# Soil-Atmosphere Exchange of CH4, CO2, NOx, and N2O in the Colorado Shortgrass Steppe under Elevated CO2. (S03-mosier115253-Oral)

**Authors:**

- A.R.Mosier* - *USDA/ARS, Fort Collins, CO*
- J.A.Morgan - *USDA-ARS, Fort Collins, CO*
- J.Y.King - *Univ. Minn., St. Paul, MN*
- D.LeCain - *USDA-ARS, Fort Collins, CO*
- D.G.Milchunas - *Colo. St. Univ., Fort Collins, CO*

## Abstract:

In late March 1997, an open top chamber (OTC) CO2 enrichment (~720 umol/ mol) study was begun in the Colorado shortgrass steppe. From this study we report here our weekly measurements of CO2, CH4, NOx and N2O fluxes within control (unchambered), ambient CO2 and elevated CO2 OTCs. Soil water and temperature were measured at each flux measurement time from early April 1997, year round, through October 2001. Even though both C3 and C4 plant biomass increased under elevated CO2 and soil moisture content was typically higher than under ambient CO2 conditions, none of the trace gas fluxes were significantly altered by CO2 enrichment. Over the 55 month period of observation NOx flux averaged 4.3 in ambient and 4.1 ug N/ m^2 hr. NOx flux was negatively correlated to plant biomass production. Methane oxidation rates averaged -31 and -34 ug C/ m^2 hr and ecosystem respiration averaged 43 and 44 mg C/ m^2 hr under ambient and elevated CO2, respectively, over the same time period. These observations suggest the possibility of increased carbon storage under increasing CO2, if system response does not become N limited.

**Corresponding Author Information:**

Arvin Mosier
USDA-ARS
USDA-ARS, P.O. Box E
Fort Collins, CO 80522

phone: 970-490-8250
fax: 970-490-8213
e-mail: amosier@lamar.colostate.edu

**Presentation Information:**

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 3:30 pm

**Keywords:**

Elevated CO2, Trace Gas Fluxes, N-cycling, Grasslands