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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Evaluating the utility of satellite soil moisture retrievals over irrigated areas and the ability of land data assimilation methods to correct for unmodeled processes" *by* Kumar et al.

Anonymous Referee #1

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.In this paper, the authors evaluate a number of a number of soil moisture products to compensate for unmodelled processes. In essence the idea of the paper is good, but I do have a number of comments.

- Page 5972: it is stated that is is common practice "to remove the bias between the observations and the model, and use a bias-blind assimilation approach...by rescaling the observations prior to assimilation". I am not sure I agree with this. Over the last decade or so, quite a bit of literature has been developed on the online estimation of

biases, as the authors explain a bit earlier. None of this literature is mentioned. This is really not placing the research in the correct frame, and a discussion on this literature should at least be included.

- Page 5983: is 0.02 volumetric soil moisture a realistic observation error? Please justify.

- Page 5983: an ensemble size of 12, is that not a bit on the small side? Is there a particular reason why a larger ensemble size has not been chosen?

- Discussion on page 5987: In this context, there is a paper by Dara Entekhabi in which he presents a number of metrics to evaluate soil moisture products. Perhaps it is not a bad idea to discuss this paper in this context.

- As a general comment on this discussion, would everything not depend on the way soil moisture is defined? If soil moisture is defined as what we can measure in the ground, then the argument could be raised that a higher RMSE does mean a worse product. To me, this means that soil moisture in a model is not really soil moisture, but a variable that is used to calculate ET and runoff etc. Since we are having a philosphical discussion here, I would add this kind of discussion as well.

- A general comment is also that the results of the study do make sense. Given this, in the section with the Summary the limitations of cdf-matching are discussed. I would also add that cdf-matching will not help your model much if the objective of the model is to model ET or runoff or any other soil-moisture related variable. If you do cdf-matching you will lose a lot of the important information in your data (the way I understand it).

Overall I think that with these improvements the paper can be published.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 5967, 2015.