N_2O emission in the LULUCF sector

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Forest land is dominating in Sweden, where 5% is on drained peatlands. These areas have substantial N_2O emissions. But hitherto the Swedish national reporting (NIR) to UNFCCC has only included forest fertilizer addition as the base for calculations, since it was supposed that knowledge on N_2O emission from drained peat soils is limited. Emission of N_2O is thus not shown, in the NIR, to be an important greenhouse gas from forest ecosystems, although it is.

We claim that enough process knowledge and emission data exists in Finland and Sweden that no ignorance of this sector should be possible ahead.

The IPCC default emission factors for drained forest peat soils are much lower than found in field measurements, especially for rich soils. Research in Sweden, Finland and Canada have found N_2O emission to be correlated with the C/N ratio of the drained forest soils. This relationship can be used for up-scaling emission more confident than by the use of default factors. This would improve estimations.

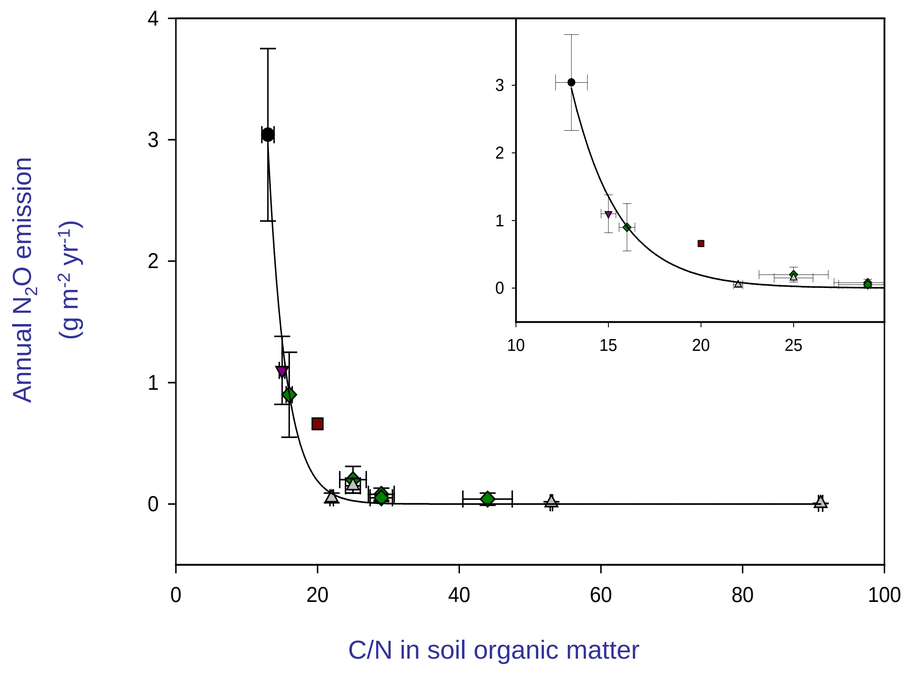
Until now N_2O from the forest sector have been based on fertilizer additions only. But this is a very unreliable measure for to estimate soil emissions. Studies in Canada have shown no increase in N_2O emissions from mineral forest soils due to fertilizing. This is confirmed by Swedish measurements, at Gårdsjön in west Sweden, with no effect on N_2O emission after 16 years of artificial N-deposition (10+40 kg N ha^{-1} yr^{-1}), still very low emission. But this is for growing forests and more studies are needed for to elucidate possible events of N_2O emission in the clear cutting phase.

•The scalar used in NIR reporting (fertilizer addition) is a shaky scalar for N_2O from N-poor forests

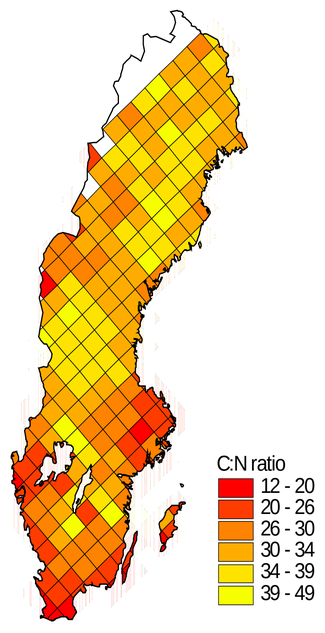
AND

•The scalar soil C/N ratio on drained forest land should be used for estimation and reporting N_2O from this sector

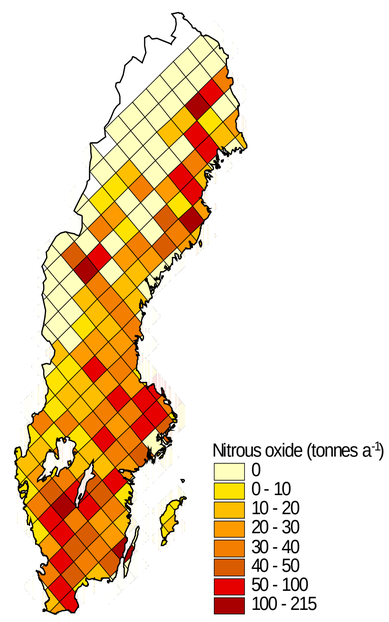
N_2O emissions from drained organic forest soils are correlated to C/N



Klemedtsson, von Arnold, Weslien & Gundersen (2005) Global Change Biology



C/N ratio of drained organic forest soils



N_2O emissions calculated on basis of the C/N ratio

Ernfors, von Arnold, Stendahl, Olsson & Klemedtsson (2007) Biogeochemistry