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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Soil-atmosphere exchange of CH_4, CO_2, NO_x, and N_2O in the Colorado Shortgrass Steppe following five years of elevated CO_2 and N fertilization" *by* A. R. Mosier et al.

A. R. Mosier et al.

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Response to Anonymous Referee #2: From A.R. Mosier

Referee #2 raised many of the same questions as Referee #1. Most of these questions were addressed in our 13 June response to Referee #1. The abstract was modified, and the introduction and discussion sections were rearranged. Following is a response to specific comments:

1. Neither the total N content nor the mineral N of the soils that were exposed to ambient and elevated CO2 were measurably different during the course of the study. We conducted a gross N mineralization study at the time that the water/mineral N addition

study was conducted. Unfortunately the data analysis for the gross N mineralization study have not been completed.

2. Abstract, see 13 June modifications.

3. Introduction, see 13 June modifications.

4. Page 2693, see 13 June modifications.

5. Page 2697, during the time of the water/mineral N addition study background NO2 concentrations were very low.

6. Plot vegetation composition. The composition of grass species was altered by elevated CO2. A cool season grass, Stipa comata, above ground biomass increased from approximately 20% to approximately 50% of total above ground biomass under elevated CO2. As far as the water/mineral N addition study is concerned I don?t think that grass composition is of great importance. The study took place in the third year of one of the driest periods in the past 85 years and very little above ground biomass existed during the time of the study.

7. Page 2698. Based upon several years of gas flux measurements in the shortgrass steppe we know that NOx and N2O fluxes are very low when it is very dry and hot, the conditions existing when we began the study. A single measurement before adding water/mineral N was sufficient to demonstrate the low pre addition fluxes.

8. Page 2698. Differences in ammonium and nitrate pool sizes are typically not detectable.

9. Page 2699-2700. We observed little change in soil microbial biomass under elevated CO2. One part of the study involved quantifying changes in microbial community structure and the data are still being analyzed. Our analysis of the gross N mineralization study have not been completed, but plant N uptake, as indicate in the text, is likely to be the greatest integrator of soil N availability for plant uptake and nitrification.

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Interactive comment on Atmos. Chem. Phys. Discuss., 3, 2691, 2003.

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Interactive Comment