PASHA – A metric to quantify behavioral catchment similarity based on the PArameter SHAring concept

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This presentation deals with a new metric to quantify the similarity of catchments. This similarity metric generalizes the approaches presented by Oudin et al. (2010) and He et al. (2011), and is based on the Parameter SHAring concept (PASHA).
PASHA relies on the systematic evaluation of a library of model parameter sets: simulations are made with each set present in the library, using the input climatic data of each catchment of the dataset. For each flow simulation, three criteria are computed: Pearson correlation (r), model bias (b) and (a) ratio of standard deviations (simulated flow vs observed flow). Two assumptions are made:

• A parameter set is considered a candidate to represent catchment behavior if and only if it meets simultaneously some minimal requirements on r, b, and a.
• The similarity of two catchments can be measured as a function of the parameter sets of the overall library which they share.

Here, we study the sensitivity of the PASHA metric to the unavoidable arbitrary choices to make in order to quantify catchment similarity (limits on r, b, and a). We show that although the size of the shared parameter groups is affected by the chosen thresholds, the catchment similarity metric remains very stable over a range of values.

References

He, Y., A. Bardossy and E. Zehe. 2011 A catchment classification scheme using local variance reduction method. Journal of Hydrology, 411: 140-154.
Oudin, L., A. Kay, V. Andréassian, and C. Perrin. 2010. Are seemingly physically similar catchments truly hydrologically similar? Water Resources Research, 46, W11558, doi:10.1029/2009WR008887.