

## ***Interactive comment on “Land use change and the impact on greenhouse gas exchange in north Australian savanna soils” by S. P. P. Grover et al.***

**Anonymous Referee #3**

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The manuscript describes seasonal results for fluxes of greenhouse gases CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. The experimental approach is similar to that used by other investigators and the results are mostly in agreement with results previously published, which are satisfactorily referenced. Differences from other reports are adequately noted and explained. The manuscript, however, does not provide any detail for improving the modeling of these greenhouse gas emissions with respect to land use change, as is suggested in the introduction, nor does it inform land use decisions, as stated in the conclusions. Some additional discussion of where present models may be improved should be within the scope of this manuscript and is encouraged. As it stands, the manuscript only stands as a repetition of previous experiments, this time in a northern Australian savannah. This may be sufficient to warrant publication.

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There are several other, more pointed comments:

1. Figure 2: was water content and soil temperature measured within the enclosures and throughout the enclosure period?
2. Figure 3: no standard deviations are shown in the figure, as suggested in the caption.
3. Figure 4: The legend and caption identifications are very confusing. I assume filled symbols are for pasture and unfilled symbols are for savannah; circles are for N<sub>2</sub>O (but also soil moisture), triangles for methane; is this correct?
4. Figure 5: captions for a and b are switched?
5. Figure 6 and text: while soil moisture is stated as the main driver of emissions, Figure 2 shows enough variation in annual temperature that this should have some effect. How much (5%, 10%)?
6. Static enclosure technique: since the enclosure time was up to 1 hour and the enclosure material is black, significant temperature increase in the enclosures would be expected. Was this measured? How much effect did this have? Since no plots of individual enclosure measurements versus time are included, did these increase linearly (implied in text), or exponential (as may be inferred from an enclosure increasing in temperature, or did concentrations reach some limiting value, implying some compensation point concentration (concentration at which emission and deposition are equal).
7. How often were individual chamber flux measurements made during experiments (number of times daily, number of days).
8. A significant amount of air was withdrawn for sampling, compared to volume of enclosure. Please estimate the influence, effect on results.
9. 2.6: Data analysis and presentation. “Data from the manual chamber measurements were not normally distributed”: raw concentrations versus what were not correlated?

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10. Please adjust all numerical values to the appropriate number of significant figures.

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Interactive comment on Biogeosciences Discuss., 8, 9087, 2011.

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