



Land Use Land Cover Changes in the Vistula Basin



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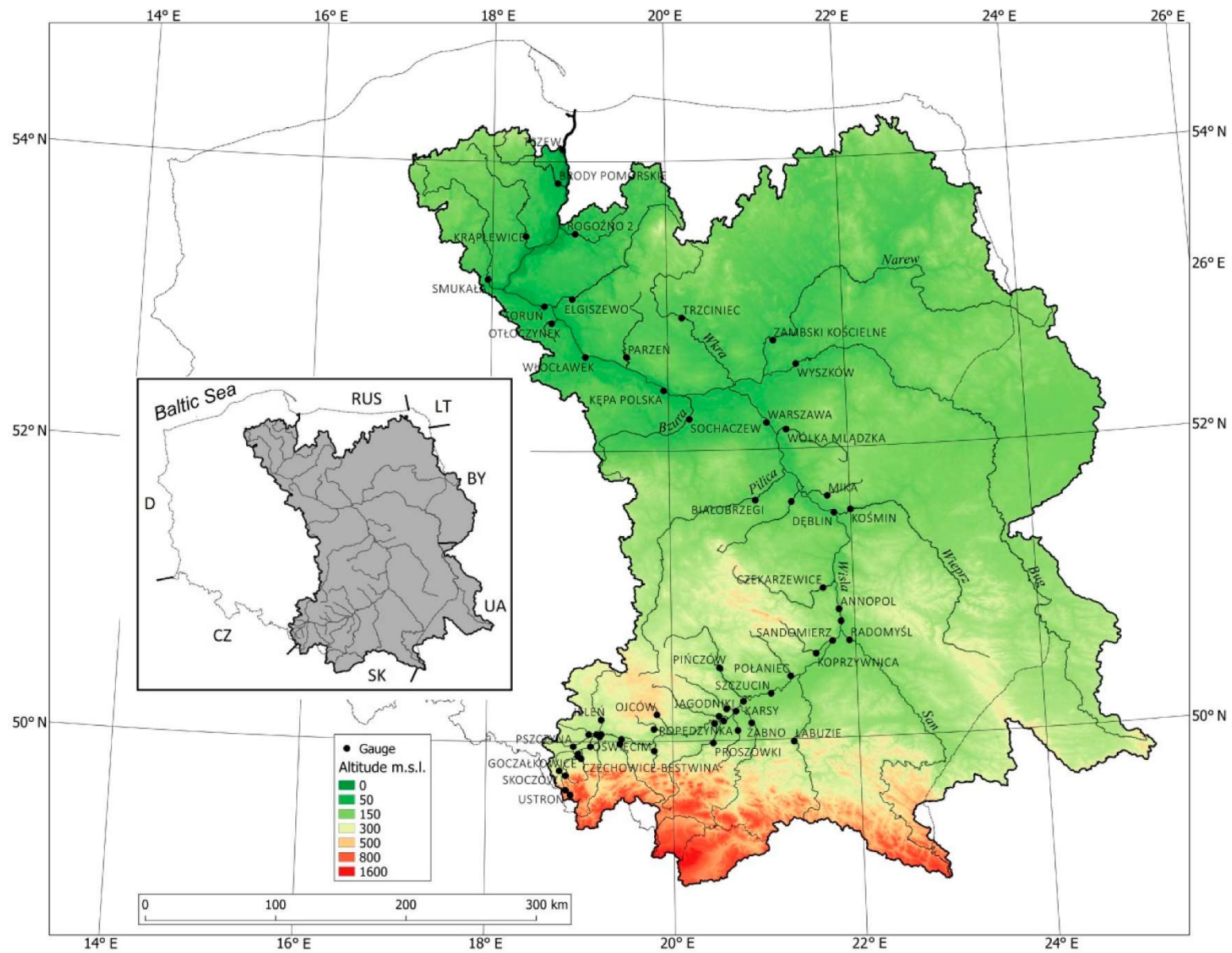
WP2 Assessment of the impacts of human activities on the formation and development of hydrological drought

(2) Impacts of land use change on the spatio-temporal characteristics of hydrological droughts

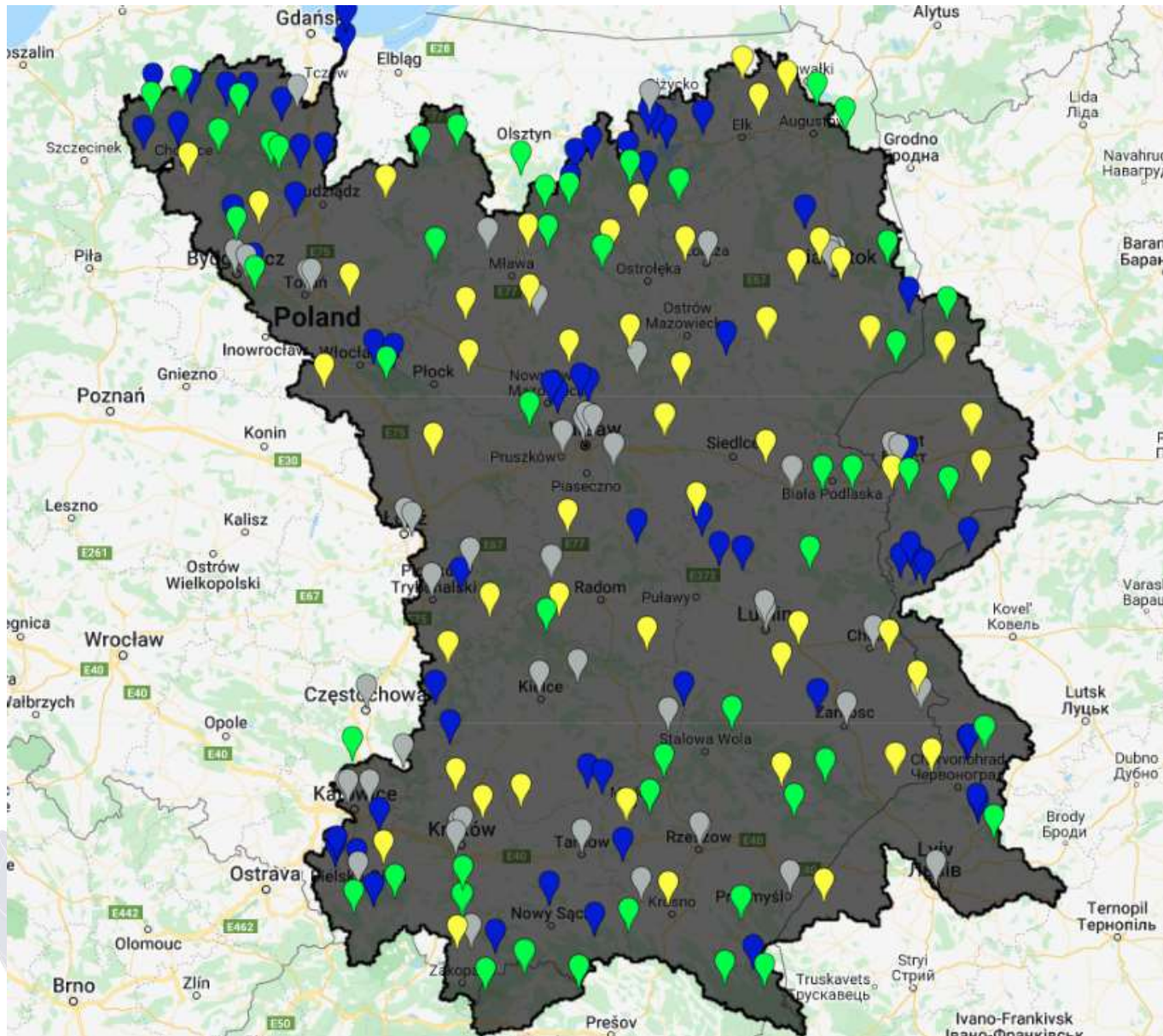
- Classify land cover using multi-temporal remote sensing imagery (Landsat satellite images) with supervised classification methods, and analyze land use land cover changes every five to ten years from 1980s' to 2010s'.
- Evaluate the temporal variation of land surface evapotranspiration (ET) using Landsat satellite images in different seasons with the ET estimation algorithm developed by Wang et al. (2014) for the two case study catchments;
- Investigate the temporal and spatial variation of land use/land cover change and their impacts on water demand and water consumption based on satellite ET estimations;
- Derive the relationship between drought parameters (deficit volume - magnitude and duration) and land use land cover changes.



➤ Vistula Basin



➤ Google Earth Engine supervised classification



- urban
- agriculture
- forest
- water

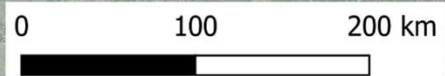
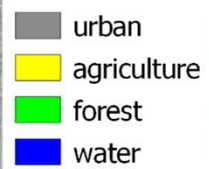
➤ Google Earth Engine supervised classification

- Landsat images (30 m spatial resolution)
- image composite to cover the entire basin
- cloud-free composite, spanning the period January-December
- yearly Land Use Land Cover
- analysis of the period 1985-2021
- use of Landsat 5, L7, L8 datasets



LULC 2010

LULC 2010 - L7

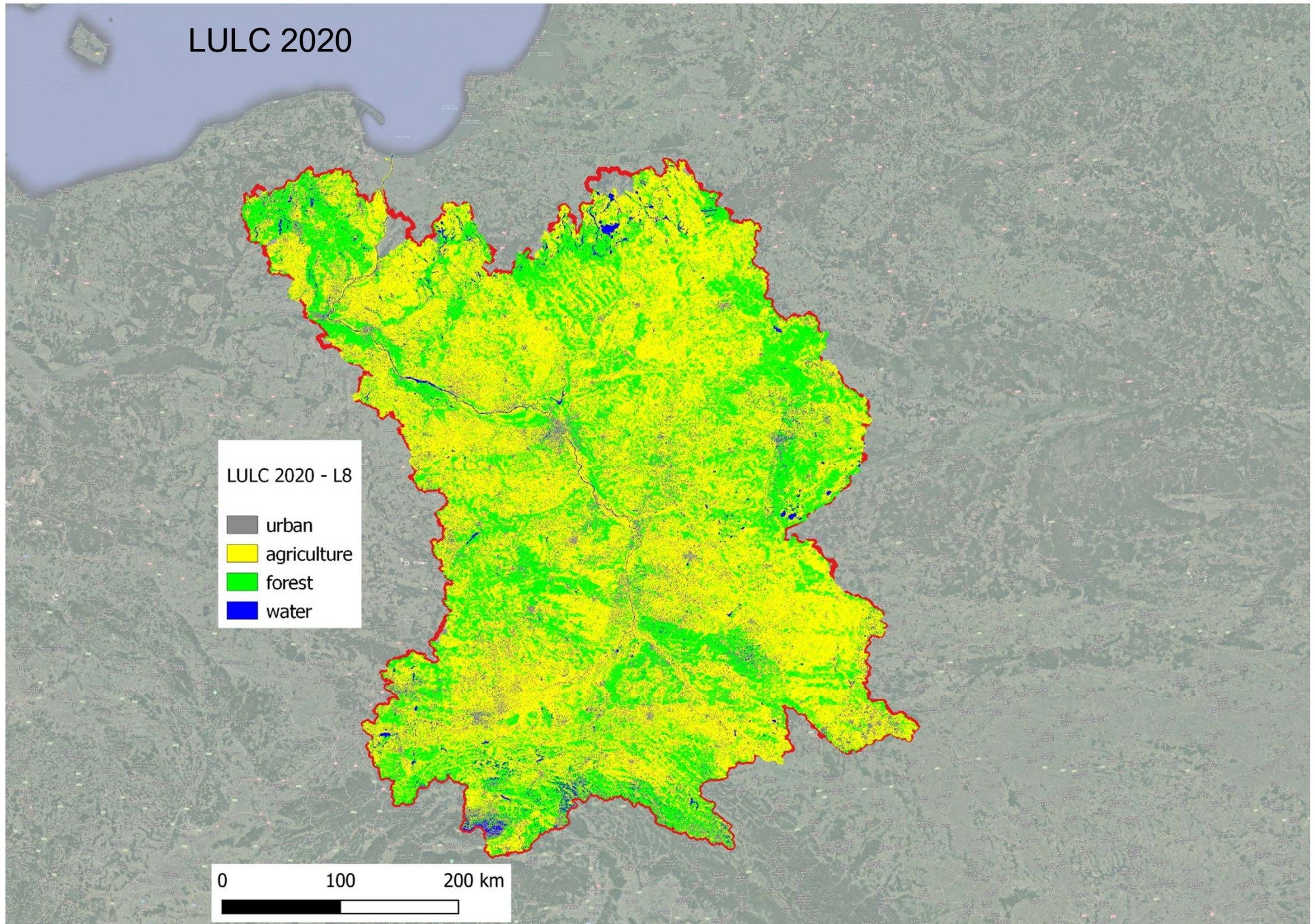


LULC 2020

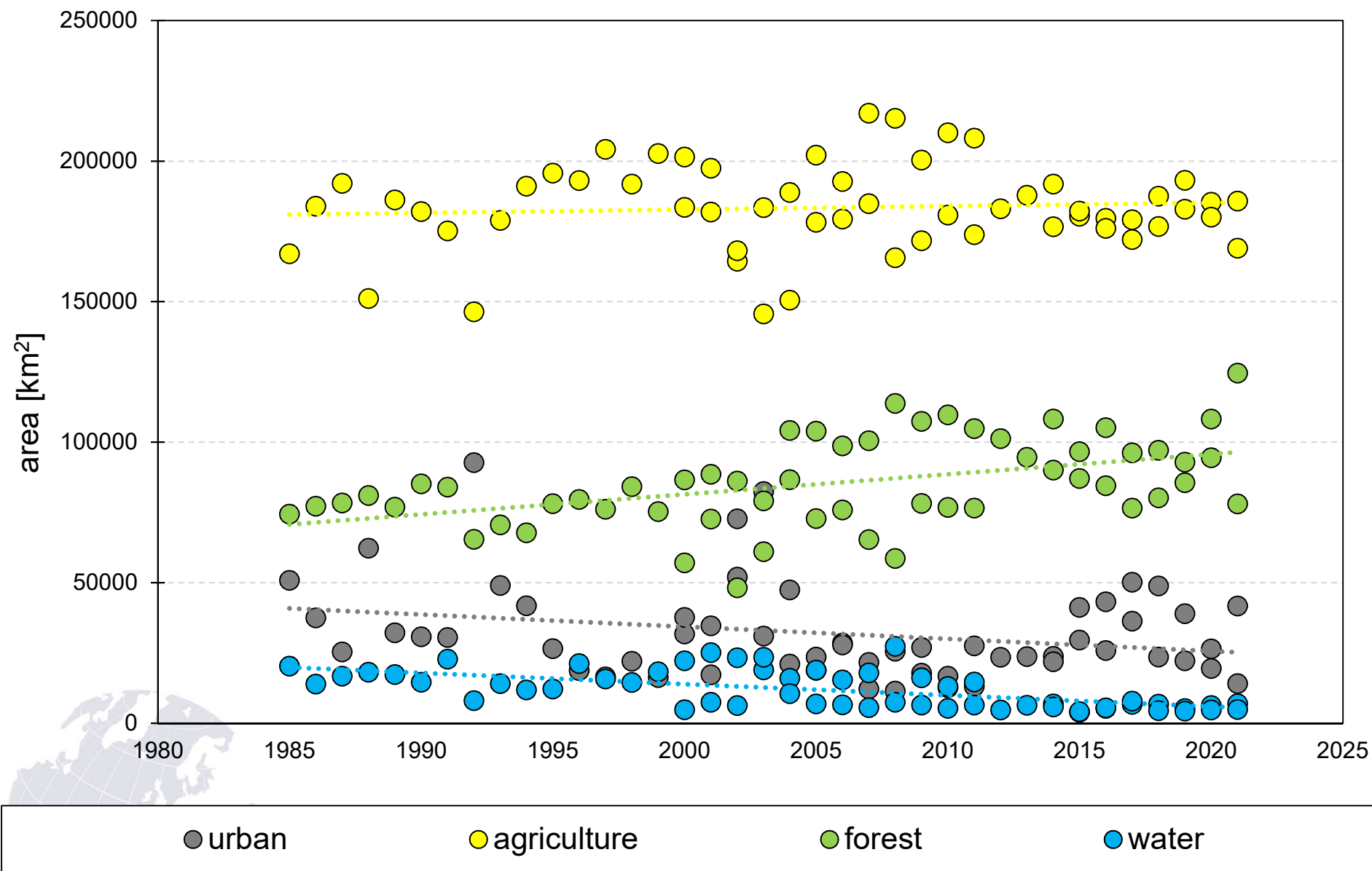
LULC 2020 - L8

- urban
- agriculture
- forest
- water

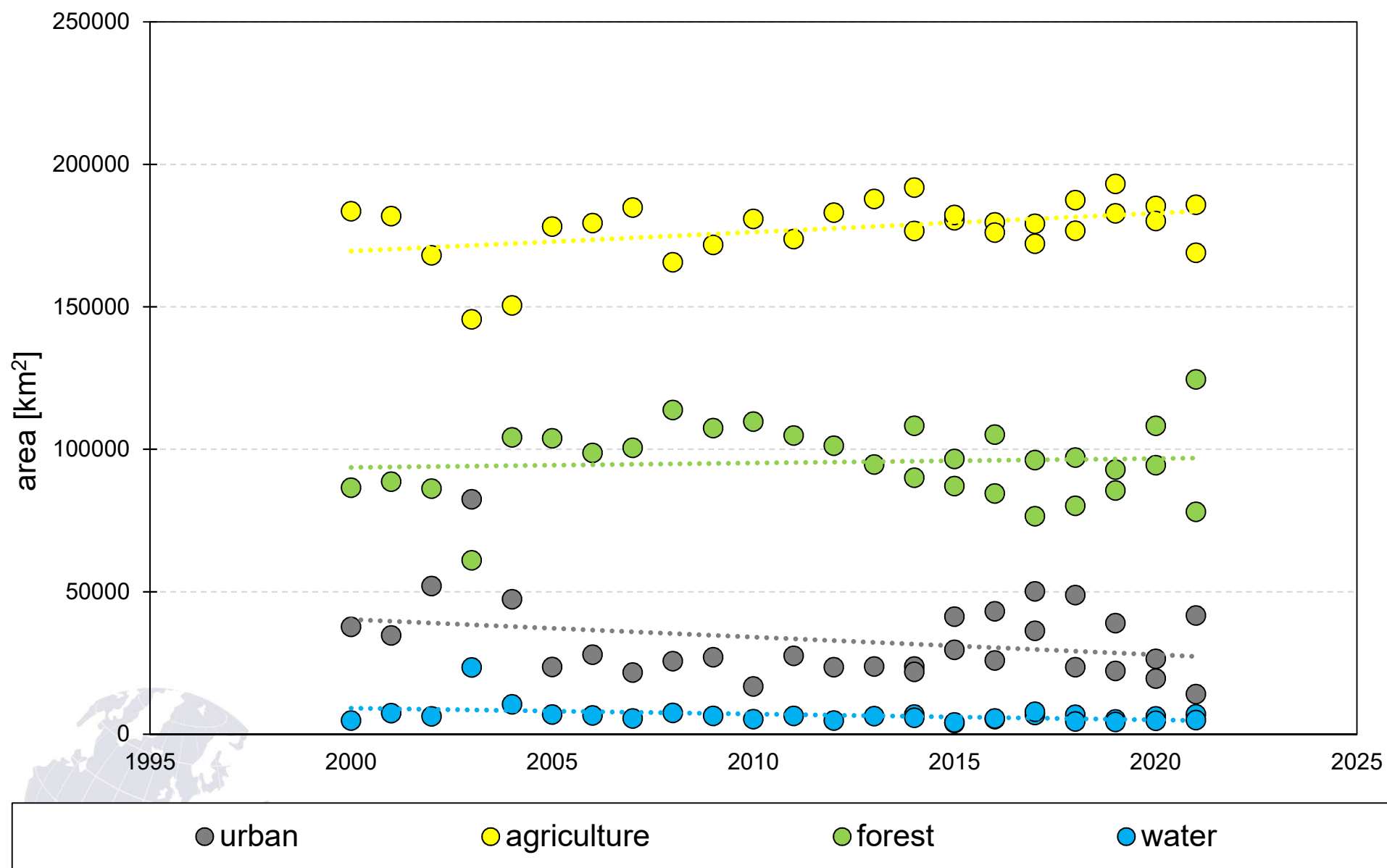
0 100 200 km



➤ LULC Landsat 5,7,8



➤ LULC Landsat 7,8



➤ **Conclusions**

- No significant changes are recognizable in LULC at the basin scale
- Not proper (e.g., clouds) and unrealistic (e.g., decrease in urban areas) results are detected
- The basin is too big for being investigate as a whole

➤ **Next steps**

- Downscale the analysis to small sub-basins, selected in connection with the other WPs
- Combined use of Landsat and Sentinel images for remote sensing of LULC
- Comparison with available datasets (e.g. CORINE Land Cover)



Thank you for your attention

