

# Synthesizing data for more site specific drained organic forest soil GHG emission factors in boreal and cool temperate regions

## Main results

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# Content

- Data features
- Results
  - Soil GHG balance in different site categories;
  - Soil GHG balance and site nutrient status/productivity in the boreal zone data
  - Environment parameters correlating with the soil GHG balance estimates in forestry drained organic soils
- Conclusions

This study is part of the SNS-120 project '*Anthropogenic greenhouse gas emissions from organic forest soils: improved inventories and implications for sustainable management*' funded by Nordic Forest Research (SNS).

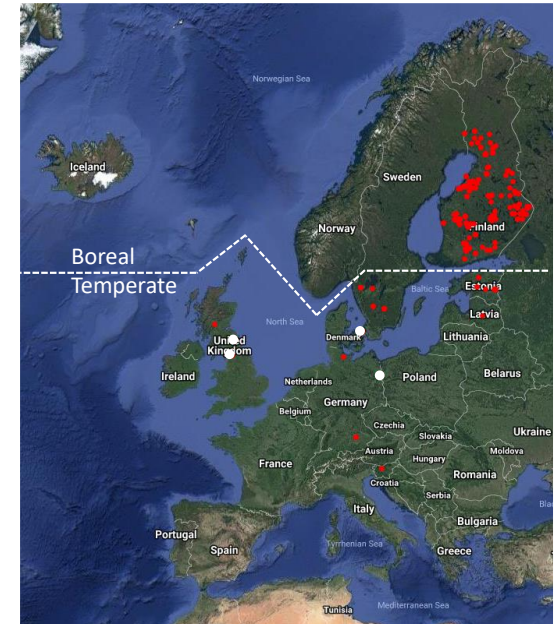
Focus is in data collected from peer reviewed publication matching with GHG inventory criteria provided by IPCC

# Data forming soil GHG balance estimates

Drained organic forest soil GHG flux data in peer-reviewed literature

- Data 1980's – 2019
  - 210 CO<sub>2</sub>, 222 CH<sub>4</sub> and 163 N<sub>2</sub>O estimates (total 595)
    - c. 95 % from peat soils
    - 69% - 83% from boreal climate zone
  - CO<sub>2</sub> data was separated by field methods
    - Flux data; 157 by chambers & 4 by eddy covariance
    - Inventory data (peat cores); 49 studies
  - CH<sub>4</sub> and N<sub>2</sub>O included soil surface flux data
  - Environment parameters (i.e. soil, climate and vegetation) for each site

=> Data checked & modified to form soil GHG balance estimate (\* as defined by IPCC)



# Data (continues)

- The work is divided into two parts
  - the first part focused on data collection methods and data structure

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## **Reviews and syntheses: Greenhouse gas exchange data from drained organic forest soils – a review of current approaches and recommendations for future research**

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- this presentation (the second part) focuses on numeric estimates on soil GHG balances and environment controls with potential importance on the balances in drained organic forest soils

# Data (continues)

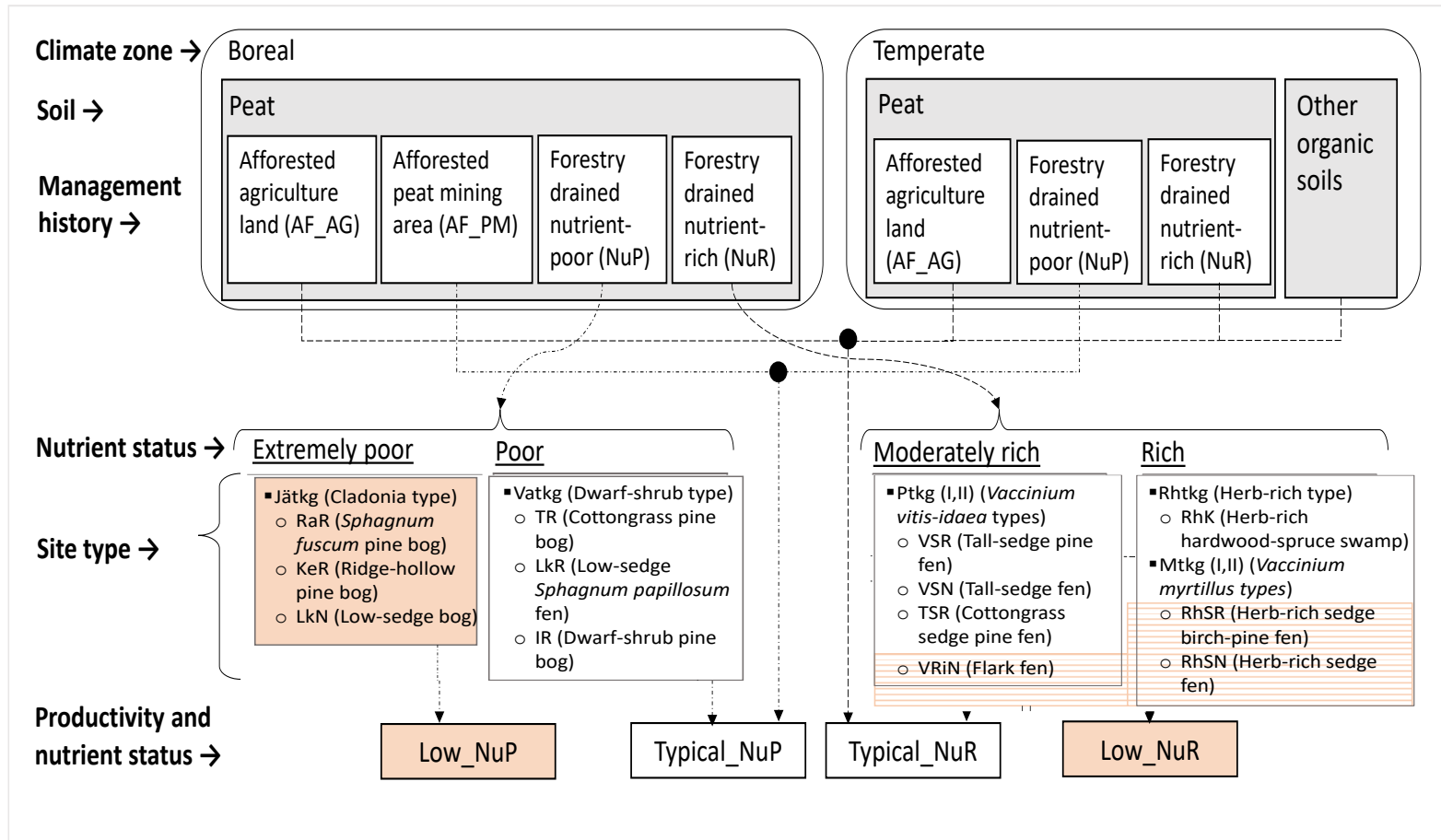


Fig. Grouping in climate, soil, management history, site type nutrient status (by indicative ground vegetation) and forest productivity categories.

# Conclusions

- GHG balance in drained organic soils
  - Default IPCC 2014 Tier 1 EFs do not improve efficiently just by adding data
  - Soil type, land use history and forest productivity have clear importance
  - Soil nutrient status and forest productivity both indicate importance in boreal zone site types
  - Soil nutrient status and climatic temperature features indicate greatest positive/negative correlation with the GHG balance estimates across the 2 climate zones
- General impression of the data
  - Supporting environment data on site characteristics is limited in reporting
  - High deviation around the average is more typically resulted from single or few highly deviating values in data (/publications) rather than site type category -> measurements and final data composition
  - CO<sub>2</sub> monitoring methods (inventory vs. flux method) -> timescale difference in the data may be reflected in the outcome
- Consideration should be given to monitoring site selection
  - Representativeness: Site is 'ideal' vs. 'typical' vs. 'available'
  - Classification: based on ground vegetation vs. soil chemistry, vs. trees
  - History: Do we know the land use and/or management history?

Thank you!