

Interactive comment on “Regional scaling of annual mean precipitation and water availability with global temperature change” by Peter Greve et al.

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Dear reviewer,

thank you very much for the helpful comments which will substantially improve the manuscript. We will address all your comments in detail in our final response and focus on the major issues in this response.

An initial response regarding the impact of biases in the atmospheric moisture budget: Based on the work of Liepert and Lo (ERL, 2013) in which they update their previous work (Liepert and Lo, ERL, 2012) for all CMIP5 models, we identified only MIROC5

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among our subset of models that potentially exhibits a large drift. This probably further applies to FGOALS-g2, even though Liepert and Lo (2013) used FGOALS-s2. From our own experience we are further aware that the IPSL model is associated with a drying bias over land areas. In order to assess the impact of these models on our results we will perform an additional sensitivity analyses by excluding these models. We totally agree that the identified drift is of great importance and potentially induces spurious changes in hydroclimatological storage components over long time scales. However, the global mean changes identified in Liepert and Lo (ERL, 2013) are equivalent to a maximum of only ca. 0.02mm/day. We further assess the multimodel ensemble in a probabilistic approach, providing median estimates and quantiles, thereby following the recommendation provided by Liepert and Lo (avoiding the ensemble mean). Hence, potentially biased models within the ensemble will not affect the median response provided here.

Regarding the different numbers of available models between scenarios: We will add supplementary material analysing the RCP2.6, RCP4.5 and RCP8.5 scenarios using only those models available in RCP6.0.

As requested in several of the minor comments, we will extend the discussion of several issues throughout the manuscript and all minor corrections and typos will be addressed in the final response. Thank you!

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