

Interactive comment on “Controls on hydrologic similarity: role of nearby gauged catchments for prediction at an ungauged catchment” by S. Patil and M. Stieglitz

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Dear Dr. Butturini,

We have posted detailed responses to the comments from both the referees. Below I will briefly summarize the main concerns of each referee and our suggested solution.

Referee #1 was primarily concerned that our streamflow interpolation approach excludes donor catchments that could be located far away from the ungauged catchment. This is a well-recognized conceptual limitation of the spatial proximity approach for ascribing hydrologic similarity, and is not exclusive to our method alone. In spite of this

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limitation, the spatial proximity approach is widely used and numerous PUB (prediction at ungauged basins) methods are based on this approach (Skøien and Bloschl, 2007; Archfield and Vogel, 2010; Andréassian et al., 2011).

We would like to clarify that the entire purpose of our paper was to test where the spatial proximity approach performs well, where it does not, and what could be the underlying controls. Continental US provides a perfect setting to test this question due to the large spatial variability in climate and physiographic features within that country. Since we were specifically testing the spatial proximity approach, any conceptual limitation associated with it is unavoidable. Overcoming the above stated limitation will require development of an entirely new conceptual approach to PUB, which is certainly out of the scope of our study. Nonetheless, we think that a study like ours that explores the wider applicability of spatial proximity approach is definitely valuable and fits well within the scope of HESS journal.

In the modified manuscript, we will provide a detailed discussion outlining the caveats and limitations of the overall spatial proximity approach.

Referee #2 correctly pointed out that our streamflow interpolation method was a variant of the drainage-area ratio method (Hirsch, 1979; Wiche et al., 1989; Emerson and Dressler, 2002). We regret that this method was not referred to and cited in the original version of the manuscript, but we will rectify that in the modified manuscript. The referee also pointed out that our result showing the WBE metric appears to be redundant and can be removed. We agree with the referee and will remove that result in the modified manuscript. We believe that other concerns of Referee #2 can be easily addressed through modifications in the introduction and conclusion sections of the paper.

In conclusion, we hope that we have appropriately addressed the comments from both the reviewers. We will certainly be able to provide a modified manuscript in a timely manner.

With kind regards, Sopan Patil

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