UNIVERSITY OF LATVIA
FACULTY OF GEOGRAPHY AND EARTH SCIENCES

"Spatial and temporal prediction of groundwater drought with mixed models for multilayer sedimentary basin under climate change" (LZP-2019/1-0165)

FLPP
FUNDAMENTAL AND APPLIED RESEARCH PROJECTS

Latvian Council of Science

Preliminary identification of groundwater drought events in unconfined aquifer with standardized drought indices in single multilevel groundwater station

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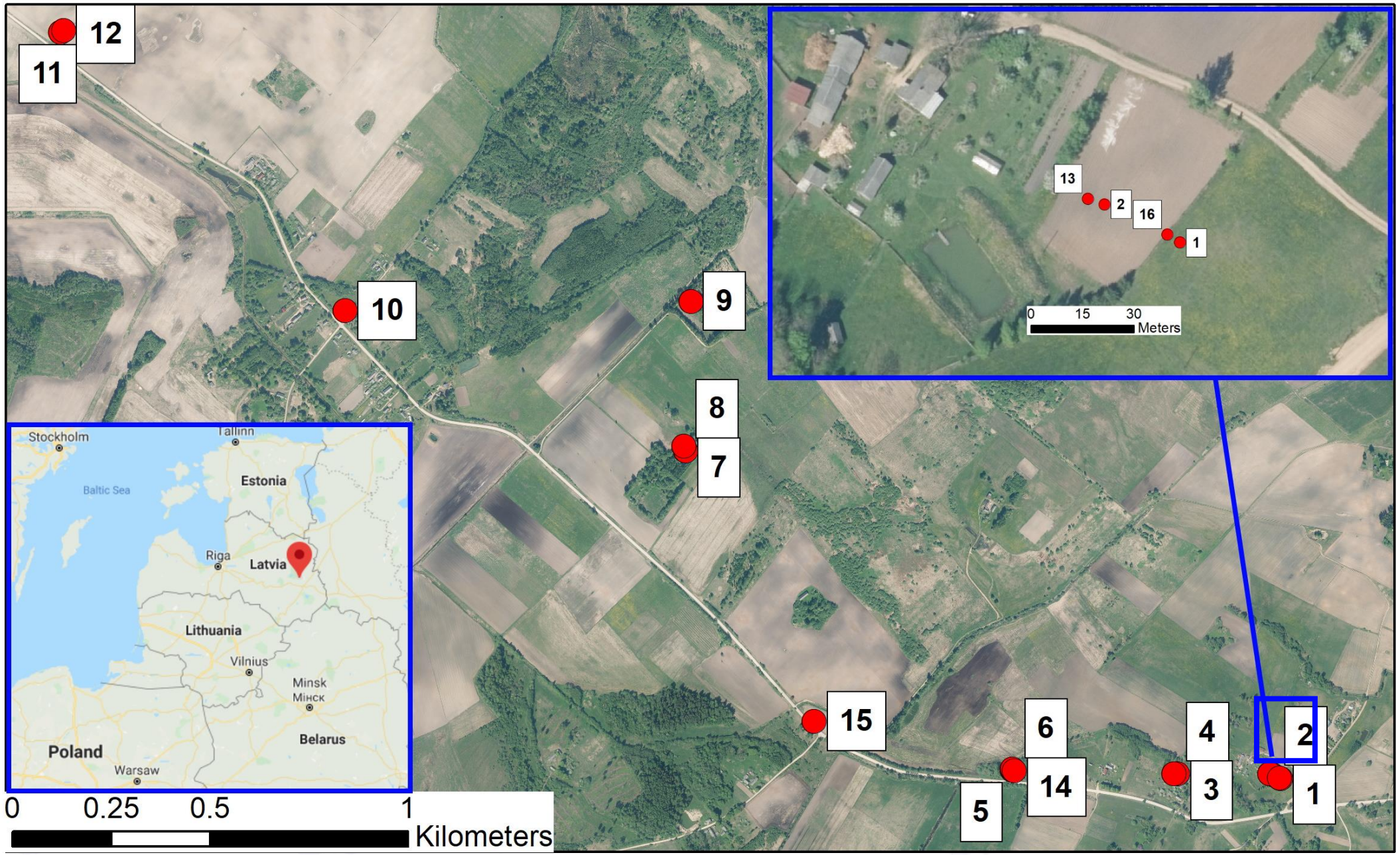
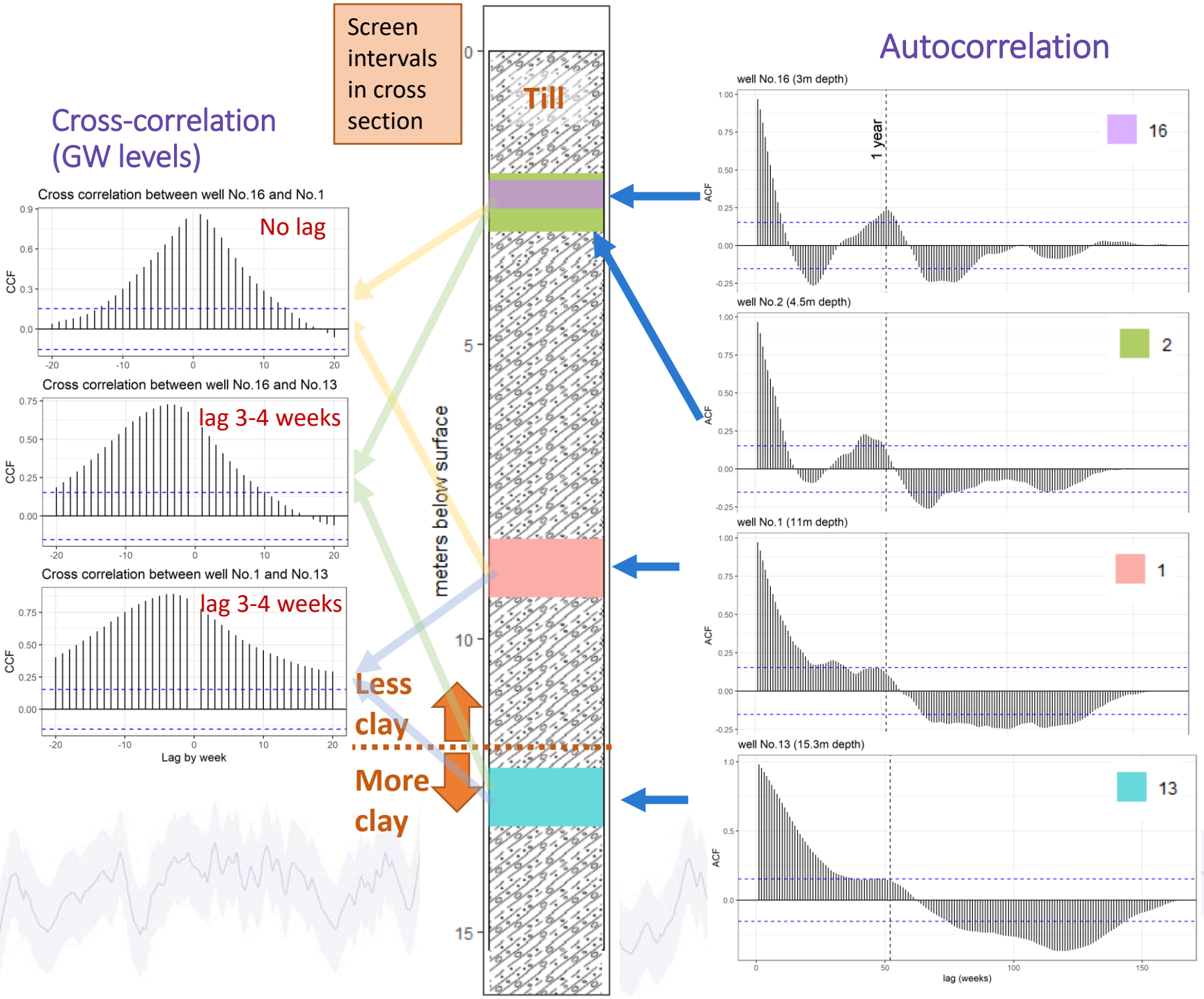
Location of the study. Emphasis on wells in zoomed rectangle



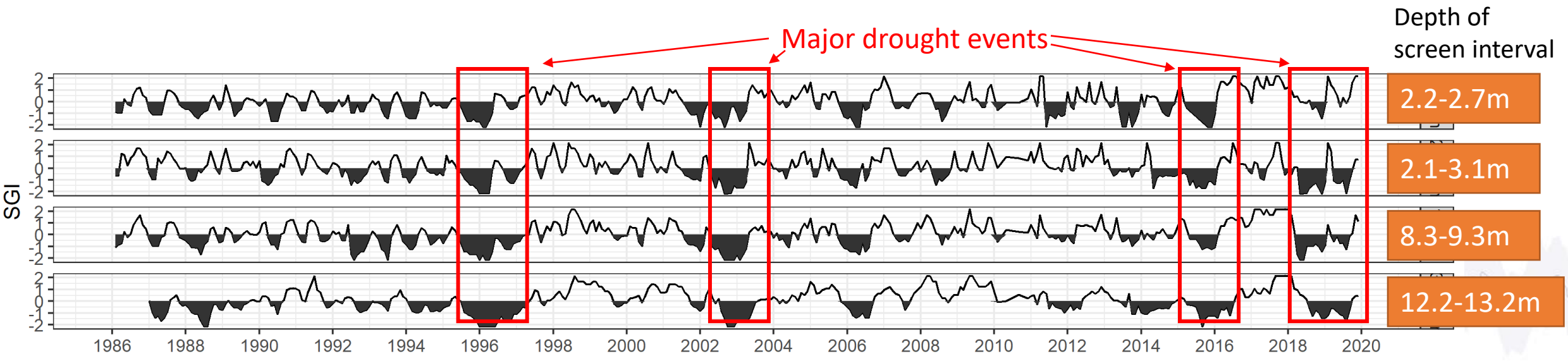
- Minor change in clay content in the till has significant effect on GW signal propagation.
- GW signal is lagged by 3 to 4 weeks in the deepest (12.2-13.2m) well comparing to three shallower wells. The lag occurs within vertical distance of ~3m between the two deepest wells.
- Distinct annual and semi-annual signal autocorrelation is present in the shallow well (3m) with short screen interval (0.5m), but less visible in well with the same depth, but longer (1m) screen interval.
- Seasonality signal diminishes with depth.



- Standardized groundwater level index (SGI) (Bloomfield & Marchant, 2013) generally show similar GW drought pattern in all timeseries at this site.
- Small peculiarities arise from aquifer characteristics:
  - Attenuation with depth
  - Pooling effect in deeper wells

- Cross-correlation indicated that three shallower wells have no significant lags in both SGI and GW level signal.
- The deepest well shows lag of 3-4 weeks for GW levels. That can be observed in SGI too.

- SGI correlates within nearby shallow (3-11m deep) wells:
  - Distance <100m: R^2 0.7 – 0.9
  - Distance <3km: mostly R^2 > 0.5



Thank you!

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