



EGUsphere, referee comment RC1
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Comment on egusphere-2022-106

Anonymous Referee #1

Referee comment on "Coupling a global glacier model to a global hydrological model prevents underestimation of glacier runoff" by Pau Wiersma et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-106-RC1>, 2022

The manuscript tests the hypothesis that coupling a global glacier model (i.e., GloGEM) with a global hydrological model (i.e., PCR-GLOBWB 2) leads to a more realistic glacier representation and improved runoff prediction in the global hydrological model. Both the uncoupled benchmark and the coupled model were run for 25 large-scale glacierized basins during the hydrological years 2001-2012. Overall, the manuscript is clearly written, and the results are well discussed.

I have only two main concerns and one specific point for this study:

- The authors test a widely accepted hypothesis that the physical representation and simulation of hydrological model will be improved if its corresponding parameterization is optimized on a global scale. I am not quite sure that a test of a widely accepted hypothesis is a true innovation (I leave this question to the editor). If the test is done by coupling the global hydrological model and global glacier model physically instead of simply replacing the PCR-GLOBWB 2 runoff by the GloGEM runoff for glacierized areas, the novelty of this study makes sense at least from a practical point of view.

- In both Abstract and Introduction sections, the authors mentioned that global runoff prediction can be improved through the coupling of GHMs and GGMs. However, only

runoff “simulation” was tested in this study rather than “prediction”. The authors are suggested showing the results of runoff prediction (not for the calibration/validation periods but for the prediction period) as well.

A specific point: Paragraph 165 in P7, extra periods.