Establishment of a German peatland monitoring programme for climate protection - Open land (MoMoK). Monitoring network and data collection.

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Peat and other organic soils store large amounts of soil organic matter, which is highly vulnerable to drainage. Thus, drained organic soils contribute around 7% to the total German greenhouse gas (GHG) emissions and around 44% to the emissions from agriculture and agriculturally used soils, despite covering less than 7% of agricultural area in Germany. With approximately 90% of the total emissions, carbon dioxide (CO_2) is the most important GHG with regards to drained organic soils. To evaluate possible GHG mitigation measures such as classical re-wetting, paludiculture or adjusted water management compared to the still widespread *status quo* of drainage-based peatland agriculture, an improved data set on GHG emissions, in particular CO_2, and their drivers is needed. Furthermore, spatial data and upscaling methods need to be improved.

To meet these needs, a long-term monitoring programme for organic soils is currently (2020-2025) being set up for open land at the Thünen Institute of Climate-Smart Agriculture. A consistent long-term monitoring of soil surface motions, representatively covering a broad range of organic soils and land use types will be combined with the repeated measurement of soil organic carbon (SOC) stocks to assess CO_2 emissions using standardized and peat-specific methods. Land use types comprise grassland, arable land, paludiculture as well as unutilized re-wetted and semi-natural peatlands. At each of the envisaged approximately 150 monitoring sites important parameters such as groundwater table, vegetation and soil properties are monitored. Together with the updated map of organic soils, all collected data form the basis for improving regionalisation approaches for drivers – particularly water levels and SOC stocks – and CO_2 emissions from organic soils in Germany. Here, we will present the structure of the monitoring programme, the used methods for data collection as well as the current status of site establishment.