

Modernizing digital soil map of Estonia using geospatial and field-based approaches with the focus on organic soils

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Questions?
Find or write us!



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Objectives

The soil map of Estonia:

- systematic large-scale soil cover mapping conducted 1954–1990
- the map was digitized in 2001 at a 1:10 000 scale.

Over **65 years of land management** and the construction of drainage systems to control water regimes have had an **impact on soil biogeochemical processes and soil genesis**.

How much Histosols have we lost over time?

Aim: update the existing large-scale soil map of Estonia with a focus on organic soils.

Methods

- Fieldwork on determining the loss of area of organic soils, peat thickness and soil organic carbon (SOC) content.
- Deep-learning to extract unmapped drainage ditches.
- Geospatial technologies, machine learning, fieldwork observations and lab data will be integrated to build a data cube.



Fig 3. Transect, where the thickness of organic layer and SOC samples will be collected

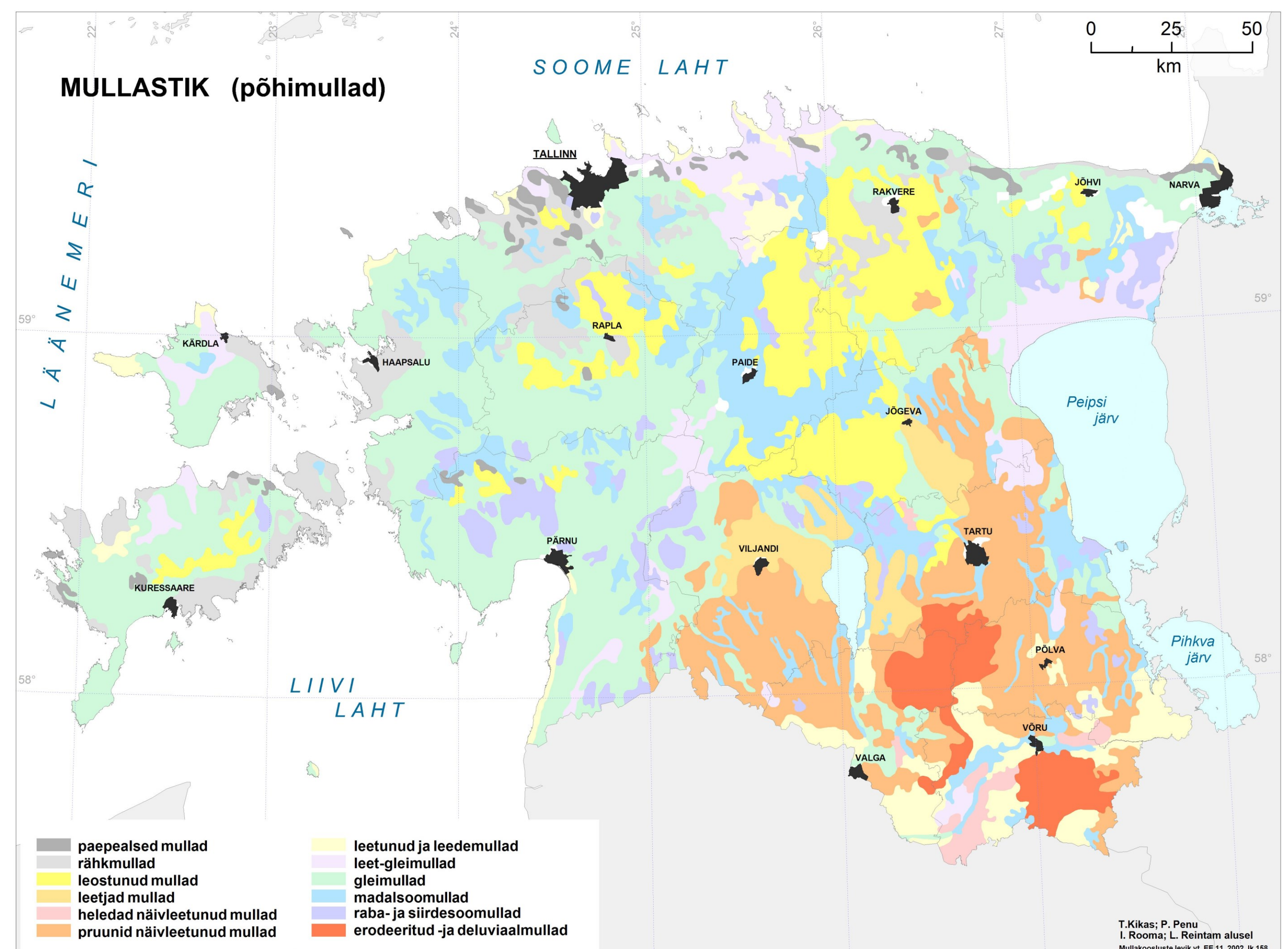


Fig 1. Soil map of Estonia (simplified)

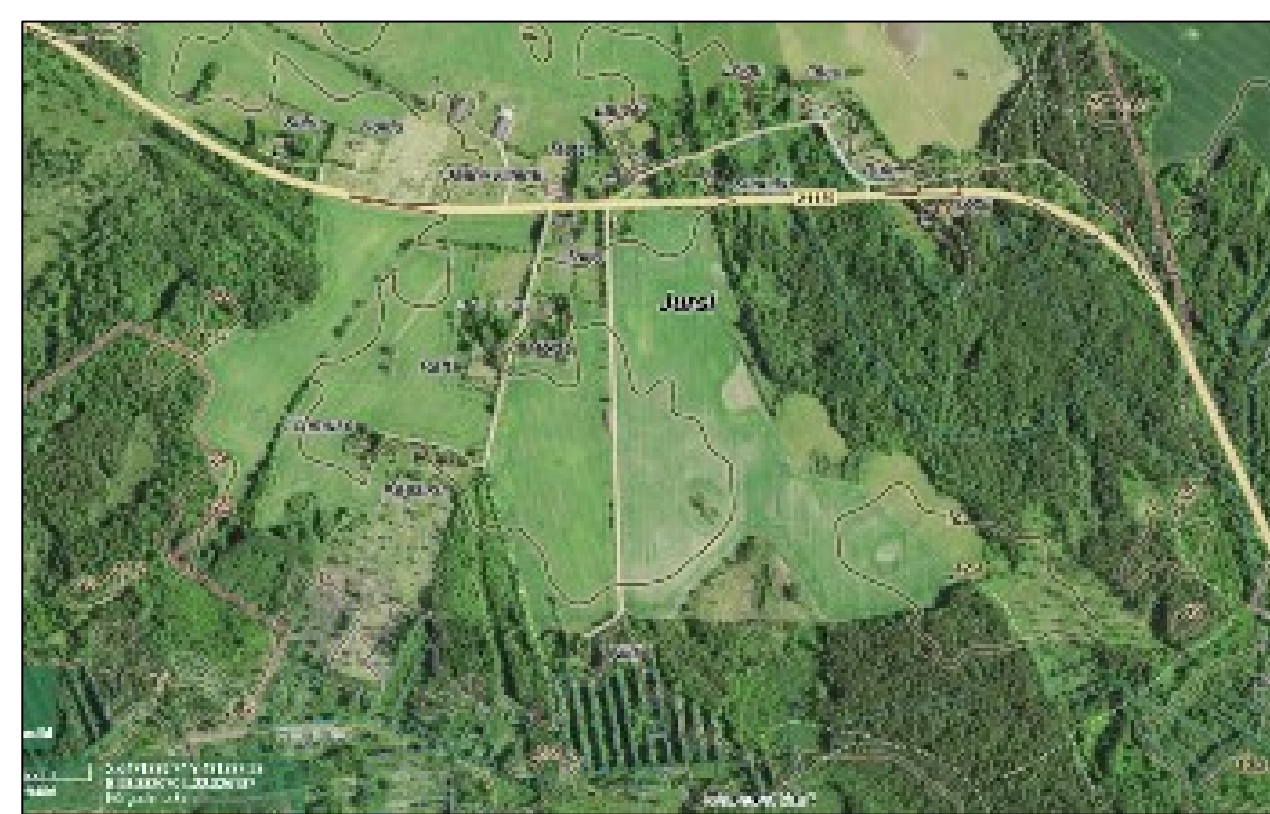


Fig 2. Drainage detection with deep learning

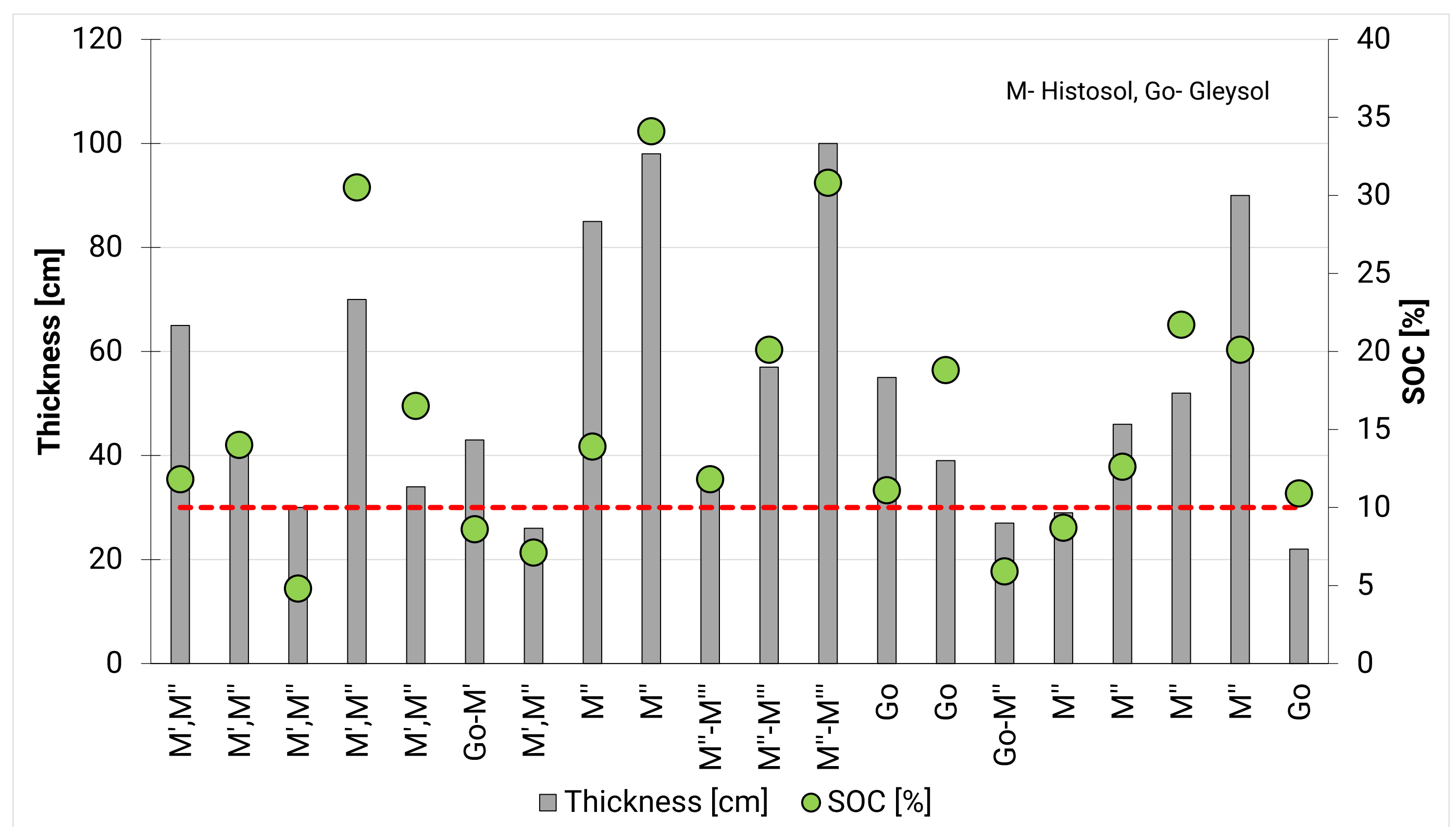
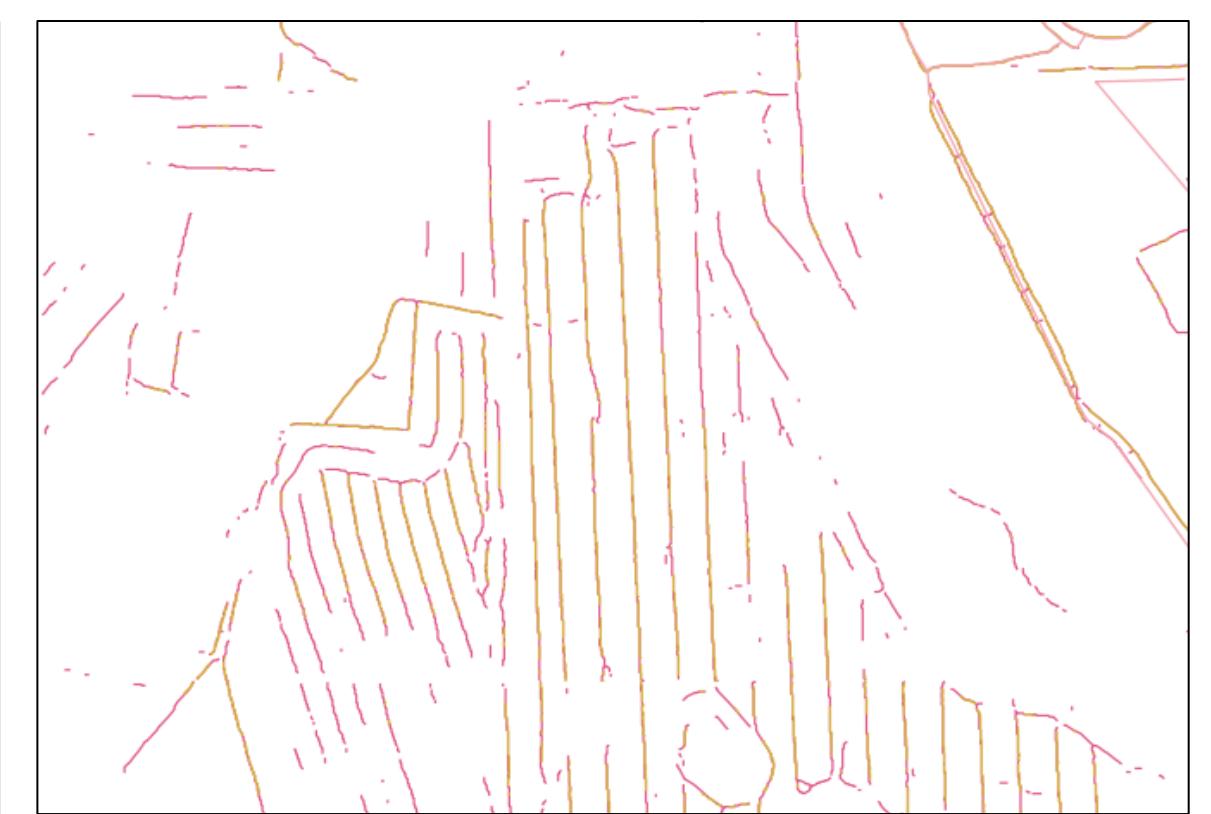


Fig 4. Measured thickness of organic layer and SOC content

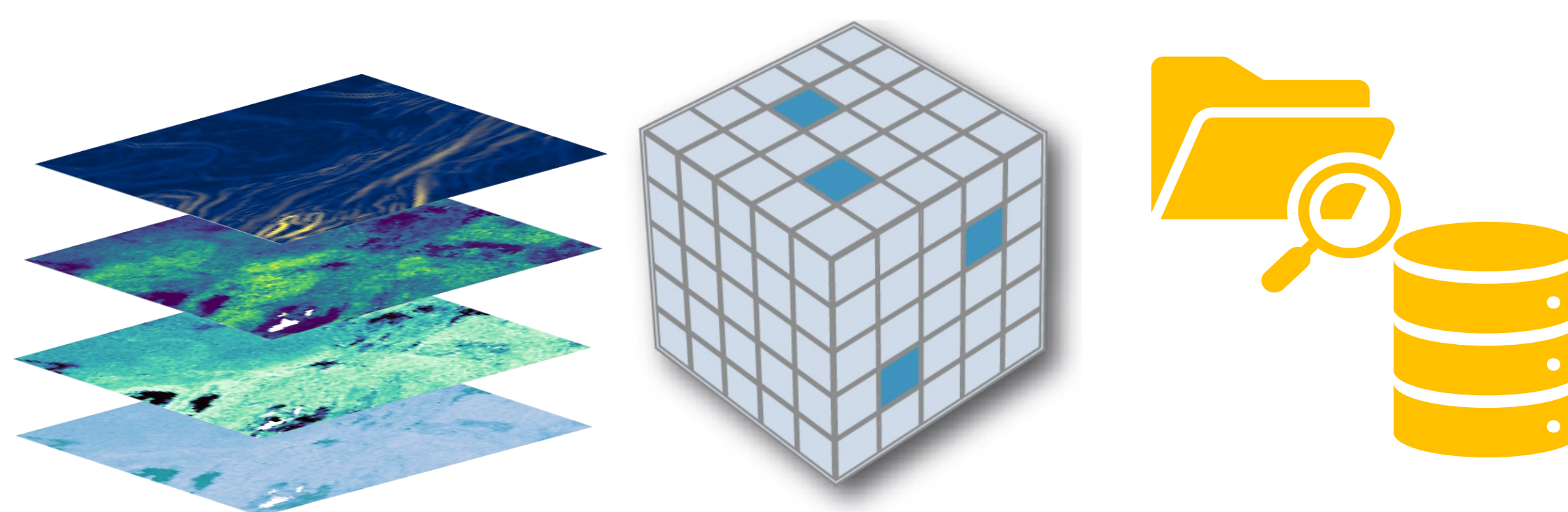


Fig 5. All collected data will be integrated to build a data cube.

Results and conclusions

- 23% of soil samples (total 667) collected from areas previously marked as Histosols are not fulfilling the criteria for being Histosols currently.
- Deep-learning revealed 25% more ditches than previously mapped.
- Based on the preliminary data, it can already be estimated that approximately 9% of the area of peatlands has been lost.