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GHG emissions of agricultural peatlands in the Netherlands.

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Peatlands used for intensive daity farming are drained to increase productivity. However, drainage lowers the groundwater table, increases oxygen intrusion, and causes decomposition of the peat soil. This decomposition emits CO_2 and is estimated to contribute up to 5% of the Dutch national GHG-emissions. Reducing these emissions requires detailed understanding of the spatial and temporal variability of these emissions and the effects of rewetting measures.

Here, we present a unique measurement setup and its results to quantify CO2 emissions of Dutch peatlands. We show the results of more than 30 site years of near continuous CO2 flux measurements with automated chambers across a wide range of peat types and different wetness conditions. We interpret the net yearly CO2 emissions in relation to water management, peat type and profile. We find clear relationships between yearly average groundwater level, the carbon density in the top 30 cm of the peat profiles, and the estimated yearly CO2 emissions from peat decomposition. However, these relationships come with a large variability between sites and between years that requires further attribution to other site characteristics such as management and history. Moreover, we compare our results to previous studies and discuss the differences and similarities.

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