

Carbon balance indicates a time limit for cultivation of organic soils in central Switzerland

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Peatlands serve as important carbon sinks. Globally, more than 30% of the soil organic carbon is stored in organic soils, although they cover only 3% of the land surface. The agricultural use of organic soils usually requires drainage thereby transforming these soils from a net carbon sink into a net source. Currently, about 2 to 3 Gt CO₂ are emitted world-wide from degrading organic soils (Joosten 2011; Parish et al. 2008) which is ca. 5% of the total anthropogenic emissions. Besides these CO₂ emissions, the resulting subsidence of drained peat soils during agricultural use requires that drainage systems are periodically renewed and finally to use pumping systems after progressive subsidence.

In Switzerland, the Seeland region is characterised by fens which are intensively used for agriculture since 1900. The organic layer is degrading and subsequently getting shallower and the underlying mineral soil, as lake marl or loam, is approaching the surface. The questions arise for how long and under which land use practises and costs these soils can be cultivated in the near future.

The study site was under crop rotation until 2009 when it was converted to extensively used grassland with the water regime still being regulated. The soil is characterised by a degraded organic horizon of 40 to 70 cm. Since December 2014 we are measuring the carbon exchange of this grassland using the Eddy-Covariance method. For 2015, the carbon balance indicates that the degraded fen is a strong carbon source, with approximately 500 g C m⁻² a⁻¹. The carbon balance is dominated by CO₂ emissions and harvest. Methane emissions are negligible. With the gained emission factors different future scenarios are evaluated for the current cultivation practise of organic soils in central Switzerland.

Joosten, H., 2011: Neues Geld aus alten Mooren: Über die Erzeugung von Kohlenstoffzertifikaten aus Moorwiedervernässungen. *Telma Beiheft* 4, 183-202.

Parish, F., A. Sirin, D. Charman, H. Joosten, T. Minayeva, M. Silvius & L. Stringer (Eds.). 2008: *Assessment on Peatlands, Biodiversity and Climate Change: Main Report*. Global Environment Centre, Kuala Lumpur and Wetlands International, Wageningen