



Huge N₂O emission from drained organic soil is related to seasonally mobile oxic-anoxic interface

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N₂O emission from soil is often regulated by the more or less sporadic occurrence of small anoxic volumes which makes the process highly variable at the microscale. In a search for situations where variation in N₂O emission was at the mesoscale rather than at the microscale we selected a drained and nitrogen rich organic soil on a slope. In this situation we would expect a spatially more uniform distribution of anoxic volumes due to a widespread decomposition of soil organic matter at the increased oxygen availability. We did find such gradients in N₂O emission at the mesoscale in the 10 meter range. Massive N₂O emissions did occur at an interface likely defined by oxic conditions upslope producing nitrate from mineralizing organic nitrogen and anoxic conditions downslope converting the nitrate into N₂O. This N₂O producing interface moved uphill in the wet season and downhill in the dry season so the clear mesoscale pattern also had a clear temporal component. One hectare soil encompassing such an interface emitted 73 kg N in N₂O annually which makes it relevant to look for such interface sites on slopes of drained organic soils elsewhere