Hydrology and Earth System Sciences
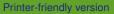
Discussions

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Interactive comment on "An evaluation of the importance of spatial resolution in global climate and hydrological models based on the Rhine and Mississippi basins" *by* Imme Benedict et al.

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We would like to thank the editor dr. Schymanski for summarizing the main outcome of RC2 and RC3 and we endorse his assessment that this paper can be seen as a reminder that increasing model resolution alone is not meaningful if the model does not represent the governing processes at the target resolution. Indeed, an important question is if models represent processes adequately and what we mean with 'adequately'. This question is almost always context-dependent. Relative few studies focus on new/better process representation but rather focus more on calibration/ model parameters when changing scales (see also Melsen et al 2016 and references therein).

The discussion triggered in this round of reviews stresses the still challenging field of hydrological modelling at multiple scales. The scale interaction from small to large scales and vice versa is insufficiently understood and different approaches deserve rigorous study. Here we followed one approach. We hope this manuscript can contribute to this discussion by showing the results of this, potentially not best, approach to deal with multiple scales and scale interactions. We will elaborate the discussion in order to put our approach in perspective with the challenges in hydrological modelling, and we will add the references suggested by the reviewer.

Best regards, On behalf of all co-authors, Imme Benedict

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