Biogeosciences Discuss., 11, C5462–C5464, 2014
www.biogeosciences-discuss.net/11/C5462/2014/

Biogeosciences
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 #4

Received and published: 26 September 2014

The manuscript aims to investigate how the water-saving ground cover rice production system (GCRPS) affects net ecosystem exchange of CO2, CH4 and NO2, and finds that it reduces these greenhouse gases (GHGs) emissions under higher rice production and lower water consumption as compared to the conventional rice production system. This provides important knowledge for not only understanding carbon and nitrogen cycles in agricultural ecosystems, but also for the planning of global food strategies in the near future. Therefore, the manuscript should be published as widely as possible.

However, I have one comment addressing the manuscript in general, and several specific comments and technical corrections, as follows.

General comments:

If possible, mention the amount of water saved (that is, the difference of water consumption between the GCRPS and conventional paddy system). Since the values of complete GHGs exchange and crop production are quantitatively estimated in the manuscript, the information on water exchange is needed to state the biogeochemical cycle within the GCRPS more accurately.

Specific comments:

P. 8930, L. 2 - 8 and P. 8944, L. 4 - 7: Even for each specific gas (CO2, CH4 or N2O) and/or limited period (e.g., only a growing-season), is there no study of the GHG flux at rice fields using the GCRPS? (I agree that the comprehensive GHGs flux and annually based study are not available). If there are one or more articles, please cite them in the introduction and compare the results in the discussion.

P. 8936, L. 25-26: Mention the number of days for the midseason aeration and final drainage.

P. 8937, L. 3-5 and Figure 1(d): During the midseason aeration (around June 30), why did the soil Eh in the GCRPS also increase? I recognize that the midseason aeration was applied only for the conventional paddy (c.f., P. 8931, L. 23 - 26).

P. 8942, L. 14 - 18 (and Figure 1(d)): So far as I know, midseason drainage lasting 7-10 days is a common length and practice in east Asia. Is the duration of midseason drainage in this study similar to those days, or the cited articles? Because the seasonal pattern of CH4 emission is different from the common pattern, this information would be of some help in understanding.

Technical corrections:

P. 8927, L. 23: Should "FAO, 2011" be listed in the References?

P. 8933, L. 13: Is it better to change "6 h" to "6 hours"?

P. 8941, L. 19: Does "The chick ..." mean "The chicken ..."?

Interactive comment on Biogeosciences Discuss., 11, 8925, 2014.