



Influence of land use and weather on the greenhouse gas exchange of drained fens in NE-Germany

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Revitalisation of drained fens in NE-Germany is limited by water shortage and socio-economic reasons. As most of these peatlands will in the near future still be used for agriculture, it is important to know, to what extent alternative land use can reduce their greenhouse gas (CO₂, CH₄, N₂O) emissions and climate impact. Therefore we studied in the "Havelländisches Luch", an area of deeply drained fens in NE-Germany, the greenhouse gas exchange of supposed strongly climate forcing land use (corn-field and intensive pasture) and of probably less forcing, alternative types (meadow and extensive pasture). The greenhouse gas exchange was measured year-round with manual and automatic chambers. Because of exceptional heavy rain and problems with the drainage system, the water level rose extremely in summer 2007 and nearly all sites were flooded for about two months. The influence of the high water level on the greenhouse gas exchange and climate balance clearly exceeded the influence of land use and vegetation. The CH₄ emissions were extremely high at nearly all sites. The CO₂ exchange was also affected by the high water, but here also land use and the susceptibility of the particular plant species to flooding played an important role. Due to a reduced ecosystem respiration, sites with robust plants even acted as net CO₂ sinks. However, the harvested biomass taken into account, all sites were characterized by carbon loss of the peat. N₂O emissions were mostly low and mainly controlled by moisture and nitrogen supply. As a result, all land use forms, also the extensive, had a surprisingly strong negative climate impact in 2007.