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Effects of topsoil removal on greenhouse gas exchange of fen paludicultures

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Drainage is necessary for conventional agriculture on peatlands, but this practice causes high emissions of the greenhouse gases (GHG) carbon dioxide and nitrous oxide. Paludiculture is an option to mitigate these adverse environmental effects while maintaining productive land use. Whereas the GHG exchange of paludiculture on rewetted bog peat, i.e. *Sphagnum* farming, is relatively well examined, data on GHG emissions from fen paludicultures is still very scarce. As typical fen paludiculture species are all aerenchymous plants, the release of methane is of particular interest when optimising the GHG balance of such systems. Topsoil removal is, on the one hand, an option to reduce methane emissions as well as phosphorus release upon rewetting, but on the other hand, nutrient-rich topsoils might foster biomass growth.

In this project, *Typha angustifolia*, *Typha latifolia*, and *Phragmites australis* are grown at a fen peatland formerly used as grassland. Water levels will be kept at the surface or slightly above it. In parts of the newly created polder, the topsoil will be removed. To be able to separate the effects of topsoil removal and water level, four smaller sub-polders will be installed. Greenhouse gas exchange will be measured with closed manual chambers for all three species with and without topsoil removal as well as at a reference grassland site close by.