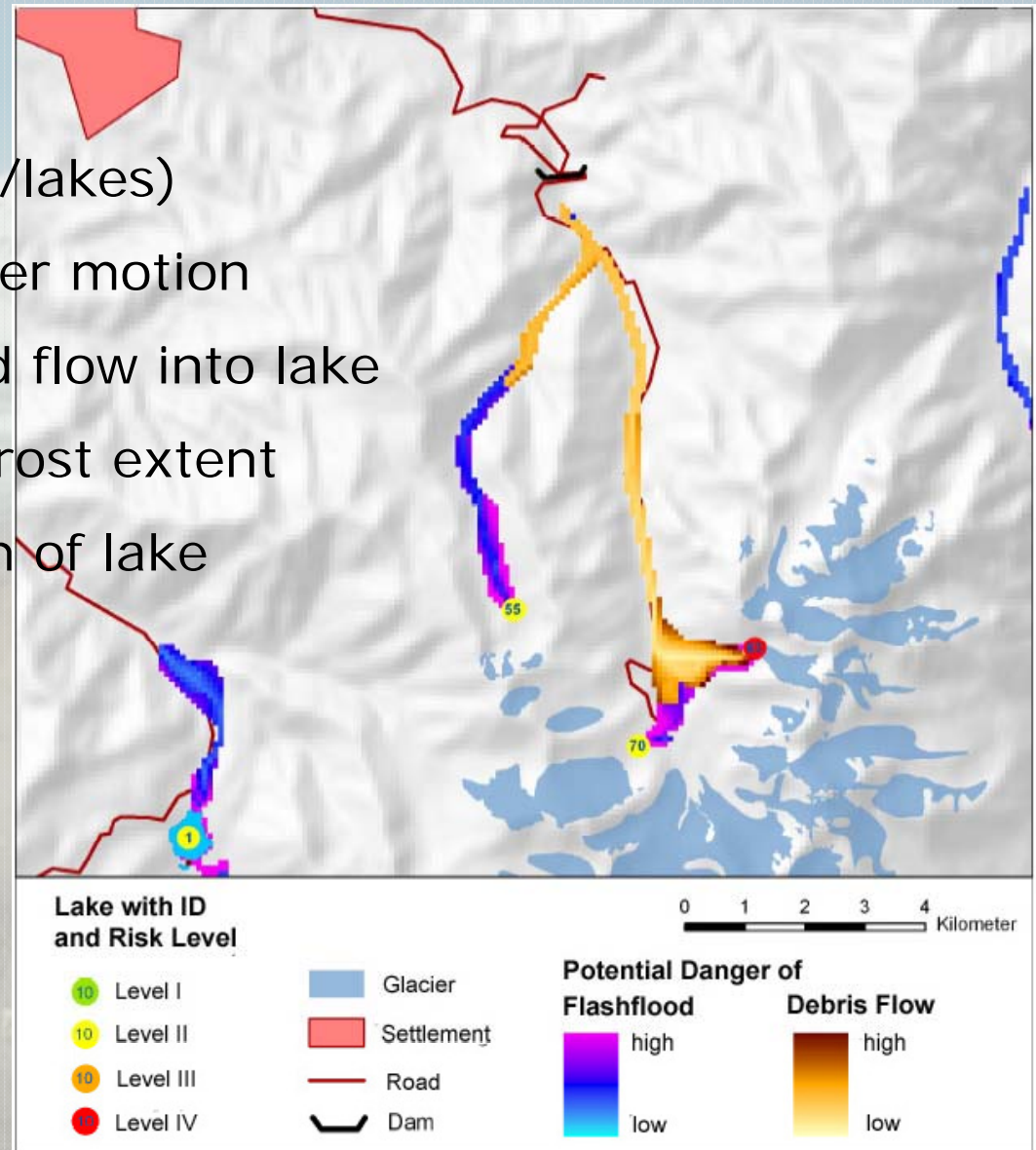
- Automated lake detection using NDWI
- Postprocessing (e.g. shadow mask)
- Manual improvement, if necessary



Methods

- Change detection (glaciers/lakes)
- Activity of the glacier/glacier motion
- Risk of ice avalanches/mud flow into lake
- Current and future permafrost extent
- Affected areas downstream of lake

Analysis of potential danger
 based on
 a weighted combination
 of each determinants.



Results

- ~ 200 lakes
- 4 lakes very dangerous
- 55 lakes medium danger
- Remote sensing and GIS modelling suitable for initial PDGL detection
- Main drawbacks:
 - Quality/resolution of satellite data
 - Resolution of SRTM3 DEM
 - Quality of ASTER DEM
- Field verification for dangerous lakes still mandatory

