Geophysical Research Abstracts,
Vol. 11, EGU2009-9471, 2009
EGU General Assembly 2009

Spatio-temporal analysis of methane emission in a boreal peatland during one growing season as measured by eddy covariance

I. Forbrich (1), L. Kutzbach (1), C. Wille (1), J. Wu (1,2), T. Becker (1,3), and M. Wilmking (1)

(1) Institute of Botany and Landscape Ecology, Ernst Moritz Arndt University of Greifswald, 17487 Greifswald, Germany (inke.forbrich@uni-greifswald.de) , (2) now at: Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, P.R.China, (3) now at: National Environmental Research Institute, Aarhus University, Roskilde, Denmark

Eddy covariance measurements of methane are becoming more common with different new analyzers available. The resulting near-continuous time series can among others improve our understanding of short-term processes (e.g. ebullition). While time series of chamber measurements allow the analysis of seasonal development, they rarely detect short-term events. However, even in the case of eddy covariance measurements, these events might be due to changes in the source area while the ecological driving parameters do not change significantly. We hypothesize that short-term oscillations in the time series of CH4 emission can indicate an increase or decrease of the distribution of high-emitting microsites in the fetch in addition to ecological influences.
To test this hypothesis, we present data from one growing season (7 May – 30 September 2007) from an oligotrophic mire complex in Eastern Finland (62.46°N, 30.58°E). The eddy covariance system was installed in the centre of the peatland, which consists to varying degree of dry sites (hummocks) and sedge-covered wetter sites (lawns). A footprint model and high-resolution aerial pictures were used to estimate the relative contribution of the two sites to the half-hourly eddy covariance flux.
Preliminary results show that the emissions from a mire part with predominating lawns are higher than from a part with equally distributed lawns and hummocks. However, these patterns are overlaid by climate driven parameters: Emissions from the lawn-dominated part can be as low as those from the part with equally distributed hummocks and lawns during periods of cold air coming from the North. Multivariate empirical modelling will be applied to analyse in detail the spatio-temporal control of the eddy covariance methane flux time series.