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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Evaluation of five hydrological models across Europe and their suitability for making projections under climate change" *by* W. Greuell et al.

Anonymous Referee #1

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I have read the article of Greuell et al. Entitled "Evaluation of five hydrological models across Europe and their suitability for making projections under climate change" with considerable interest, as the validation of continental to global scale hydrological models is an important contribution to the discipline. Overall the paper is relatively well written and the results do contribute to a better understanding of the performance of the current generation of models.

However, some choices made by the authors constitute weak-points, which need to be resolved before I can recommend the paper for publications. The main issues are:

(1) Section 5: Evaluation metrics is very hard to read. For me the notation was rather

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confusing and the relation relation between, as well as the interpretation of, the different metrics is still not 100% clear to me after repeated reading. Why not simply relying fully on the Talylor (2001) diagrams, which are in my evaluation the strongest results of the study.

(2) The study focusses on the evaluation of five models in 46 river basins. However, important figures do only show results for either selected river basins (Figs 6 & 11) or selected models (Figs 5, 8, 9, 10, 11). The reasons for the specific selections is semitransparent and statements on the representativeness (e.g. p 10305, l 15f) are neither supported by clear arguments nor data. This does unfortunately leave the impression that the authors have either worked very sloppy or are trying to hide specific results. Consequently I cannot recommend the paper for publication if this issue is not resolved.

(3) while I find it valuable that the paper compares the spatial patterns in long-term mean statistics (mean discharge, Q5, Q95), I do also miss a systematic approach for evaluating (i) inter-annual dynamics; (ii) the longterm-mean seasonal cycle and (iii) the time-evolution of low and high-flow (e.g. annual Q5, and Q95 time series). This could be achieved through Taylor diagrams derived from the three above mentioned models.

(4) I fully support the authors idea to compare the impact of the forcing data on model performance. However, the results are only shown for one (sometimes two) model(s). Only Table 3 allows for some insights to the inter-model differences, but this information is over-simplified if compared to the associated figures. Therefore I would suggest to either (i) include results from all models in the figures or (ii) to reduce the comparison of the forcing data on the table.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 10289, 2015.