



Simulation of N₂O peak emissions on peat soils with SWAP-ANIMO

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Nitrous oxide (N₂O) is a very strong greenhouse gas, with agricultural soils as its main anthropogenic source. Various management practices, like fertilization or tillage, can give rise to pulses of N₂O emissions. In spite of their short duration, in the order of a couple of days to weeks, these pulses can constitute major part of total annual nitrous oxide emission. Understanding, predicting and ultimately mitigating these pulses poses a considerable challenge. N₂O is mainly produced by nitrifiers and denitrifiers. These require different conditions with respect to aerobicity and available mineral N.

Simulation models offer a promising tool to test and further develop process knowledge on N₂O production and -emission. SWAP-ANIMO is a process oriented biogeochemical model, originally developed for the simulation of nitrate leaching, that has recently been extended with an N₂O module. It includes production and consumption of N₂O by denitrification, production of N₂O by nitrification and transport by diffusion and convection in the soil water and soil air.

Here we present the validation of N₂O surface flux simulations, with daily measurements of fluxes from grassland on peat in The Netherlands. As a first step to evaluate the simulation of the processes in the soil, we compare observed and simulated soil N₂O concentration profiles.