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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Using hydro-climatic and edaphic similarity to enhance soil moisture prediction" *by* E. J. Coopersmith et al.

C. Peters-Lidard (Referee)

christa.peters@nasa.gov

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General Comments:

The general objective of this work is to extend and generalize the diagnostic soil moisture model of Pan et al, 2003 and Pan 2012 by recasting the work into an hourly time step and calibrating the parameters of the model using SCAN data. The authors then explore how hydro-climatic and edaphic similarity can be used to transfer parameters between sites.

This work is generally well described and relevant to HESS readers. My biggest concerns are the presentation of results, and particularly the lack of consistency in the evaluation metrics among the various analyses. The manuscript really needs a table

showing site number, site characteristics such as hydroclimate class and soils, as well as different error metrics (ubRMSE, Bias and Rˆ2) before and after bias correction.

The results from the k-NN bias correction procedure shown in Figure 2 show only the total Rˆ2 before and after correction, and only by site number, rather than by something related to the hydro-climatic or edaphic similarity (see suggestion for table above). Further, the importance of the bias correction is likely a seasonal or diurnal bias, and this should also be discussed/shown, perhaps as separate lines on Figures 3-6 or as an add-on to Figure 2 for different types/magnitudes of bias correction. Are the sites shown in Figures 3-6 representative?

The most important results in the work are the results shown in Figure 7/Table 1 as well as the Venn diagram in Figure 11. However similar to the suggestion above, it would be useful to examine these cross-validation results with a common set of statistics as with the initial calibration results. The boxplots do give a sense for the distribution of errors, but the description of what is actually shown in both Figure 7 and Table 1 is a bit confusing. The captions need more information across the board. Is the loss of Rˆ2 equivalent to the simple difference in Rˆ2 (baseline-new)?

The results for "similar" sites are interesting but what exactly constitutes a "similar" site is tersely defined with the discussion of Figure 7: "(different by a single split within the classification tree)." At a minimum you should refer back to Figure 1, where presumably the components of the tree algorithm are derived using MOPEX data.

Overall, I think the work is worthy of publication, and just needs some moderate revision to standardize the statistics and also expand captions and discussion to make explicit links and provide better explanations of the results being shown.

Specific Comments:

Figures 3-5 do not have legends, and appear to be cut off on the right side. The legend on Figure 6 is barely legible. The captions don't need to be repeated. You could say

“same as Figure 3 but for site xxxx, which is a <fill in type> hydroclimate and <fill in type> soil."

Figure 9 and Figure 10 are redundant. Only Figure 10 is necessary.

Figure 11 is a nice summary of the net effect, but I’m left wanting to see more results for the four cases illustrated in the diagram. I would think the type of errors due to soil and hydroclimate are different. Some more insightful discussion here is warranted.

Technical Issues:

Throughout the manuscript, the references to Pan et al., 2012, need to be corrected to Pan 2012, as there are no other coauthors.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 2321, 2014.