EGU21-4489
https://doi.org/10.5194/egusphere-egu21-4489
EGU General Assembly 2021

Exploring the variation in ecosystem scale methane fluxes and its drivers within a boreal mire complex

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Northern peatlands cover a small fraction of the earth's land surface, and yet they are one of the most important natural sources of atmospheric methane. With climate change causing rising temperatures, changes in water balance and increased growing season length, peatland contribution to atmospheric methane concentration is likely to increase, justifying the increased attention given to northern peatland methane dynamics. Northern peatlands often occur as heterogeneous complexes characterized by hydromorphologically distinct features from < 1 m^2 to tens of km^2, with differing physical, hydrological and chemical properties. The more commonly understood small-scale variation between hummocks, lawns and hollows has been well explored using chamber measurements. Single tower eddy covariance measurements, with a typical 95% flux footprint of < 0.5 km^2, have been used to assess the ecosystem scale methane exchange. However, how representative single tower flux measurements are of an entire mire complex is not well understood. To address this knowledge gap, the present study takes advantage of a network of four eddy covariance towers located less than 3 km apart at four mires within a typical boreal mire complex in northern Sweden. The variation of methane fluxes and its drivers between the four sites will be explored at different temporal scales, i.e. half-hourly, daily and at a growing-season scale.