

Interactive comment on “Catchment modeling and model transferability in upper Blue Nile Basin, Lake Tana, Ethiopia” by A. S. Gragne et al.

Anonymous Referee #5

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General comments

Succinctly, this paper presents the application of the semidistributed model HBV in several subbasins of the Blue Nile. Its main aim is to transfer model parameters from gauged subbasins to the ungauged ones. The subject covered by this paper is relevant for HESS and fits well within the PUB initiative. Since the state-of-the-art in this subject is still far from satisfactory, publications of relevant research in this subject should be encouraged. In this paper, however, there are many points that have to be clarified before publication.

Specific comments

This paper has the following technical shortcomings:

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- Uncertainty analysis is an important issue in precipitation-runoff modelling. It not clear why after one million parameter sets were generated, the Authors did not use these valuable information to estimate the confidence bands of the parameters. Moreover, and what it is most important, there is no confidence bands associated with the generated streamflow.
- The calibration procedure is not clear. Please indicate the calibration period explicitly and describe the searching algorithm in detail. Why a simple Monte Carlo search was preferred to a more efficient searching algorithm like simulated annealing (as an example)?
- Why manual adjustment of parameters was necessary after 1e6 Monte Carlo realizations?
- Equations with subindices such as P_{AUGASC} is absolutely inappropriate in scientific writing. Wouldn't be easier to rename each subcatchment to A,B,C, or 1, 2, 3 for example?
- Why the Thiessen polygon method was used to obtain areal rainfall estimates? It is well known that this method is biased. Why areal precipitation was not estimated with Block Kriging or External Drift Kriging? Would it be possible to get TRMM precipitation data to obtain a rainfall variogram or to force the HBV model with this?
- A prerequisite for F- and t-tests is the fundamental assumption that the random variable should be normally distributed. Is the areal precipitation in the Blue Nile Gaussian distributed? I guess, it is not. If so, other nonparametric methods should have been used in the statistical analysis.
- The difference among k_0 , k_1 , and k_2 is not substantially large as expected. In this case, I expected $k_0 \gg k_1 \gg k_2$. (e.g. see Bloeschl et al. , Env. Mod. Soft.2008). Please explain the possible reasons for these results?

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- It is no surprise that non-regionalized parameters have not produced good results. The Authors should consider to regionalize at least some of them.
- It is not a surprise that a semidistributed model can not predict the spatial distribution of saturation zones. If this was an implicit objective of this study, then a fully distributed model should have been employed. Therefore, the Authors' conclusion in this respect is a platitude.

Technical corrections

This manuscript require also the following corrections:

1. Labels of Fig 6. are not clear.
2. Sentence in pag. 821, lines 12-14 is incomprehensible.
3. Please use another notation for this statistic *meandiff* ?
4. Pag. 829. line 1. Bárdossy instead of Brádossy.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 811, 2008.

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