

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2021-433

Peter Düben (Referee)

Referee comment on "A framework for ensemble modelling of climate change impacts on lakes worldwide: the ISIMIP Lake Sector" by Malgorzata Golub et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-433-RC1>, 2022

The paper is summarizing an important effort to simulate the impact of climate change on lakes using an ensemble of lake models and climate change scenarios. The paper is well-written and suitable for GMD. However, the presentation can still be improved following the minor revisions below.

Comments:

- In general, can you maybe also comment on the computational cost and the size of the datasets somewhere? If those simulations are cheap, you should also state this somewhere.
- It is a bit difficult to understand whether the paper is summarizing results for ISMIP 1, 2, 3 or all from the abstract. This should be stated explicitly, early in the paper.
- P8L5: "with the aim of conducting innovative science" should be rephrased.
- P8L14: "were simulated for existing lakes in the local domain and "representative" lakes" is rather cryptic and should be rephrased.
- P8L20: "for this first phase of lake sector simulations" I thought this would be about ISIMIP 2 and 3?
- P9L18: "is expanded", can you be more specific?
- P9L24: 0.5/0.5: You are using different ways to write 1/2 degree resolution throughout the paper. Maybe you can state once that you are working on a lon/lat grid with 1/2 degree grid-spacing and then remove the information from the rest of the paper?
- P10L22: "for which the original data was remapped from 30" to match" This needs more information.
- P13L13: "the lake layers can be defined according to water volume" No sure what this means.
- P13L20: "suite of Swiss lakes" Can you be more specific? What kind of predictions, how many lakes?
- P14L15: Simstrat (v2.1.2) was described above, not Simstrat v1.4, or am I missing something?
- P20L20: "^-0424" is not a very nice format.
- P24L17: "robust fit for all eight local lake models was found" What does this mean?

- P25L16: "calibrated parameters c" This should be rephrased.
- P29L24: "the first stage of simulations undertaken by the ISIMIP Lake Sector" But this was about ISIMIP 2 and not 1?
- P29L27: "it will clearly not be the case for" should be rephrased
- P30L2: "Within the ISIMIP framework, the simulated climate change impacts are (inter-) comparable with results from 13 other sectors, supporting cross-sectoral aggregation of impacts (Vanderkelen et al., 2020)." I do not understand this sentence.
- Table 1: "L" and "G" should be defined in the caption.
- Table 2: What does the dot in brackets stand for? Maybe?
- Table 3: "Calibrated parameter name" should be rephrased. Maybe "Names of model parameters that need to be calibrated"
- Table 3: "Cross-site calibrated parameters summary statistics" Can you explain exactly in the caption what the two numbers are standing for and what the numbers in the brackets are?
- Table 4: "Highlighted" I guess this refers to the grey colour?
- Figure 1 A: Why is there more than one colour for the dots?
- Figure 2: The panels are too small, and A, B and C are not visible.
- Figure 3: I do not understand the sub-plot on the bottom left.