

Benthic macroinvertebrates and the use of stable isotopes ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) in the impact assessment of peatland use on stream ecosystems

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Benthic macroinvertebrates and the use of stable isotopes ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) in the impact assessment of peatland use on stream ecosystems

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We have assessed the possible changes in the basal resources of stream ecosystems and differences in the impact of two forms of peatland use: forestry and peat mining (studysetting in Fig. 1). The main methods used in this study are stable isotope analysis (SIA) and benthic macroinvertebrate community analysis.

Mulling over the initial results

Initial stable isotope analysis (SIA) results of invertebrates suggest some degree of discrimination between different sources of organic matter and possible effects on feeding habits, presumably due to the quality of the basal resources (Fig. 2). This result will be explored further by examining the taxonomical structure of benthic macroinvertebrate communities and the role that functional feeding groups may have on results. We suggest that SIA results should be interpreted together with community analyses (Fig. 2) to develop better insight into ecological impacts of different peatland uses with respect to changed food quality.



Fig 1. STUDY AREAS

Within each studied watershed, one stream drains a subcatchment affected by peat mining and the other stream flows through a subcatchment affected by forestry. The two subcatchment streams merge to form a single stream flowing into a lake.

Fig 2. HINDS

ORGANIZATION of benthic macroinvertebrate communities

Three watersheds (SAM, SO, PO) and four control areas (natural mire and natural forest). Initial results on benthic community structure in response to land use indicate the importance of geographical site location over land use effects.

Fig 4. Total area of Finland and land use in peatlands

Peat production is regionally less scattered compared to forestry and can have measurable local impacts.

Future directions

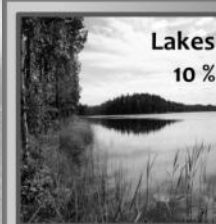
We will assess whether CH_4 and CO_2 could be used as an indicator of basal resource change. For example, initial $\delta^{13}\text{C}$ -DOC results from stream water gas samples varied between -24.7 and -20.4 , thus indicating possible methane oxidizing activity in part of the streams. In future studies, we will address the role of the quality and quantity of basal resources in more detail. We believe this provides more insights into the effects of different forms of peatland use on aquatic ecosystems.



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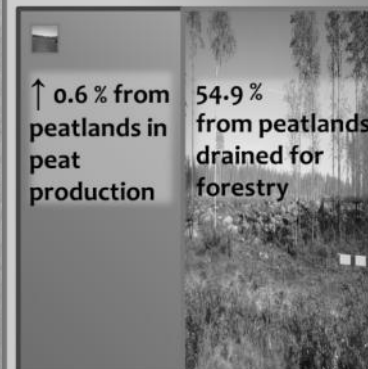


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Lakes
10 %

Total area of
Finland



↑ 0.6 % from
peatlands in
peat
production

54.9 %
from peatlands
drained for
forestry

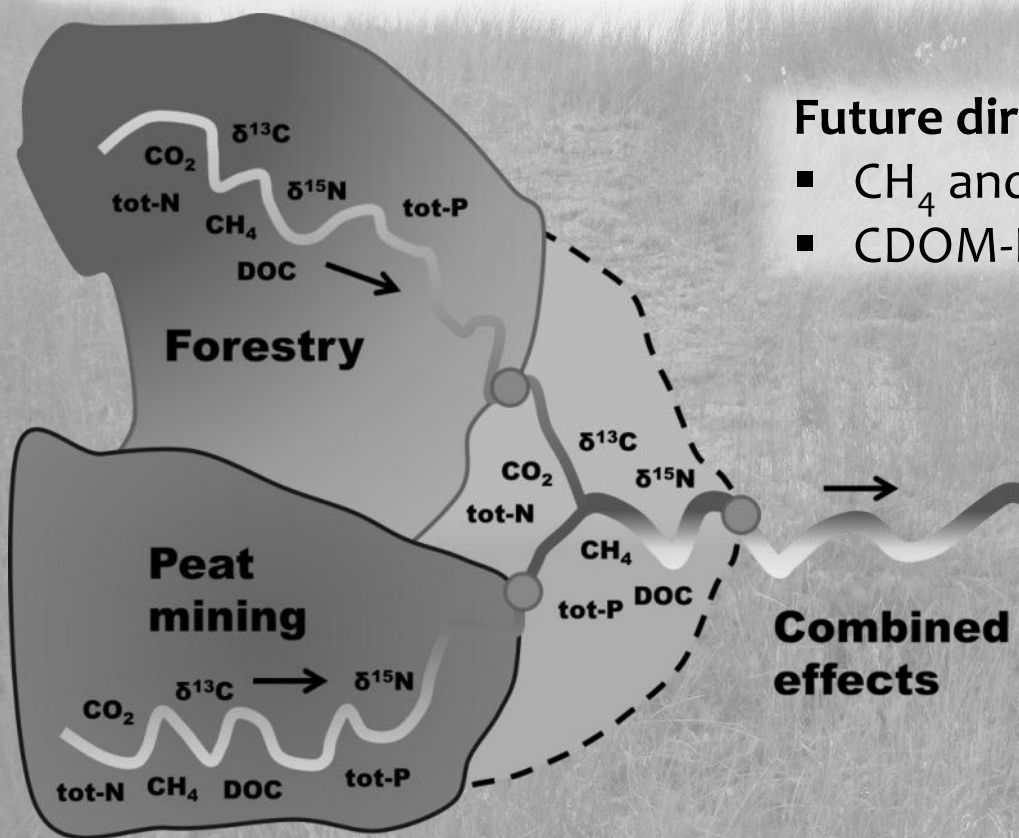
30 %
Peatlands

Poster G37

BG4.1 Linking biogeochemistry and environmental stressors to nutrient cycling and ecology in freshwater systems

1. Aquatic insects: geographical site location more important over land use effects

2. Some degree of discrimination between different sources of organic matter and possible effects on feeding habits



Future directions

- CH_4 and CO_2 , $\delta^{13}\text{C}$
- CDOM-EEM



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