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Discussions
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Interactive comment on "Water-saving ground cover rice production system reduces net greenhouse gas fluxes in an annual rice-based cropping system" *by* Z. Yao et al.

Anonymous Referee #3

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General comments

In the discussion paper the authors quantify CH4, N2O and CO2 (soil heterotrophic respiration and plant uptake) responses to six different fertilizer treatments in a ground covered rice production system, in a cropping year, to find the best sustainable management regime (higher grain yield with lower GHG efflux).

The paper provides useful data for comparative GHG flux responses to various nutrient treatments (fertilizer and/or manure) in a ground covered rice production system set up, and determining the best for achieving the sustainability goals and protecting food security, potentially helpful to cope with future food security challenges. Considering

the high global acreage under rice crop and shrinking water resources, this information is vitally important.

The use of English language is appropriate and the quality of presentation is very good. The determination and calculation methods are of good scientific quality as well. However, some minor improvements / explanations are needed as listed in the specific comments section:

Specific comments

P 8926 R 19. Be consistent with # of decimal places, two are good

P 8927 R 4-6. The starting sentence structure is awkward. Try to make it clear

P 8931 R 2-4. Interestingly, the soil is sandy loam which has a very low water holding capacity. It would be useful to explain how the crop plants get furrow water that may preferably percolate in sandy loam soil instead of lateral seepage? Also how deep is the soil profile? Is it heavier in the lower depths?

P 8932 R 16-17. It is unclear if there was a transplanting hole in the sheet within the frame, as well? I assume there was one.

P 8932 R 17-18. Sentence "the top edge of the frames. . . . . .of the top chamber" could be clearly explained

P 8932 R 11. Covering the soil essentially alters the spontaneous CO2 flux by affecting the concentration gradients between soil and the air within the chamber. How was this corrected when the chamber was used for longer time intervals of up to 40 minutes?. Also need to be mentioned what regression was used. Also need to explain how the type of regression used (liner or exponential) will explain constantly changing controls on CO2, CH4 and N2O fluxes?

P 8933 R 19-20. Were the fluxes corrected for chamber (gas) volume as well?

P 8936 R 10. Were separate ANOVAs performed for the response variables? Again,

also mention the type of regressions analyses?

Discussion section. It would be helpful to present and discuss the typical diurnal pattern of air temperature observed in the growing season and fallow. This will complement the fig. 4.

Fig. 4. The fig explains the temperature-flux relationship very well. However, font size of the axis labels is too small to be legible after potential reduction in fig size that usually occurs when the fig is reduced to fit a single column.

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