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Greenhouse gas emissions from an abandoned peatland in central Belarus during the first year of rewetting

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Peatland restoration by inundation of drained fen grasslands can lead to very high methane emissions in the first years (M. Hahn-Schöfl et al, 2011). Due to a lack of other studies on the GHG emissions of fen forbs and meadows during the first years after flooding there is the worry to create methane plants by restoring such sites.
Within the BMU–ICI financed project "Restoring Peatlands and applying Concepts for Sustainable Managements in Belarus – Climate Change Mitigation with Economic and Biodiversity Benefits" we selected the mesotrophic fen Bartenikha as a typical petland for central Belarus as study site. The peatland Bartenikha was drained in 1990 and used for peat extraction till 1999. Subsequently the peatland got abandoned and a meadow dominated by Agrostis stolonifera emerged in its SW part. In September 2010 the meadow was unexpectedly flooded by the beaver and the forbs died. During one year the water level changed from nearly 10 cm below surface to nearly 50 cm above surface. In 2011 only detritus was left from the former vegetation, but new species, beside some Chara, were still not established.
We studied the effect of rewetting on the emission of carbon dioxide and methane during the period from September 2010 till September 2011 using the closed chamber method.
Methane release during autumn, winter and early spring was still low. Substantially higher emissions of Methane are observed since June with highest rates in July when the water level was lower than usually, i.e. 20 cm above the surface and the temperature was high. In total Methane emissions per year were lower as expected. Carbon dioxide release was low during the whole year because of high water level but a dependence of emissions on temperature was detected. Altogether greenhouse gas emissions from the rewetted peatland were not high in the first year of flooding.

Hahn-Schöfl M, Zak D., Minke M., Gelbrecht J., Augustin J., and Freibauer A. Organic sediment formed during inundation of a degraded fen grassland emits large fluxes of CH4 and CO_2. Biogeosciences, 8, 1539–1550, 2011.