Hydrology and Earth System Sciences Discussions

Interactive comment on "Multi-objective regionalisation for lake level simulation, the case of Lake Tana in the Upper Blue Nile, Ethiopia" *by* T. H. M. Rientjes et al.

Anonymous Referee #1

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This is an interesting contribution, sound science, well written, and appropriate to the special issue focus. The authors do a commendable job making clear their goal – improving the Tana water balance compared with previous studies. The following comments/suggestions are offered:

While well written, there are a few instances of minor grammatical mistakes that could be fixed with an additional careful read-through.

P7342,L12: HVB should be HBV

P7345,L10-12: how does this delineation compare with previous studies, and is that

important?

P7346,L8: "Runoff time-series were analyzed for consistency. . ." How? Method?

P7348: Variable names (initials_ do not all seem to match figure 2 (e.g. don't see 'R' there.)

P7350,L15-16: Are parameter bounds based on physically reasonable limits?

P7350,L17-24: Assume it's possible that the effects of 2 'unreasonable' parameter values are canceling each other out. Can this be checked?

P7353,L7-8: Reference for this statement?

P7353,L6-9: Do the 25 sets contain significant differences between parameter values? So no single set is probably appropriate, but an average gets back to something reasonable? Is this expected (e.g. central limit theorem)?

P7355,L1-6: Does order of adding individual variables matter in either process? Please clarify.

P7355,L6-14: There is a lot information here – difficult for the reader to process. Is it possible to present in another fashion (e.g. steps as bullets, etc.)?

P7358,L10: So is it fair to say that one can't be confident that the right parameter values are selected. . .only an optimal combination? This should be stated.

P7358,L16: Figure 4: is this essentially sensitivity or uncertainty? Is it possible to communicate the uncertainty of individual parameters?

P7359,L20-P7361,L1: Is there a physical basis for PCC selection for each MP? The statistical strength/procedure is clear, but are the associations physically meaningful? Might be useful to connect the physical relationship of predictor and predictand with a sentence or two per predictand.

P7361,L2: So are NS and RVE values potentially higher than one would expect on

validation of independent (not in regionalization) basins? Please clarify.

P7362,L17-25: The authors acknowledge uncertainty. . .but is it possible to quantify?

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