



Soil nitrogen gas emissions increase considerably in warmer forest soils

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Climate change will likely modify ecosystem properties and processes and therefore impact nitrogen (N) dynamics of forest soils.

To elucidate the effect of warming and drought conditions on the nitrogen gas emissions we measured N₂O and NO fluxes from the soil warming experiment Achenkirch, a spruce-fir-beech forest soil in the North Tyrolean limestone Alps in Austria. The uppermost layer of the soil was warmed (4°C) by heating cables during the snow-free seasons. Roofs were installed during 25 days in July/August 2008 and 2009 to simulate drought conditions. Gas sampling was conducted biweekly with static chambers (N₂O). Gas concentrations were detected by GC. Nitric oxide fluxes were measured by an automatic dynamic chamber system on an hourly basis. In our study the emissions of N₂O were increased by up to 73 % at warmed plots, and we observed a temporary increase following first rain. However N₂O emissions of the drought affected plots remained depressed for more than two months after roof removal. Nitric oxide fluxes were increased considerably during dry periods and under warmer conditions.