

Effects of elevated CO₂ on trace gas emission from grassland soil under FACE in Switzerland

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General subject area: agricultural sources

CO₂, N₂O and CH₄ are the main three greenhouse gases in the atmosphere. Soil which acts as the sink or source plays crucial role in mediating atmospheric CO₂, N₂O and CH₄ concentration.

Atmospheric CO₂ concentration is predicted to double within this century. Increased atmospheric CO₂ concentration will stimulate primary production, leading to higher C and lower N in residues and indirectly influence soil respiration and microbial process.

Soil collected from long-term elevated CO₂ fumigation (Swiss FACE-free air carbon dioxide) was incubated under constant room temperature and moisture. We studied gross nitrogen mineralization using ¹⁵N isotope technique, fluxes of CO₂, N₂O and CH₄, and net nitrogen mineralization from disturbed and intact soil cores planted with *Lolium Perenne* and *Trifolium Repens*. Results showed that elevated CO₂ increased soil CO₂ emission. When soil moisture was low, N₂O emission is similar between elevated and ambient soils. But N₂O emission was higher in elevated than in ambient soil when soil moisture content was high. No difference was found for CH₄ emission. There is more available N under elevated than ambient soil. Interactions between different species and N fertilization will be discussed.