

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).

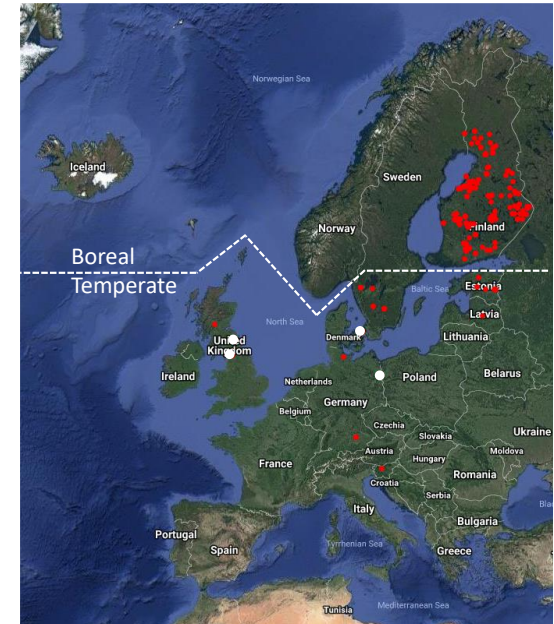
Focus is in data collected from peer reviewed publication matching with GHG inventory criteria provided by IPCC

Data forming soil GHG balance estimates

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

- Data 1980's – 2019
 - 210 CO₂, 222 CH₄ and 163 N₂O estimates (total 595)
 - c. 95 % from peat soils
 - 69% - 83% from boreal climate zone
 - CO₂ data was separated by field methods
 - Flux data; 157 by chambers & 4 by eddy covariance
 - Inventory data (peat cores); 49 studies
 - CH₄ and N₂O 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)

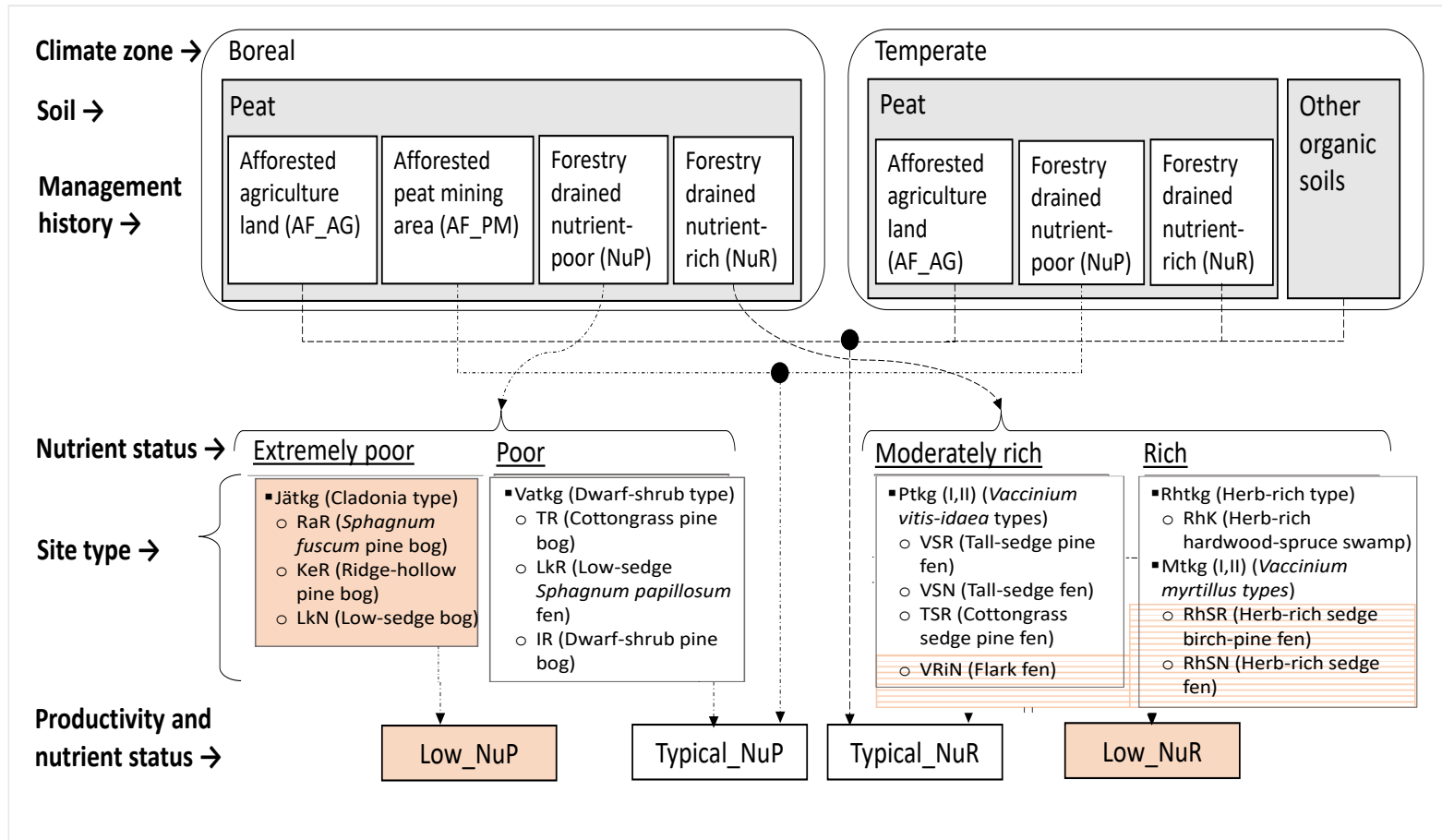


Fig. Grouping in climate, soil, management history, site type nutrient status (by indicative ground vegetation) and forest productivity categories.

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
 - CO₂ 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!