



HoliSoils

Working together for forest soils

Holistic management practices, modelling & monitoring for European Forest Soils

Horizon 2020 project with 20 partners (May 2021- October 2025)

May

2024

Key products for LULUCF inventories

- Soil model ensemble – for capacity building and GHG invs

SOIL MODEL ENSEMBLE

- Soil property maps for Europe

SOIL MAPS

- Soil monitoring law

SML

Soil model ensemble [Elisa Bruni & Bertrand Guenet]



- Develop an interactive online interface that launches state-of-the-art models to simulate SOC stocks and GHG fluxes at site scale.
- Publicly available for end-users such as land managers, forestry experts and scientists: <https://github.com/elisabruni/Holisoils-multimodel>
- A pre-release version (v0) of web tool is publicly available at the following link: <https://elisabruni.shinyapps.io/test4/>
and was developed using the Shiny app framework (R Core Team, 2022)

SOIL MODEL ENSEMBLE

Soil model ensemble – summary

- If input data lacks:
 - soil property data are extracted from **ESDAC** maps
 - and climate variables from the **ISIMIP** repository
- Advantages
 - The interface is user-friendly so anyone can use it even without a background in modeling
 - The tool is easily extendable to other land-uses and continents as long as global maps are available
- For capacity building, GHG-invs and future scenarios

SOIL MODEL ENSEMBLE

Soil model ensemble – dissemination with UNFCCC



United Nations
Climate Change



Webinar on Soil Organic Carbon to Support National Greenhouse Gas Inventories from Developing Countries under the Enhanced Transparency Framework of the Paris Agreement

Organized by the UNFCCC Secretariat in collaboration with Natural Resources Institute Finland

16–18 April 2024

Agenda – all times in the agenda are Bonn (Germany) time

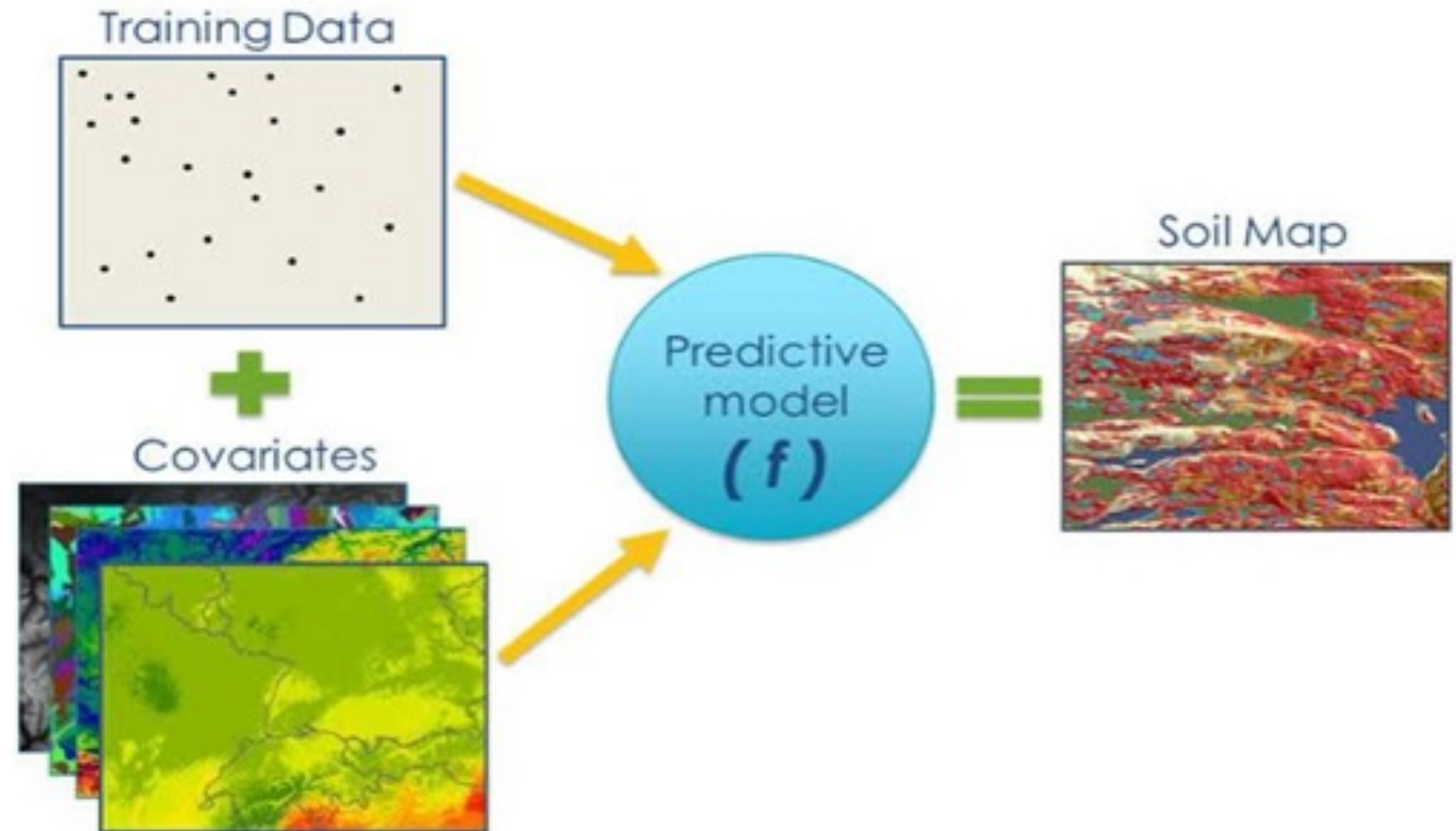
- During 3 days, 2 hours, about approaches to estimate SOC change
- > 300 participants, mainly from Southern hemisphere

SOIL MODEL ENSEMBLE

Soil mapping in HoliSoils – ISRIC and others

Three ingredients:

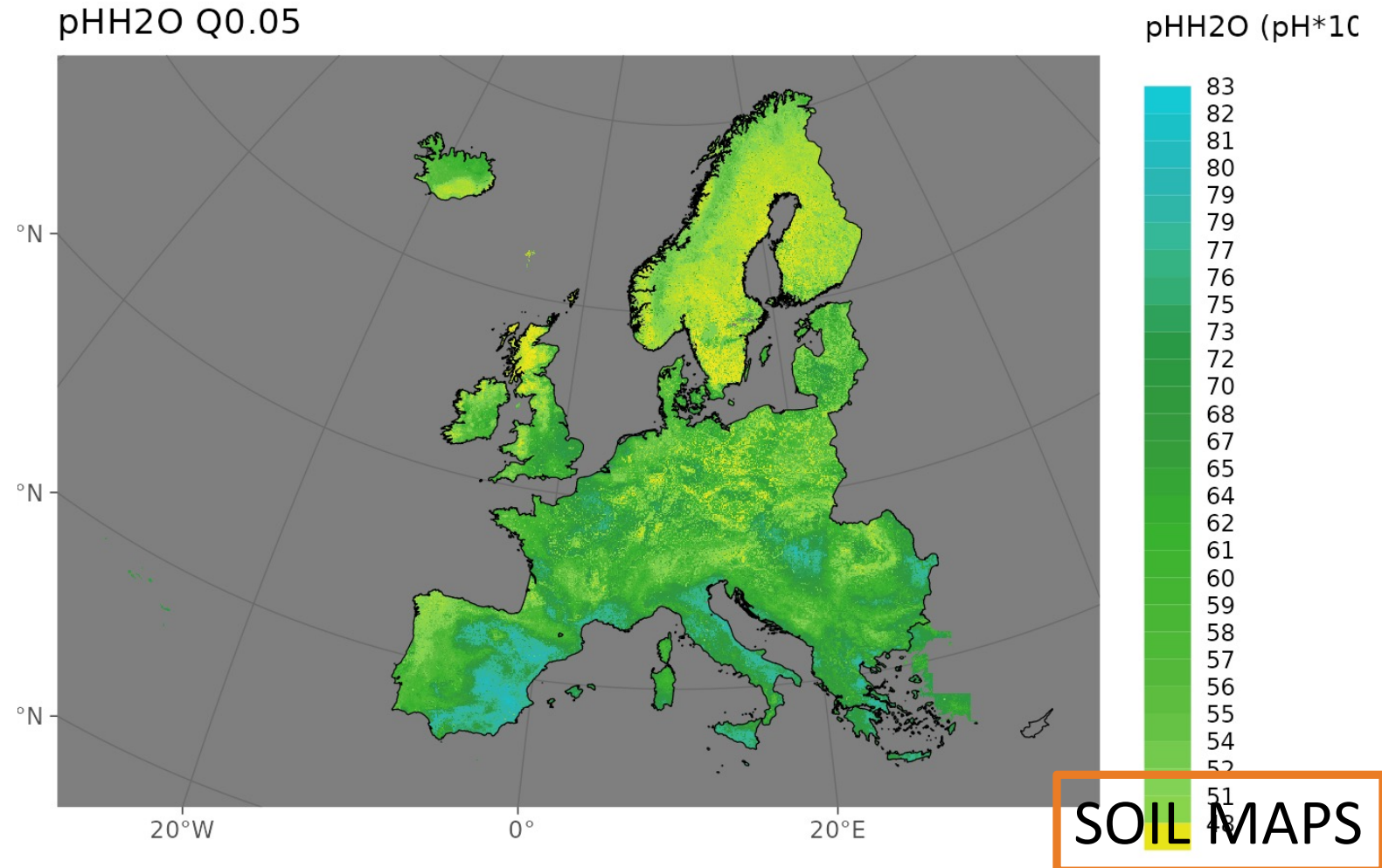
- Soil observations with physical/chemical(/spectral) analysis
- Covariates
- (Geo)Statistical/ML/AI Model



SOIL MAPS

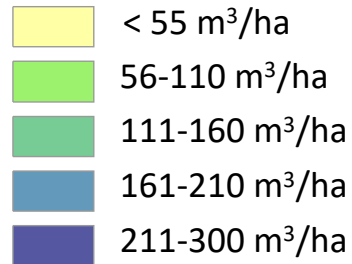
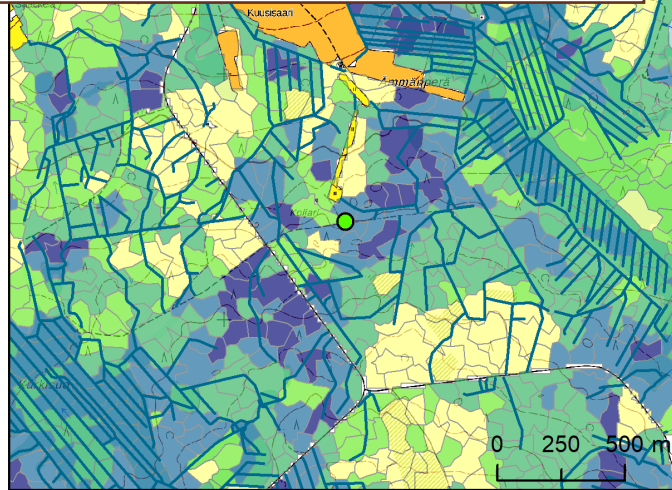
More HoliSoils maps to generated, available 2024

- **Data: LUCAS, ICP Forest + national data**
- Primary properties considered:
 - Soil Organic carbon
 - Soil Inorganic Carbon
 - pH (water)
 - Total nitrogen
 - Coarse fragments
 - Texture components (sand, silt, clay)
 - Bulk density (dry oven)
- Complex properties considered:
 - Soil Organic Carbon stocks
 - Soil Inorganic Stocks (*extra*)
 - Nitrogen stocks

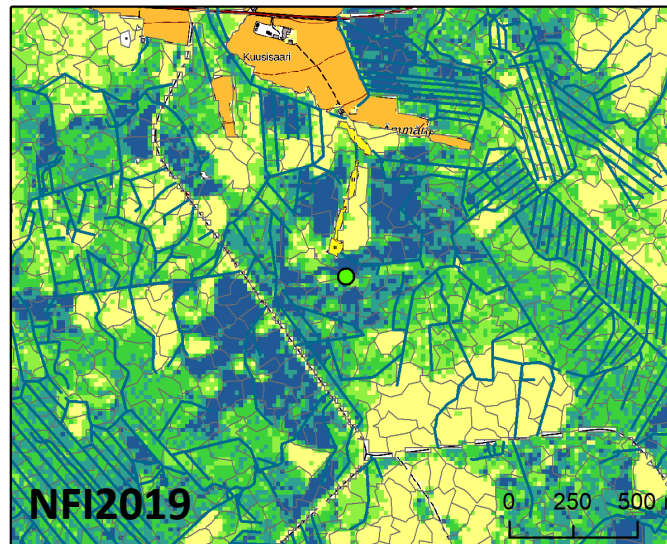
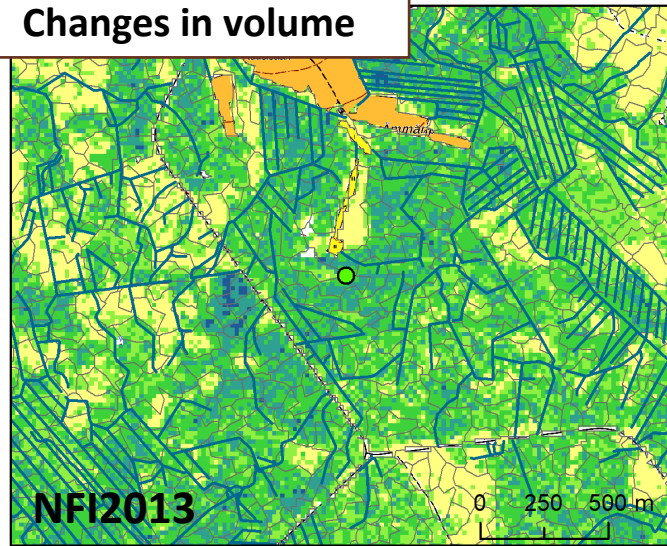


Peatlands from Finland – to be scaled for Baltic sea countries

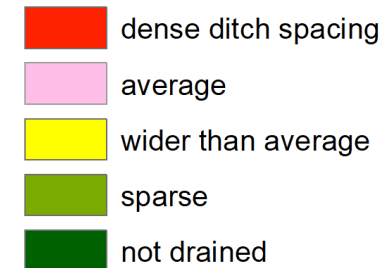
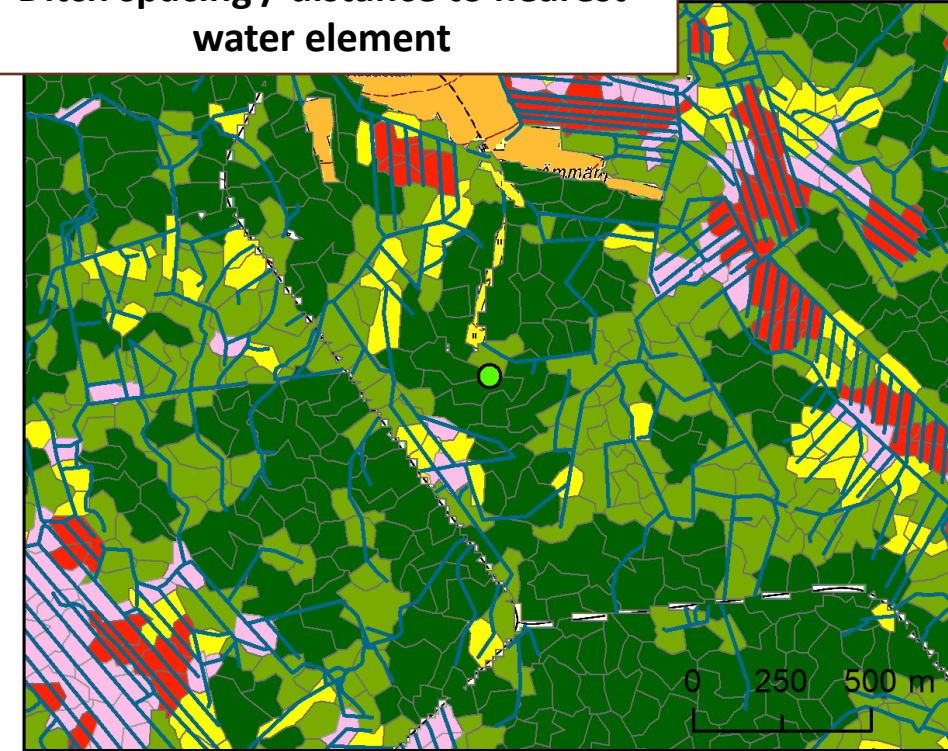
Current volume per segments



Changes in volume



Ditch spacing / distance to nearest water element



If interested, contact:

Aura Salmivaara (Luke)

Ditches: William Lidberg (SLU)

SOIL MAPS

Soil monitoring law and HoliSoils



Geoderma 444 (2024) 116862



Contents lists available at ScienceDirect

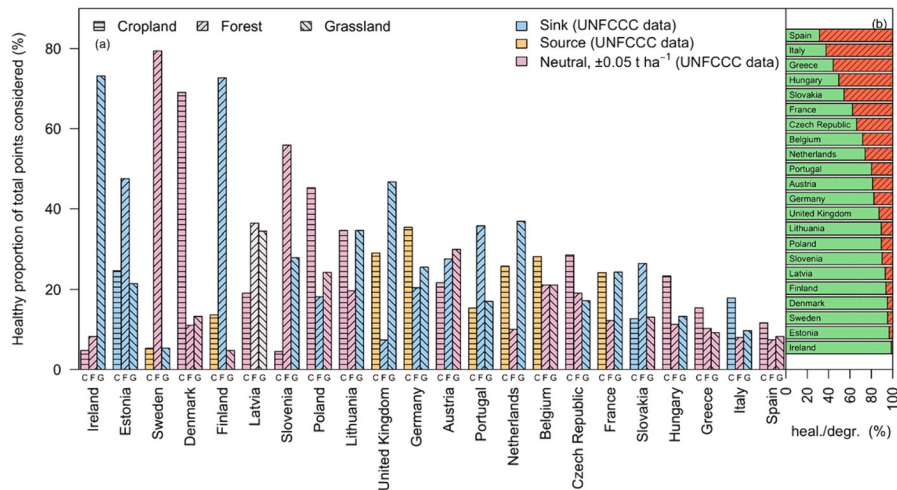
Geoderma

journal homepage: www.elsevier.com/locate/geoderma

Is the organic carbon-to-clay ratio a reliable indicator of soil health?

Raisa Mäkipää, Lorenzo Menichetti*, Eduardo Martínez-García, Tiina Törmänen, Alekski Lehtonen

Natural Resources Institute Finland (Luke), Latokartanonkaari 9, FI-00790 Helsinki, Finland



- Comparing proposed soil health indicators: large proportion healthy soils and significant sinks by UNFCCC and vice versa

Wellbrock et al. 2024. There is a need to better take into account forest soils in the planned Soil Monitoring Law of the European Union. Accepted. Ann. For. Sci.

- SML - Monitoring should use existing national forest monitoring and reporting systems that include forest inventory data, this allows to link forest management and its impact soil health
- The ICP Forests monitoring programme is particularly suitable as a basis because it is adapted to forest soils, has harmonised methods, and long-time series, fulfils all the above requirements and is operational in many countries
- There is a need for specific indicators and thresholds for forest soils based on appropriate methods to identify unhealthy soils in forests (e.g. acidification and base cations loss).
- A data interface like ICP Forests data interface should be established as a datahub.

If LUCAS will be integrated in the national inventory sampling scheme should be improved for proper forest soil spatio-temporal monitoring.

HoliSoil - Training Course on Soil Sampling and Classification



- Date and location: 25.-27.09.2024 close to Eberswalde (~ 60 km from Berlin)
- Contents: Teaching of soil classification following WRB, soil sampling (disturbed and undisturbed, mineral soil and humus layers), humus type classification
- Goal: Teaching of the mentioned topics and the discussion/exchange/networking on those, with focus on harmonised European forest soil monitoring for GHG reporting
- Target audience: LULUCF experts interested in establishing or intensifying their forest soil monitoring and soil experts working in forest monitoring
- HoliSoils Institutions involved: Thuenen and ISRIC
- The registration will start end of next week (probably 24.5.).
- More info: nicole.wellbrock@thuenen.fi

Thank you for your attention

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holisoils.eu

for deliverables:

<https://holisoils.eu/deliverables/>

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