

Interactive comment on “Delineation of homogenous regions using hydrological variables predicted by projection pursuit regression” by M. Durocher et al.

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General Comments:

The present manuscript investigates the utilization of hydrological information in Regional Frequency Analysis (RFA) in order to improve homogenous properties of neighborhoods and then improve regional flood estimation. I think that the contribution of the study is relevant, and the authors have adequately responded to most of the comments of the reviewers. However, I still have one major comment, two “unfinished” specific comments regarding the first review, and one additional minor comment.

Major comments:

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The authors support the idea of using the estimation of hydrological variables, instead of site characteristics, to delineate homogeneous regions. Yet, the estimation of hydrological variables is based on subjective selections of site characteristics and subject to model errors. Moreover, since, homogeneity tests (e.g. Hosking and Wallis 1997) are generally based on hydrological variables (e.g., L1, LCV), these variables should not be used in delineating homogeneous regions. In other words, the same information should not be used for both delineating the homogeneous regions and testing the homogeneity of such regions. And this clarifies the good results regarding the improvements of the homogenous properties (i.e., the results of AHM and ARE) of the resulted neighborhoods by the new method, while the improvements in the results of the regional flood estimations are insignificant (i.e., the results of RMSE and NHS).

Specific comments:

1. P2 L21. “the distance between hydrological variables”. The distance is between locations not variables. I guess that the authors misunderstood this comment. I am aware that the distance between two locations can be geographical distance or hydrological distance. However, the distance still should be between locations not variables, otherwise, what is the distance between the two hydrological variables L1 and LCV?
2. P11 L23. Please, define here the $Q(r)$ as the regional quantile. The authors defined the $Q(r)$ on P11 L29 but it still needed to be defined immediately after the equation in P11 L23.

Minor comments:

The second part of the title of figure 3: (b), (c), and (d) Regional L-moments based on the 15 nearest gauged sites for 3 selected target locations.

References

Hosking, J.R.M., Wallis, J.R., 1997. Regional frequency analysis: an approach based on L-moments. Cambridge Univ Pr.

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