Controls over Nitrogen Oxide Gas Emissions from Forest Soils along a Gradient in Atmospheric Nitrogen Deposition in the Northeastern U.S. (S07-venterea093239-Oral)

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Abstract:

There is increasing concern that elevated rates of atmospheric N deposition to forests may result in enhanced off-site N losses via leaching or trace gas emissions. We compared N trace gas fluxes and N cycling rates in N-amended versus non-amended plots at five forest sites. Rates of nitrification and NO production were enhanced at some sites. Dominant forest vegetation type may have influenced the differential responses and also affected background N cycling rates, although patterns differed among sites. A pine forest in Massachusetts showed increases in N cycling in response to N inputs while a mixed deciduous forest showed no response. In Maine, a mixed deciduous forest showed an increase in NO fluxes while plots dominated by mixed coniferous trees did not. In the Catskills, plots dominated by sugar maple trees exhibited higher background NO fluxes than oak- or beech-dominated plots, while N addition did not affect N cycling rates. We also found evidence that the lowering of soil pH resulting from enhanced nitrification and/or directly from atmospheric acid deposition may influence N trace gas production by promoting abiotic reactions involving nitrous acid.

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