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Hydrology and Earth System Sciences Discussions

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.

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1. General comments

This study presents potential future changes in hydrological response of the Ourthe catchment as projected by three different climate scenarios and simulated by the HBV model. The study has two parts. In the first, the authors evaluate the performance of four different bias correction approaches. The precipitation and air temperature outputs of the regional climate model are corrected according to the observations at one climate station. In the second, the bias corrected data are used as an input to the

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hydrological (HBV) model. Here, the authors compare the model simulations in both – historical reference period and future time horizons.

Generally, the study has a good structure, is clearly written and within the scope of the journal. However, it should be also noted that the significance of potential future response simulations may be not so attractive for international audience (because of the results for only one specific catchment and the large uncertainty in climate scenarios). In order to learn more from this part, it may be worth to extend the discussion and put results in the context of existing studies (different/same scenarios from the same region, or the same scenarios in different regions). Much more interesting part is the application and assessment of the importance of the bias correction. The credence of the correction procedure is somewhat limited by the use of only one climate station (as it is already discussed by the authors), and it will be certainly interesting to see its performance in another regions and/or observations. However in comparison to the alternative evaluation, based on the assessment of relative changes between the reference and future scenarios, the approach used here is methodologically beneficial as it also allows to speculate about the changes in the absolute value of hydrologic response (e.g. a change in the storage in mm). Thus, I would suggest to discuss more how the hydrologic changes may differ according to the assessment used.

Specific comments

Eq. 1: the description (and units) of the lakes and time constants in Eq. 1 is missing.

Section 2.3: Please consider to add a table showing general characteristics of the climate scenarios used (e.g. what changes in precipitation and air temperature are projected by different scenarios).

Section 3.1: Please give more details about the CRU dataset. Is it possible to evaluate the spatial variability of corrected data using the CRU dataset?

Section 3.2: a) How is the elevation dependence introduced in model simulations con-

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sistent with the bias correction procedure?

b) Please consider to present the calibrated model parameters and their ranges used in calibration. What is the weight of volume error in the objective function?

Section 4: It may be interesting also to compare selected characteristics, as e.g. mean outflow, simulated by the calibration dataset (ERA) and the reference (bias corrected climate output). Are these consistent? To what extent may the uncertainty in model parametrization affect projected changes in hydrological response?

In summary, this is an interesting topic, and I propose to accept the paper after some revisions.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 7143, 2009.