

Interactive comment on “Variations of global and continental water balance components as impacted by climate forcing uncertainty and human water use” by H. Müller Schmied et al.

Anonymous Referee #1

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This m/s used alternative climate forcings in a global hydrological model to determine the resulting uncertainty in water resource estimates, and compares that uncertainty with the estimated impact of human modifications on water resources.

Overall Assessment:

In summary, I am not convinced of the original contribution of this m/s.

The overall methodology seems sound enough and the first 2 questions asked (page 4) appear answered by the analysis. The 3rd question seems ill-formulated within the context of this m/s, as it does not clearly distinguish between real changes in precipitation and apparent changes that are artefacts in the data.

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However the concern I have with this m/s is the answers to those first 2 questions are already known and the results unsurprising. Regards (1): from numerous previous studies (including those cited but many more – including high level reports such as from IPCC etc) we already have a fair idea of temporal variations in global water cycle components. Regards (2): we already know that global precipitation analysis in particular diverge considerably and of course that will propagate through a hydrological model. Regards (3): This m/s shows that depending on the precipitation data set chosen we see the human impact on the water cycle less or more clearly, but always in places where we know it exists.

Furthermore, on page 19/20 the authors refer to an earlier study in 2014 that sounds like it had very similar objectives to the present m/s. It is not clear to me what new insights this m/s adds to that previous study, given its title makes explicit reference to the sensitivity of the model to input data.

The above does not mean that the analysis presented cannot be used to draw some interesting new conclusions. In particular, the authors draw attention to the unexpectedly large uncertainty in North America and Europe, which they attribute to undercatch corrections. I thought that was a very interesting finding which could probably be the topic of a m/s in its own right.

Specific comments:

- page 6: It sounds like you essentially treat land use as unchanged during the model period. That has a precedent of course but is still a limitation, pls discuss.

- page 12: This section requires proper statistical treatment, which some type of significance testing, not the type of ‘binary’ heuristics you use here. For starters, you clearly show that the forcing data are uncertain (not to mention the model) so that error needs to be considered in testing.