Hydrol. Earth Syst. Sci. Discuss., 5, S240–S242, 2008
www.hydrol-earth-syst-sci-discuss.net/5/S240/2008/

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.

Anonymous Referee #1

Received and published: 25 April 2008

The paper presents a study where the transferability of a runoff model from on catchment to another is tested for two catchments in the Blue Nile basin. This is an important issue and fits well to the ongoing efforts to increase our ability to make predictions for ungauged catchments (as also highlighted by the PUB initiative). My major concern with this paper is that it is based on only two catchments and, even more important, relies on manual calibration without considering the issue of parameter uncertainty. This unfortunately limits the value of this contribution.

The calibration procedure (p.816, 819) is subjective because the authors used a manual fine-tuning after a monte carlo approach. It remains also a bit unclear how these manual adjustments (p.819) actually were done (e.g., how much adjustment, which objective function, ...). Especially in the case of regionalization studies this subjectivity

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

can influence results quite significantly (even if not intended) and I, thus, would recommend to use an automatic calibration approach (actually one such approach is implemented in the software used in this study, see Seibert, 2000, HESS, http://www.hydrol-earth-syst-sci.net/4/215/2000/hess-4-215-2000.html). The calibration strategy has to be transparent, which usually is difficult for manual calibration. By using different land-use classes (CR2 and CR3) the authors must have run into problems with parameter identifiability. The authors state that parameter uncertainty was beyond the scope of this paper. To be honest I do not agree with this excuse for not addressing parameter uncertainty. As nicely summarized by Pappenberger and Beven (2006, WRR) including such an analysis should be the standard of any model application! The results obtained from by transferring a parameter set from one catchment to another depend heavily on the chosen parameter set; if we agree that it is difficult (or impossible) to find one best parameter set then we have to consider different parameter sets (if we want to get robust results).

Other comments:

Potential evaporation (p.816): The approach to use actual and long-term daily temperature to correct long-term potential evaporation for a certain day has been developed for boreal conditions. Can we assume this approach to be appropriate also for the quite different conditions in Ethopia? There is no information which observed data was used to compute Epot using the Penman-Monteith equation, but if these data are available it might be more reasonable to use the computed values directly instead of first averaging and then correcting them.

The lapse rates (p.818) for both precipitation and temperature differ from usual values. Please describe how these rates have been determined. Especially I find the lapse rate for temperature (0.14 C/100m) a bit surprising (even assuming it should actually be -0.14 C/100m).

The term direct runoff (p.823) is usually not used in connection with the HBV model,

HESSD

5, S240–S242, 2008

please specify what you mean here and how you attribute the different flow components to the flows in the HBV model.

Conclusions: Here I miss a focus on the conclusions of this particular work, i.e., what could be learnt from this study? For most of what is written in the conclusion now, one would not have needed to perform the modeling study.

The language needs to be improved. As an example (p.826) 'The presences of permanent marshland and dambos cannot be simulated well with present version of the HBV model'; The HBV model does not simulate the presence marshlands, what the authors mean, I guess is 'Runoff cannot be simulated well with present version of the HBV model for catchments where permanent marshland and dambos are present.';

In the tables there are generally too many digits.

Figure 4: what is oversaturated soil moisture?!?

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