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Earth System Science Data Discussions

Interactive comment on "Development of a global dataset of Wetland Area and Dynamics for Methane Modeling (WAD2M)" *by* Zhen Zhang et al.

Anonymous Referee #1

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Dynamic wetland datasets are no doubt essential in monitoring and estimating global methane budget. The efforts made by the authors to combine available wetland datasets including those from remote sensing, ground survey and modelling are comprehensive and valuable. There are, however, a few concerns related to the rationale of the data fusion and comparison results as follows:

(a) A better justification of "fwmax to match the wetland maps for pixels where fwmax is less than the static distribution" in the data fusion is needed. According to Schroeder et al., 2015, SWAMPS retrievals represent "water surface within open areas and under low density vegetation" due to the relatively low penetration ability of the microwave frequency used. Therefore, it is likely that SWAMPS will have overall underestimated water fraction for vegetated areas. In addition, both SWAMPS and the

static water datasets have biases, uncertainties and inconsistency in their representative season/periods. Ideally, all these factors should have been carefully accounted for when fusing the datasets, though it might not be practically achievable. The information of relative changes of SWAMPS water area seems more important to me than the absolute values when merging the datasets.

(b) The use of GSW to identify and mask out inland open water bodies seems oversimple to me. Assuming a lake with seasonal inundation changes, the pixels detected as water for less than 50% of the months were not classified as inland water (section 2.2.2), but they may be part of the lake over the wet season.

(c) What caused the overestimation of water fraction in dry areas such as central Australia (Fig.2a, 3a)? Did the uncertainty associated with drylands also affect wetland areas?

(d) Is it possible to examine data quality and accuracy for an area where ground/aircraft-based wetland mapping is available?

Minor comments: (a) For Fig. 9: please provide statistics on correlations between WAD2M times series and the others.

(b) For Fig. 9: did you miss GRACE time series in the upper-left figure?

(c) Line 91-92: please revise the sentence, which is not accurate.

(d) Line 101-102: please revise to improve clarity.

(e) Line 104: did you mean "inundation under snow"? Any reference to support this?

(f) Line 193-194: "The coastline. . ." Not sure about the meaning. Please revise or clarify.

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