Geophysical Research Abstracts
Vol. 18, EGU2016-17775, 2016
EGU General Assembly 2016

Postglacial Spatiotemporal Peatland Initiation and Lateral Expansion Dynamics in North America and Northern Europe: Implications to Carbon Uptake

Atte Korhola, Meri Ruppel, Tarmo Virtanen, and Minna Väliranta
University of Helsinki, Environmental Sciences, Helsinki, Finland (atte.korhola@helsinki.fi)

Peatlands are major ecosystems of the Northern Hemisphere and have a significant role in global biogeochemical processes. Consequently, there is growing interest in understanding past, present and future peatland dynamics. However, chronological and geographical data on peatland initiation are scattered, impeding the reliable establishment of postglacial spatiotemporal peatland formation patterns and their possible connection to climate. In order to present a comprehensive account of postglacial peatland formation histories in North America and northern Europe, we collected a data set of 1400 basal peat ages accompanied by below-peat sediment-type interpretations from literature. Our data indicate that all peatland initiation processes (i.e. primary mire formation, terrestrialization and paludification) co-occurred throughout North America and northern Europe during the Holocene, and almost equal amounts of peatlands formed via these three processes. Furthermore, the data suggest that the processes exhibited some spatiotemporal patterns. On both continents, primary mire formation seems to occur first, soon followed by terrestrialization and later paludification. Primary mire formation appears mostly restricted to coastal areas, whereas terrestrialization and paludification were more evenly distributed across the continents. Primary mire formation seems mainly connected with physical processes, such as ice sheet retreat. Terrestrialization probably reflected progressive infilling of water bodies on longer timescales but was presumably drought driven on shorter timescales. Paludification seems affected by climate as it slowed down in Europe during the driest phase of the Holocene between 6 and 5 ka. Lateral expansion of existing peatlands accelerated c. 5000 years ago on both continents, which was likely connected to an increase in relative moisture.