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Geoscientific Model Development Discussions

Interactive comment on "Evaluation of $CH4MOD_{wetland}$ and TEM models used to estimate global CH_4 emissions from natural wetlands" *by* Tingting Li et al.

Anonymous Referee #1

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Wetlands are important natural sources of atmospheric CH4, but the estimation of CH4 emissions from natural wetlands remains large uncertainty. The model performance plays an important role in its global/regional assessment. Here, the manuscript "Evaluation of CH4MODwetland and TEM models used to estimate global CH4 emissions from natural wetlands", authored by Tingting Li et al, evaluated the performance of two process-based models from different wetland types and continents, and then estimated the global CH4 emissions during the period 2000-2010. In general, the manuscript is well structured and is easy to follow. The result is important for evaluating the two process-based models' generality in different wetland types and continents. This type of large-scale modeling simulations and comparison yield much insights to the CH4

modeling community. The manuscript definitely fits the aims and scope of GMD journal. I suggest this paper to be accepted for publication in GMD after some minor revisions as shown below.

Comments: 1. The authors should add the background and implications of this work in the abstract. 2. There are several process-based models for simulating CH4 emissions from natural wetlands. Why do the authors choose CH4MODwetland and TEM? In the methods and materials, the authors should clearly state the reasons of choosing CH4MODwetland and TEM. 3. The authors collected 30 wetland sites across the world, including 6 marsh sites, 14 peatland sites, 6 swamp sites and 4 coastal wetland sites. More information about the environmental conditions of the sites, e.g., climate, soil and hydrological conditions should be introduced in the data description. Also, it is better to add observed CH4 flux data for each site. 4. There are too many details presented in the results section. Please refine your results and remove unnecessary details. 5. L54: "satospheric water vapor and CO2", lead to an increase or decrease? 6. L62: typo: CH4emitted. And wetlands should be the largest natural source of CH4 emitted to the atmosphere. 7. L74: It might be better to remove this sentence, since it is unreasonable to say top-down or bottom-up is better. 8. L78: the unit should be Tg CH4 $yr-1$. 9. L87: remove "and" from "...because the processes of and controls on..." 10. L200: change "PH" to "pH". 11. L214: seasonal CH4 fluxes refer to monthly or daily fluxes? 12. L217: remove "and" from "...the coefficient of determination (CD) and were used to..." 13. L258-259: the sentence "The result indicated that the variations in the CH4 emissions between sites and in different years could be delineated by both process-based models" should be moved to the end of this paragraph, and changed to "These results indicated that..." 14. L270: change unit "g m-2" to "g m-2 month-1"? 15. L303-305: please remove the sentence "Marsh, swamp, peatland and ... of natural wetlands. Although the process-based models showed ... for each wetland type". 16. Figure 2: (a) and (b) are missing in the sub-figures. Add explanation for red lines 17. Figure 3 and 4: figure with higher resolution or vector figure is better

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