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Subsoil drains in managed peat soils, the effect on CO_2 emissions in wet and dry periods

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Drained peatlands are responsible for 6% of the global anthropogenic greenhouse gas emissions. Thereby, peat oxidation causes soil subsidence, which gives damage to buildings and infrastructure, and could result in an increased frequency of flooding and crop failure.
In Friesland (northern part of the Netherlands) a pilot was set up in summer 2016, to evaluate the effects of groundwater management with a dense network of subsoil drainage tubes, compared to drainage management with ditches only. Drains were placed at 70 cm depth to accelerate drainage in wet periods (spring, autumn) and to irrigate the subsoil in dry periods (summer). We tested how the change in groundwater levels during wet and dry periods affects CO_2 emissions.
At four farms with grassland, subsoil drains were installed at a field size of about 3-4.5 ha. In 2017 CO_2 fluxes were measured with the chamber method on pastures with subsoil drains and on control pastures (one per farm). Farms differed mainly in grazing frequency and topsoil clay content (presence of clay layers). Data from a dense network of groundwater dipwells with automatic level loggers will be presented to illustrate changes in hydrology. The effect of the subsoil drains in spring and summer on the CO_2 fluxes will be shown and the effect size of subsoil drains slowing carbon losses and consequently peatland subsidence will be discussed.