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Hydrology and Earth System Sciences Discussions

Interactive comment on "Influence of rainfall observation network on model calibration and application" *by* A. Bárdossy and T. Das

Anonymous Referee #3

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Report on the manuscript entitled

"Influence of rainfall observation network on model calibration and application"

by

A. Bárdossy, T. Das

submitted for possible publication to Hydrology and Earth System Sciences

GENERAL COMMENTS

This paper deals with the sensitivity of hydrologic models to the characteristics of the rainfall measuring network that is used in order to estimate rainfall input to the catch-

ment. This is indeed an important topic for hydrological modelling, since precipitation is the main external forcing to the hydrosystem, and since there is no way to measure the areal rainfall itself: all “new” measuring devices (radar, satellite) still have extremely large errors, and hydrology will still have for many years to rely on discrete ground networks.

I found the title of this paper promising, and I have no doubt that the scientific work being it is solid, based on an interesting dataset of 13 catchments and 51 raingages. This being said, I was somewhat disappointed by the form of the paper, and I believe that the authors did not do a good job in communicating their results. My opinion is that, whatever the quality of research, a journal paper is an exercise of scientific communication, that requires from the researcher to take a step back from his work and make a real effort to provide to the reader all necessary information to understand the significance of the presented results. In this respect, I think that there is still a lot to be done on this paper:

1. First of all, the authors did not success in putting in front what is really original (or at least instructive, since all papers cannot be entirely original) in their paper:

a. the fact that the less the raingages, the worst the performances is not original (though putting it in perspective could be instructive).

b. the fact that after a certain level, the model stops improving its results is not completely original either, but it raises interesting questions that the authors did not discuss in detail.

2. Second, the authors left several serious points unclear, and I believe additional efforts are needed to help the reader understand what is really done, and in which objective:

a. page 3696, you state that “the raingage networks were selected from the complete network, consisting of 51 raingages, using the combinatorial optimization algorithm

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simulated annealing [...] to identify a uniform set of locations for a particular number of raingages". I am sorry, but here I do not understand what you do (and I guess many readers may be in the same situation): what do you calibrate on? Rainfall fields? Runoff simulation results?

b. Do I understand right that you have only generated 7 subsets of raingages? Why not more (in order to get a distribution of possible outcomes)?

3. I have a major problem with your experiment, which I end-up to find a little confusing: your model is semi-distributed, you have not been clear in the paper about the outlet (13 possible in total) where the calibration was made. And since you discuss the impact of raingage network density on parameters value, we need this information to understand what's happening. Honestly, I find it extremely confusing. I really think that it would be much clearer if you would deal with each catchment outlet independently. I would suggest for pedagogical purpose to treat each of your catchments in a lumped way (HBV can do it): this way, you could have for each catchment a value for the raingage network density, and would be able to study simply the link between model performance, model robustness, and network density.

MISCELLANEOUS REMARKS

4. In my opinion, section 3.3 should be moved in section 4 (you already discuss the results. You would help the reader by introducing sub-headingsĚ

5. Table 6: since you have worked at a daily time step, why didn't you show the N&S criteria also at this time step? It will give the reader an impression that you are hiding something from him!

6. Fig. 4: what N&S criterion are you representing (daily, monthly?)

7. Literature review: what you are studying is the sensitivity of RR models to the amount and quality of rainfall input. There are several recent papers on this topic that you should perhaps review instead of citing papers on radar (which are perhaps

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excellent, but do not bring anything to your paper): Huard et al., WRR 2006; Oudin et al. 2006, J. Hydrol; Anctil et al., J Hydrol, 2006; Bormann, HESS, 2006; Chaplot et al. 2005. J. Hydrol; Cudennec et al., 2005, HSJ; Yilmaz et al. J. Hydromet. 2005; Niel et al. JH, 2003; etc..

8. Literature review: Check the spelling of the cited papers section, e.g. p3708 line 29 (for/or); p3710 line 4 (scale/sale).

CONCLUSION

My feeling is that this paper can be quite interesting, but that it will still require some serious efforts from the authors.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 3691, 2006.