**SUPPLEMENTARY INFORMATION**

for

**Factors controlling nitrous oxide emissions from managed northern peat soils with low carbon to nitrogen ratio**

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This study included 11 drained peatlands with different land-use types and management intensities such as forested (2 sites), cultivated (3 sites) or only drained (1 site) peatlands and afforested (3 sites) or abandoned agricultural (2 sites) peatlands. The sites with their drainage history, peat depth and dominant tree and understory plant species are shown in **Table S1**. The site CS (Maljanen et al., 2010) is currently used for hay production whereas the site CK (Regina et al., 2004) is nowadays used for cereal-grass rotation. The site AG (Björk et al., 2010, Klemedtsson et al., 2010) is a mesotrophic peatland in Sweden that was under agricultural use until 1950, after which it was forested. The AG site is described in more detail in Ernfors et al. (2011). The age of the tree stand in sites AL and AR is >30 years and >25 years, respectively. Both, AL and AR sites, were used for cultivation for many decades before they were afforested (Maljanen et al., 2012). The BA and BB sites were also used for cultivation for decades before they were abandoned (Maljanen et al., 2012). The Icelandic site CI was subjected to hay cultivation ~10 years after drainage whereas the other Icelandic site DI has remained mostly unused, with occasional use as a rangeland for horses or dairy cows.

**Table S1.** The study sites and their drainage history, peat depth (cm) and dominant tree and understory plant species.



**Table S2.** Total amount of nutrients (mg kg-1) in soil layers of 0-10 cm and 10-20 cm. Soil samples were extracted with HNO3/H2O2 combined with microwave digestion. Extracts were analyzed with inductively coupled plasma atomic emission spectroscopy (ICP-AES).







**Table S5.** Factor loadings in the principal component analyses (PCA, **Fig. 6.**) for variables measured in 0-10 cm soil depth (left table) and in the 10-20 cm depth (right table). Variables are sorted based on their values in the component 1 (from the highest to the lowest loadings) and for three first loadings (negative or positive) over 0.2 are bolded.



**Table S6.** Mean (±SD, n=5) soil pHH2O, electrical conductivity (EC) and concentrations of nitrate (NO3-) and ammonium (NH4+) at the time of sampling (initial values) and after two weeks of soil incubation at +15°C (final values) for 0-10 cm and 10-20 cm soil layers. For pH only initial values are shown. In site codes the first letter refers to land-use type: F = forest, C = cultivated, A = afforested field, D = drained, B = abandoned field. The subscript defines the site.



**Table S7.** Eigenvalues in the principle component analysis (PCA, **Fig. 6**) for variables measured in 0-10 cm soil depth (left table) and in 10-20 cm depth (right table). The first six components were included in the PCA.



**References for supplementary information**

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