What rules GHG-(greenhouse gas)-fluxes in a prealpine bog - management or watertable?

Christoph Förster and Matthias Drösler
Chair of Vegetation Ecology, Technische Universität München (TUM), Emil-Ramann-Stra6, D-85350 Freising, Germany
Phone (+49) 08161-712611; eMail: christoph.foerster@wzw.tum.de

Being an important sink of carbon, the small stripe of bogs in the foreland of the Alps plays an important role for the carbon balance of Germany. A big part was drained for peat-use and to get agricultural land in the last centuries. Restoration of these degraded bogs can help to rebuild this function, whereas the watertable is an important co-factor for the amount of mitigation of greenhouse gases (CO₂, CH₄ and N₂O).

To estimate GHG-balances gas-flux measurements, using the chamber method developed by Drösler (2005) were done in 2007 and 2008 on a degraded bog-meadow, which was partly rewetted in 1993 and which is still managed in large areas. This mosaic of restored, drained and managed areas showed big differences in their carbon-balances from a high source (∼ 500 g CO₂-C m⁻² a⁻¹) to a moderate sink (∼ -200 g CO₂-C m⁻² a⁻¹).

Where the management was stopped in 1993, some Sphagnum-communities developed which helped to turn these areas from moderate sources (47 g CO₂-C m⁻² a⁻¹) or sinks (-58 g CO₂-C m⁻² a⁻¹) to permanent sinks with uptakes between (-150 and -250 g CO₂-C m⁻² a⁻¹).

Key words: bog, carbon-balance, greenhouse gases, restoration, watertable