

Interactive comment on “Large-sample hydrology: a need to balance depth with breadth” by H. V. Gupta et al.

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This paper should eventually be published in HESS, and will make an important contribution to the literature, especially in the context of the new Panta Rhei initiative which requires an understanding of catchment behavior even beyond what was achieved under PUB.

I thank the authors for responding positively to my invitation to contribute a paper to the special issue.

However, for the paper to provide guidance to the future, the paper needs to undergo moderate to substantial revisions. I list below a few summary comments based on my own reading of the paper, and the many constructive comments and suggestions of

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the reviewers.

[I note that most of the reviewers declared themselves to be of the younger generation that grew up in the era of PUB, and are totally supportive of the large-sample idea, and who do not need to be sold on this idea, which means we are at the good starting point.]

1. There is a confusion (you might call it tension) between this being an opinion paper (as stated) and a review paper (which is what it may have turned out to be). If it is an opinion paper then it needs to be shorter and sharper.

2. There is confusion in the minds of the reviewers (and may I say the authors themselves) about their framing of large-sample hydrology. Is this paper about modeling per se (and if so it limits it to what is traditionally called regionalization as a way towards model improvement? Or is it about using the large-sample of catchments (and the data therefrom) to develop generalized understanding independent of a focus on rainfall-runoff models, or where any modeling activity is used primarily to generate understanding. As I read the paper these two sentiments are both included almost interchangeably, which makes it confusing.

3. Related to the above, I have another question: what is the difference between large-sample hydrology and comparative hydrology? I am more knowledgeable about comparative hydrology (my opinion is that it is more related to activities devoted to develop generalized understanding, at least this is the way it is framed in Falkenmark and Chapman, and again in Bloeschl et al. (2013), and several papers the reviewers have also highlighted. If the authors want to separate large-sample hydrology from comparative hydrology, and want it to focus on model regionalization, then they should clearly state it, and not leave this confusion hang around.

4. Such a clear definition and a narrower focus would help address the main criticisms of many of the reviewers, who were commenting on the non-inclusion of several recent comparative studies in HESS (as part of the catchment classification analysis

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many of which used the MOPESX dataset), in WRR (part of the hydrologic synthesis project which also exploited the MOPEX dataset), and several previous studies (e.g., the work of Tom McMahon who performed statistical analyses of thousands of catchments in terms of the organization or classification of signatures of hydrological variability). None of these studies were highlighted in this paper, which can only mean that the authors use the notion of large sample hydrology to advance model regionalization studies. If this is so, it is fine, they must acknowledge it, and re-frame the paper to remove this confusion.

5. If the authors agree with my interpretation of their framing of large sample hydrology (that is a BIG IF), then I have a final question. How different is their notion of large sample hydrology (within the context of modeling) to what has already been happening in catchment hydrology in the last 10 years or less. For example, in the latest PUB synthesis book, there have been several studies cited that fall into the category of large-sample studies. So is this paper just giving a name to something that is already happening or are they heralding something new that builds on the past work, or are they introducing new concepts that have not been previously tried. This is not a new criticism - just a call to clarify so as to avoid confusion. I do not see the novelty very readily as I read the paper quickly, and hopefully their revisions can fix this problem.

6. How will any of these issues be impacted by the new focus on Panta Rhei (where we will be asked to extrapolate both in space and in time)?

7. Depending on their response to these queries, I suggest that authors revise the title, abstract and conclusions.

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