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The influence of management on GHG fluxes over Central European grasslands

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Agricultural management practices and land use change at grassland sites can have a strong impact on annual carbon dioxide (CO_2), methane (CH4) and nitrous oxide (N2O) budgets. At the same time emissions of CH4 and N2O can contribute to an increase of the global warming potential (GWP) of an ecosystem by offsetting concurrent CO_2 uptake in terms of CO_2-equivalents. It is therefore necessary to quantify long-term fluxes of all three compounds in order to reliably assess the climatic impact of management activities and the effectiveness of greenhouse gas (GHG) mitigation strategies.

In this presentation we give an overview of the GHG exchange of eight managed Central European grassland sites along an elevation and land use intensity gradient. Fluxes of the three major GHGs CO_2, CH4 and N2O were calculated using the eddy covariance or chamber technique. The investigated grasslands were different with regard to the amount of fertilizer input, frequency of cuts and grazing duration and intensity.

In this presentation we focus on time periods when measurements of all three compounds were available and investigate common features among observed CH4 and N2O exchange patterns at the different grassland sites. We analyze these observations in relation to management activities and concurrently measured biotic / abiotic parameters. For field sites where long-term measurements are available we evaluate the impact of CH4 and N2O fluxes on the annual GWP.