

Interactive comment on “Replication of ecologically relevant hydrological indicators following a covariance approach to hydrological model parameterisation” by Annie Visser et al.

Seibert

jan.seibert@geo.uzh.ch

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Thanks for asking me for feedback for this interesting study on Researchgate. In general, I like this approach and think your work makes a good contribution towards better modelling of aspects in the hydrograph, which are relevant to hydroecology.

My main concern with this study is that you used only one catchment. In our studies on the subject (Vis et al., 2015; Pool et al., 2017, as cited in your manuscript) we used 25 catchments and actually found that the performances differed among catchments. This means that there is a risk for somewhat random results if one uses only one catchment and more catchments would be advisable for robust results. At the very least this

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needs to be discussed, and it would be even better to extend your study to a few more catchments. Of course, handling all the simulations and their results can be painful as Marc (Vis), and Sandra (Pool) certainly will confirm.

Isn't the covariance approach by Vogel and Sankrarasubramanian (2003, WRR) not also some form of calibration /fitting. Could you clarify the difference to traditional calibration a bit more?

In the results, you report model parameters (P8 L7ff). Here it seems you derived one set of values. Later (P14) you discuss equifinality, but it was not fully clear to me how you considered equifinality in your study. Also, I am not sure I understand your comment regarding the number of model runs (P14L15): why would your 100 000 runs scale to 400 000 runs for the HBV model? It seems like you are arguing with the number of parameters, 4 to 16 resulting in a factor 4. However, this should not be a factor, but the exponent resulting in a far larger increase of model runs to sample the parameter space with a similar density.

In the discussion (P11L14) you say that the replication of indices was good. Does this result apply for calibration or validation (both regarding time period but even more regarding index)? In our studies, we found in general the indices could be nicely (even perfectly) be replicated when calibrated, but performances decreased for the validation case.

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