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Effect of different tillage methods on soil N2O emission in an arable field

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In this study we investigated the effect of mouldboard ploughing (MP), shallow cultivation (SC) and no-tillage (NT) methods on N_2O emission of a Central European long-term field experiment. We measured N_2O fluxes and environmental parameters (soil moisture and temperature) in three replicates per treatment on a biweekly to mounthly basis during two and a half year period. Besides regular measurements we carried out additional occasions timed to heavy rainfalls. N_2O fluxes occured after fertilization and on soils under high soil moisture conditions only, during spring and autumn. The average N_2O emission for the whole experimental period was the highest in NT (0.025±0.045 μg N_2O m^{-2} s^{-1}), which was significantly higher ($p<0.005$) than in MP (0.004±0.003 μg N_2O m^{-2} s^{-1}) or SC (0.003±0.003 μg N_2O m^{-2} s^{-1}). Soil mositure was a significant ($p<0.005$) environmental driver of N_2O emissions in NT treatment.