Photoacoustic measurement of soil greenhouse gas fluxes. (S11-dobermann085338-Poster)

Authors:

- M.A.A.Adviento - *University of Nebraska*
- A.Dobermann - *University of Nebraska*

Abstract:

A portable trace gas analyzer based on photoacoustic infrared spectroscopy was used to monitor N2O, CO2, and CH4 fluxes. A closed-loop vented chamber was placed on the soil surface and accumulation of gases was measured in 2-min intervals. In laboratory experiments fluxes were linear within 4 to 14 min after chamber placement. Average R2 values of the linear regression of gas concentration vs. time were 0.97 for N2O, 1.0 for CO2 and 0.81 for CH4. Measured fluxes were sensitive to changes in soil moisture or sucrose addition. In a field experiment with maize, at a given date, coefficients of variation between replicate plots ranged from 27 to 64 % for N2O, 13 to 87 % for CO2 and 56 to 226 % for CH4. For N2O and CO2, coefficients of variation were mostly in the 30-40% range and R2 values of flux rates were >0.95. Crop rotation and fertilizer regimes had less effect on flux dynamics than soil temperature or moisture. The portable method allows fast, simultaneous measurement of greenhouse gas fluxes. It is particularly suited for laboratory studies and field studies on spatial variability or experiments in which automated continuous monitoring is not feasible.

Corresponding Author Information:

Achim Dobermann
University of Nebraska
P.O. 830915
Lincoln, NE 68583-0915

phone: 402-472-1501
e-mail: adobermann2@unl.edu

Presentation Information:

Presentation Date: Tuesday, November 12, 2002
Presentation Time: 9:00-11:00 am
Poster Board Number: 2130

Keywords:

greenhouse gases, flux measurement, nitrous oxide