

Interactive comment on “The hydrological response of the Ourthe catchment to climate change as modelled by the HBV model” by T. L. A. Driessen et al.

G. Blöschl (Editor)

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Reviewer #1 is supportive of the paper but, among other things, suggests to better test the consistency of the model and analyse / discuss the uncertainty of the results. Both reviewers #1 and 2 point out the limitation of using a single climate station. Reviewer #2 is concerned about the many uncertainties involved. He/she suggest that to better assess the uncertainties the authors should simulate streamflow regimes with the output information during 1979 -2003. Reviewer #3 notes that a better test of the bias correction (eg. by directly comparing the climatologies) is needed and is not sure about

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what is the novel contribution of this study.

From my reading of the manuscript as an AE I agree with the reviewers in that the detailed analysis of the bias correction is laudable and perhaps the more interesting contribution to hydrology than the actual runoff results. I recommend that the authors take heed of the suggestions of the three reviewers.

Most importantly, the goodness of fit of the bias correction is tested extensively in the present manuscript but this tells little about the predictive performance. The wording "perform best" p. 7153 is a little misleading as far as I can tell - this should really read "fit best". In order to use the bias correction for the projections in a meaningful way, a split sample test would be needed, i.e. calibrating the bias correction parameters for one period and comparing it to data from a different period. As runoff models are much more sensitive to precipitation than to air temperature Fig. 4 should be replaced by an analogue figure of precipitation (for the validation period). Similarly, Fig. 5 should be replaced by validation period results. This split sample test should, ideally, be carried out for both rainfall and runoff (as recommended by reviewer 3), but doing it for rainfall would be a minimum. Without properly taking the uncertainties involved into account it is really difficult to appreciate what can be learned from the simulation studies. Also, the new contribution should be made crystal clear and the uncertainty needs a proper discussion, perhaps in the context of the issues raised by Bloschl and Monanari (2010, Hydrol. Processes).

These are moderate revisions.

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