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Influence of biomass harvesting on fluxes of CO_2 CH4 and N2O for a sedge fen in south-west Belarus

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Until now, it is usual to drain a peatland to be able to use it economically. The consequences are a progressive peat loss and a negative climate impact caused by a strong emission of the greenhouse gases CO_2 and N2O (Droesler et al., 2008). To avoid these negative effects of the peatland use, the concept of the so-called Paludiculture was developed. This is the harvest of plant biomass on wet and rewetted peatlands (Wichtmann & Joosten 2007). However, there is only few and contradictory information about the actual effect of the Paludiculture on the greenhouse gas fluxes, the peat carbon budget, and the climate balance so far.
Therefore, we investigated the influence of late mowing on a sedge fen in the Paliessie region in SW Belarus. The site is characterized by Carex nigra, Carex rostrata, Calamagrostis canescens, Potentilla palustris, Drepanocladus aduncus and Rhizomnium punctatum and a mean water level close to the surface. The investigation covers two variants: Without use (control), and the removal of the aboveground biomass in late autumn. For every variant, we installed three soil collars distributed randomly as a base for the gas flux measurements. Since August 2010 the CO_2, CH4 and N2O exchange rates are measured by the closed chamber approach of Droesler (2005). The first harvest of plant biomass was on 17th of November 2010.
It turned out, that the single gas fluxes are influenced very differently by the biomass removal. In case of the CH4 a noticeable impact of mowing became evident directly after melting of the ice layer in spring 2011, when the emissions at the harvested plots for nearly doubled those from the control on two measurement campaigns. The N2O fluxes were very week but these are according to tendency lower on the harvest variant all the time. However, the ecosystem respiration did not show any clear reaction on the mowing at all.
Furthermore, we will report about the effects of the biomass removal on the current net CO_2 exchange, the annual gas flux rates, the peat carbon budget and the climate balance.
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