

Hydrol. Earth Syst. Sci. Discuss., author comment AC1
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Reply on RC1

Simon Ricard et al.

Author comment on "Producing reliable hydrologic scenarios from raw climate model outputs without resorting to meteorological observations" by Simon Ricard et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-264-AC1>, 2022

We first want to thank the reviewer for the positive remarks on the relevance and readability of the paper.

We acknowledge that the discussion could be more balanced. Proposing a new method, we probably constructed a biased argumentation, overweighting its benefits in comparison to the conventional modelling approach. We commit to modify the discussion section to better reflect the strengths and weaknesses of both approaches in a neutral way. The argument provided by RC1 presenting both modelling approaches as a complementary analytical tool appears to us as particularly relevant and would therefore be explicitly integrated to the discussion. Instead of being claimed as the best approach, our proposed alternative modeling framework will be presented as a complementary analytical tool available to modellers.

We agree that the discussion should encourage a sound use of reliable meteorological observations when available. While the paper was focusing on describing the alternative asynchronous approach and comparing it to a conventional modelling scheme, we would definitively encourage the exploration of combined approaches fully valuing available meteorological observations. On the other hand, we would like to remind that hydrologic scenarios produced using bias corrected climate simulations are affected with an inappropriate attribution of confidence in the capacity of the climate model to provide a plausible projection of hydrological conditions. In our view, the suggested asynchronous framework allows a more reasonable assessment of the confidence that should be attributed to the resulting hydrologic scenarios.

We agree that the physical consistency through the whole modeling chain is not fully respected in either approach. While conventional bias correction of raw climate model outputs may disrupt the physical consistency between simulated climate variables, our approach may disrupt the physical consistency of the simulated processed at the catchment scale through parametric compensation affecting the calibration of the hydrologic model. This has been explicitly acknowledged as a limitation of our approach in Section 5.3 (second paragraph). We believe further research is required to clarify the specific role of both perturbations on hydrologic projections. In the meantime, the manuscript provides, sound recommendations to minimize parametric compensation while applying asynchronous modelling. We are definitively open to contribute further to this debate and to clarify our position in the discussion section of the paper.

We did not intentionally suggest excluding climate model experts in the analysis of bias, but rather to encourage the dialog with impact modelers and end-users to support sounder climate change impact analyses. We commit to rephrase sentences that could be misleading regarding this aspect.

We commit to revise the manuscript according to the minor comments/questions raised by RC1.