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

Z. Xie[1] G. Cadisch[2] E.M. Baggs[2] E. Grant[2] H. Blum[3]
[1] *Imperial College at Wye, Department of Agricultural Sciences, Wye, Ashford, Kent TN25 5AH, UK* (before July, 2003. tel: +44-20-759-42900; fax:+44-20-759-42640; email:x.zubin@ic.ac.uk)
[1]*Institute of Soil Science, Chinese Academy of Sciences, Nanjing, 21008, China* (after july, 2003. tel: +86-25-360-1015; fax: +86-25-335-3590; email: zbxie@issas.ac.cn)
[2]*Imperial College at Wye, Department of Agricultural Sciences, Wye, Ashford, Kent TN25 5AH, UK*
[3]*Institute of Plant Science, Swiss Federal Institute of Technology (ETH), 8092 Zürich, Switzerland*

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.