



Emissions of N₂O from peat soils under different cropping systems

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Drainage of peatlands for agriculture use leads to an increase in nitrogen turnover rate causing emissions of N₂O to the atmosphere. Agriculture contributes to a substantial part of the anthropogenic emissions of N₂O therefore mitigation options for the farmers are important. Here we present a field study with the aim to investigate if the choice of cropping system can mitigate the emission of N₂O from cultivated organic soils. The sites used in the study represent fen peat soils with a range of different soil properties located in different parts of southern Sweden. All sites are on active farms with good drainage.

N₂O emissions from the soil under two different crops grown on the same field, with the same soil type, drainage intensity and weather conditions, are compared by gas sampling. The crops included are oat, barley, carrot, potato and grassland. Three or four sampling occasions during the growing season in 2010 were carried out with static chambers. The N₂O emission is calculated from the linear increase of gas concentration in the chamber headspace during the incubation time of 40 minutes. Parallel to the gas sampling soil temperature and soil moisture are measured and some soil properties determined.

The result from the gas sampling and measurements show no significant difference in seasonal average N₂O emission between the compared crops at any site. There are significant differences in N₂O emissions between the compared crops at some of the single sampling occasions but the result vary and no crop can be pointed out as a mitigation option. The seasonal average N₂O emissions varies from 16 ± 17 to 1319 ± 1971 $\mu\text{g N}_2\text{O}/\text{m}^2/\text{h}$ with peaks up to 3317 $\mu\text{g N}_2\text{O}/\text{m}^2/\text{h}$.

The N₂O emission rate from peat soils are determined by other factors than the type of crops grown on the field. The emission rates vary during the season and especially between sites. Although all sites are fen peat soil the soil properties are different, e.g. carbon content varies between 27-43% and pH 5.4-7.7, but showed no correlation with N₂O emission rate.