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Hydrology and Earth System Sciences Discussions

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

A. S. Gragne et al.

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Please note our general introduction to the referees' comments in our reply to referee #1.

We thank the reviewer for all positive and encouraging remarks, the through review of the paper and the stimulating thoughts for future research. In the following, we would like to respond to his 15 'specific comments'.

1. The HBV model, its applied model structures, its availability and justification will be explained in further detail in the revised version of the paper.
2. We checked the time series intensively (much more than usually done in such studies) to be on the save side when selecting the records for model calibration

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and validation. The original data series were checked in the MSc study of the first author (not reported here) and led to the same results, which will be clarified in the revised version. There were not significant land use changes in 80ies compared to the 90ies.

3. We will define the used terms to evaluate the model performance better.

   We will add references to illustrate the fact that for water resources management, in particular in data scarce developing countries, monthly simulations are of high practical values (water balance estimations, water resources development etc.).

   We are not sure if the referee can say that the efficiency of monthly models is always better than the one of daily models, as e.g. the Reff values usually get high if the water balances matches and the flood volumes are simulated well.

4. We agree that quite some work has been done on parameter uncertainty analysis using the Monte Carlo Simulations etc., but more could be done. We will describe the results so far better (discussion of figure. 6 etc.), but we do not think that this is the right catchment for further uncertainty studies of that nature as the input data uncertainty dominates too much (cf. response to referee 1). A through analysis of the model uncertainty was beyond the scope of the paper.

5. Model calibration will be described more in detail (see responses to other reviewers). In fact, what is suggested by the referee was done (some manual calibration at the beginning).

6. We will be edited in revised version.

7. All these clarifications will be addressed in revised version.

HESSD

5, S807–S809, 2008

8. We will provide %-values of the water balance error in the revised paper. Note that the mean annual rainfall varies better 1400-2000 mm/a (table 1) and therefore we concluded that an error of 52 mm/a is relatively small. (<3 % of annual rainfall).

9. Yes, the insufficient model representation could also be responsible for the less successful model application (as already stated in the manuscript and the responses to the other referees). We will discuss this more carefully but, finally, are limited by the partly poor data quality to shed more light on this.

10. Good points, this discussion will be clarified in the revised paper.

11. Yes, we will 'put it more clearly', but an extensive statistical analysis of the parameter value spaces etc. is beyond the scope of this paper (cf. discussion on limited data quality; response referee 1).

12. Good common, we will reword that sentence.

13. We are sorry for this typo. In the revised version we would like to give the mean discharge values in mm/a for better comparison with the rainfall (lower part of that table), which amounted to 1074 mm/a and 601 mm/a for the UGASC and KSC, respectively.

14. An additional graph illustrating the model structures will clarify this point.

15. Figures will be improved accordingly.

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