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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Climate model uncertainty vs. conceptual geological uncertainty in hydrological modeling" *by* T. O. Sonnenborg et al.

Anonymous Referee #1

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The authors provide an interesting and up-to-date analysis of the impacts of climate model uncertainty and geological model uncertainty on hydraulic head, stream flow, travel time and capture zones. The manuscript is very well written, concise, includes a clear motivation and fits well in the scope of HESS. I enjoyed reading the manuscript and recommend to accept it after a few technical corrections (see comments below).

MINOR COMMENTS:

- Page 4357, lines 19-20: "no model is generally superior to the others". Looking at the Nash-Sutcliffe coefficients (E) in Table 1, I would conclude that L1 and L2 are not

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suitable for any streamflow simulations...

- Table 3 is not entirely needed, as it is not that relevant for the results of this paper.

- Page 4358, lines 6-20: I don't believe that the DC method is the most appropriate method that should have been used here. Even though the authors argue that van Roosmalen et al. (2011) have shown that changes in the dynamics are not important when mean variables are considered, Teutschbein and Seibert (2013) proved that the DC method is the least reliable under changing conditions even when considering only the mean value (it can't deal with bias non-stationarity). This drawback should be addressed in 1 or 2 sentences.

REFERENCES:

Teutschbein, C. and Seibert, J.: Is bias correction of regional climate model (RCM) simulations possible for non-stationary conditions?, Hydrol Earth Syst Sci, 17(12), 5061–5077, doi:10.5194/hess-17-5061-2013, 2013.

Van Roosmalen, L., Sonnenborg, T. O., Jensen, K. H. and Christensen, J. H.: Comparison of Hydrological Simulations of Climate Change Using Perturbation of Observations and Distribution-Based Scaling, Vadose Zone J, 10(1), 136–150, doi:10.2136/vzj2010.0112, 2011.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 4353, 2015.