

Interactive comment on “Clustering CAMELS using hydrological signatures with high spatial predictability” by Florian Ulrich Jehn et al.

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Dear Referee 1,

Thank you for your comment, which point out two rather critical aspects. As you correctly pointed out in your first statement, climate is obviously an important factor in the western United States. We fully agree with this and it may well be that we have formulated this too hard in our manuscript. Still, we would like to point out that our conclusion is grounded in the observations. While in the overall dataset climate attributes are clearly the most important (Fig 2.), the case is different for the single clusters. Here, several non-climatic attributes are most important (Fig. 4, e.g. cluster 2). In cases where climatic attributes are most important, they are often only slightly more important than other attributes (e.g. cluster 4). We see this as a clear indication that

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the climate in the western United States is not the dominating factor for catchment classification. However, we acknowledge that our wording does not depict this accurately enough and we will revise our manuscript accordingly.

The second point of criticism is that our analysis does not provide any new findings compared to other existing studies. However, the studies cited by Addor et al. (2018) and Knoben et al. (2018) have a different focus and followed a different methodological approach. Knoben et al. (2018) clustered their catchments using climate and linked this to a specific river behaviour. Addor et al. (2018) also starts from catchment attributes and related these with hydrological signatures. Our approach takes another scientific angle. We identified rivers with similar hydrological behaviour according to hydrological signatures and combined these with climatic information. This allows to show that relying only on climatic attributes in clustering catchments can be misleading, as we found catchments that belonged to a single cluster regarding their hydrological behaviour, but did have very different catchment attributes (e.g. cluster 4 with catchments in Florida and the Northwestern Forested Mountains). In addition, our study enables further research that looks into comparing rivers with similar behaviour. This will also be made more clear in a revised version of our manuscript.

Kind regards,
Florian Ulrich Jehn

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