

Interactive comment on “Evaluation of CH₄MOD_{wetland} and TEM models used to estimate global CH₄ 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 CH₄MOD_{wetland} 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

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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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