



EGUsphere, referee comment RC2  
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## **Comment on egusphere-2022-106**

Anonymous Referee #2

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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-RC2>, 2022

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In general the manuscript is quite interesting and the contribution of a global glacier model coupled with a global hydrologic hydrologic model certainly has the potential to be an important and significant contribution to our field.

I do have a few but important major comments that relate to both the model coupling and verification of the process representation.

(1) It would be useful to speak more about the coupling approach and its compatibility with BMI (L110-113). In particular, this sentence needs to be expanded on: "Communication with hydrological models is independent of the model language through GRPC4BMI (van den Oord et al., 2019) and BMI (Hutton et al., 2020). Additionally, the ESMValTool (Eyring et al., 2016) implementation in eWaterCycle allows for smooth preprocessing and high compatibility of forcing data."

Firstly, please spell out BMI in its first use. In the US in particular, BMI is rapidly becoming the standard for model coupling. It should be noted as to how the coupling approach here is compliant with the BMI standard or can be adapted to BMI.

If the code is not usable with the BMI standard, please add detail to the text so that a user understands that (at least from what is implied by the above sentence) they can use something other than a Jupyter Notebook (Python, for example) to couple the models - because of the language-independent nature of the coupling used by the different modeling components.

Hopefully, this is the case, as it is certainly an important advancement beyond the potential scientific improvements offered with respect to the process representation.

(2) In the results and conclusions (and abstract), (see L341 as an example), the statement is made that "The coupled model produces higher runoff across all basins." However, there is not a follow-on statement discussing whether this results in better hydrological modeling of the process in that it matches observations. This type of assessment should be more clearly stated in these sections. Simply producing more runoff through this new model coupling does not necessarily mean the modeling results are better or the process representation is more correct. Using an evidence-based approach with a comparison to observations, and showing how this is an improvement over other modeling approaches is preferred. Otherwise, the manuscript's hydrologic contribution is reduced and more emphasis is placed on the model coupling/software engineering contribution. I would be interested to understand the authors' response to this comment.