

Interactive comment on “The importance of topography controlled sub-grid process heterogeneity in distributed hydrological models”

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We would like to thank mr. Tian for his valuable comments. We highly appreciate the suggestions and would like to improve the issues raised. Herewith, we would like to respond to the comments.

"I noticed that the improvement of mHM with semi-quantitative constraints improves a little bit when incorporating the additional sub-grid heterogeneity. The authors are often anticipated to improve the performance by comparing to the known 'best' one (not the worst one). More explanations and discussions are preferable here."

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We are not entirely sure what you mean, but we believe you refer to Figure 10b, which is indeed only discussed briefly at page 13325, lines 1-4. We will add a more elaborate discussion on the improvements of mHMtopo-constrained compared to mHM-constrained in an extra paragraph in section 3.2.3.

"As the authors test two things, sub-grid heterogeneity representation and expert knowledge based calibration methodology, in this paper, the title of the paper should also reflect the two things."

Thank you for this suggestion, we fully agree with it and will change the title: 'The importance of topography controlled sub-grid process heterogeneity and semi-quantitative prior constraints in distributed hydrological models'

"P13303, the last sentence: on the catchment scale > at the catchment scale."

We will correct this.

"P13305 L7-10: the authors state that the distribution function for maximum unsaturated storage capacities are originally defined in the VIC-model. In my mind this is not true. I suggest the authors refer to Xinanjiang model developed by Zhao (1992, on JoH, 135: 371-381)."

We agree with this and will add the reference to the Xinanjiang model.

"The same place with 4): For the Representative Elementary Watershed approach and its closure problem, there is quite a few new publications after Reggiani et al. (1998). I suggest the authors to cite the news as well to reflect the recent advance."

We will adjust this and cite the new work as well.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 13301, 2015.

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