Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC2
https://doi.org/10.5194/gmd-2021-409-RC2, 2022

Comment on gmd-2021-409

Anonymous Referee #2

Referee comment on "Inland lake temperature initialization via coupled cycling with atmospheric data assimilation" by Stanley G. Benjamin et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-409-RC2, 2022

Overall this paper provides and important and interesting contribution to operational coupling of lake temperature and weather models, I enjoyed reading the paper and the structure of the arguments. Fundamentally the science presented here should be published and is appropriate for the journal audience, however the manuscript needs additional work in two significant areas.

Firstly, a more comprehensive methods description is required describing how the assimilation was implemented, and secondly the figures could be significantly improved (there is much repetition and little content on most map based figures). I also found that the early context setting in the introduction assumes a lot of prior knowledge and believe the article could be made more accessible with some relatively minor alterations to this section.

My specific comments are below.

Line 71: Could you define SST on first use.

Line 71-76: I would like a more specific background here on what is done operationally (e.g. which models and data) and how that differs between the great lakes and smaller non-great lakes. I think this makes too many assumptions about how well the reader will know the problem being addressed and there are not even any references in this section which should form a key component of the study rational. I appreciate a more comprehensive review is provided later, but I think this section needs to set out the problem better.

Figure 1a/b, It's quite difficult to see the lakes in these figures. Could you provide an insert map to zoom in on an example area so that the reader gets a better impression of the data.

Could figures 1a and 2 be combined? And perhaps you could label the lakes to link with Table 5? I'm not convinced of the need for Figure 2 and 8, perhaps these become too busy if combined but a more efficient use of plots seems possible.

Line 317: Is this ocean separation different to the elevation thresholding method described at line 300?

Line 329: Global lake products will include significant uncertainties, could you briefly outline what is known about these here?

Line 449: I was expecting to see a description of the assimilation method. What is provided here is too brief given the focus of the paper and journal style. If these details really mess up the flow of the article this methodological detail could take the form an appendix.