Geophysical Research Abstracts
Vol. 13, EGU2011-13088, 2011
EGU General Assembly 2011

Assessing greenhouse gas emissions from peatlands using vegetation as a proxy – First trial and insights on Belarusian peatlands

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Drained peatlands are an important source of anthropogenic greenhouse gas (GHG) emissions. In the framework of the BMU financed project 'Restoring Peatlands and applying Concepts for Sustainable Management in Belarus – Climate Change Mitigation with Economic and Biodiversity Benefits' drained peatlands are currently being rewetted. Aim of the project is to produce emission reduction credits ('carbon credits') for the voluntary carbon market (Thiele et al., 2009). Before credits can be issued, reliable assessments of GHG fluxes have to be made both in the drained baseline and in the rewetted project situation.

As direct measurements of GHG fluxes are protracted and expensive, simple proxy parameters have to be developed (Joosten & Couwenberg, 2009). We present an emission assessment tool based on an extensive meta-analysis of data on yearly fluxes from temperate Europe, including correlation against a wide spectrum of site characteristics (Couwenberg et al., 2008). Mean water level fluctuation turned out to be the best single factor proxy for GHG fluxes from peat soils.
Vegetation seems to be well qualified for assessing GHG fluxes because it
• is an indicator of long-time water level conditions (Ellenberg et al., 1992; Koska et al., 2001),
• is controlled by various other site factors that determine GHG emissions from peatlands,
• is itself directly and indirectly responsible for the predominant part of the GHG emissions,
• allows fine-scaled mapping,
The emission assessment tool is currently being validated and extended with measurements in Belarus (Minke et al., 2009).

We describe and discuss our vegetation based methodology to assess GHG emissions and emission reductions from peatland rewetting using the example of two Belarusian peatlands. The methodology includes mapping of vegetation types characterised by the presence and absence of species groups indicative for specific water level classes. GHG flux values are assigned to the vegetation types following a standardized protocol and using published emission values from plots with similar vegetation and water level in regions with similar climate and flora. Carbon sequestration in trees is accounted for by estimating the annual sequestration in tree biomass from forest inventory data. The methodology follows the criteria of the Voluntary Carbon Standard. Our assessments indicate that the outcomes can be improved substantially with a better developed vegetation succession tool, a comprehensive hydrogeological evaluation, and a more robust baseline assessment.

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