Biogeosciences Discuss., 12, C388–C390, 2015
www.biogeosciences-discuss.net/12/C388/2015/

Biogeosciences Discussions
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Interactive comment on "Seasonal and inter-annual variability in wetland methane emissions simulated by CLM4Me′ and CAM-chem and comparisons to observations of concentrations" *by* L. Meng et al.

Anonymous Referee #1

Received and published: 2 March 2015

Comments on "Seasonal and inter-annual variability in wetland methane emissions simulated by CLM4Me' and CAM-chem and comparisons to observations of concentrations" submitted by L. Meng et al. to Biogeosciences.

General comments This manuscript described results of global terrestrial CH4 emission from wetlands simulated by CLM4Me's models and atmospheric CH4 concentration simulated by CAM-chem. The authors compared these results with previous model estimates and observational data. Modeling CH4 emission is undoubtedly an important task for understanding and predicting the Earth system, and fits the scope of journal.

The authors present plenty of materials showing seasonal and interannual variability in their simulated CH4 emissions and atmospheric concentrations. Moreover, they made comparison with TransCom-CH4 and WETCHIMP data, and conducted several model experiments. The manuscript seems well prepared but I would like to recommend several modifications. First, it is unclear and somewhat confusing why the authors used two model versions: i.e., CLM4 (CN) and CLM 4.5 (BGC). If the latter is the latest (e.g., incorporating an updated scheme) one, I think using the CLM4.5 (BGC) is sufficient. If you persist in using the two versions, I recommend presenting more descriptions for the different schemes. At present, I could not understand from the manuscript why (i.e., by which process and factor) the two versions of CLM provided different results. Second, several figures can be removed or merged; the present manuscript contains as much as 20 figures. For example, data in Figure 19 seem to have been presented in Figure 18. Third, more importantly, it is unclear for me what is the advancement of this study compared with previous studies. The only message of this study seems that uncertainties remain in your model estimation. Please clarify progress and derive more insightful implications from your simulation results. In conclusion, the manuscript is not acceptable in the present form and requires at least major revision. In addition, the manuscript has several issues (see below) that should be addressed.

Specific comments Page 2163 Line 20 Chen and Prinn (2006) is not found in the reference list

Page 2064 Line 17 “adde” should be “added”

Page 2166 Line 13 Add “(” before “Fung”

Page 2168 Line 4 Clarify the spatial resolution of CLM4Me’s simulations. Is it the same as that of CAM-chem? The NCEP/NCAR reanalysis has the spatial resolution of T62, which is different from that of the CAM-chem.

Page 2170 Line 24 From the statement here, it seems that you calculated relative contributions to total RMS instead of absolute RMS for each component. Please check.

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Page 2172 Line 25 Do you mean “on the right” instead of “on the left”? Latitudinal figures are given on the right of Figure 6.

Page 2175 Line 7 In Figure 8, high seasonality caused by rice paddy in North America seems to occur in central Canada. Is it reasonable?

Page 2180 Line 13 Why HR increased dramatically in from 1993 to 1994 in the CN_a case?

Page 2181 Line 1 Most of statements in Conclusions are just a repeat of results. Please focus on conclusive statements and implications in this section.

Page 12 Figure 12 Please clarify correspondence between numbers in the figure and site names (e.g., in Table 2).

Interactive comment on Biogeosciences Discuss., 12, 2161, 2015.