GMD-2021-409 response to Anonymous Reviewer #1 - 28 July 2022

We now submit a new version of our manuscript for consideration by the reviewer and the editor. We appreciate your challenge to bring our manuscript to another level that will seem appropriate for the GMD special issue on modeling inland lakes. In particular, we have remade all of the figures except for two that were already more suitable for a professional journal. We interpreted the reviewer statement on the manuscript seeming like a 'report' rather than a journal article was driven especially by the non-professional quality of the figures in our previous submission. The manuscript already contains sufficient details that allow the reproducibility (provided that one has sufficient computing resources and labor for a large operational system like the one in this study), including those for the atmospheric model (WRF) and land lake model (CLM), lake representation (mask, depth), parameterizations for key processes (turbidity, heat fluxes), and data assimilation. The public repositories for accessing the codes and data are listed in the code and data availability statements.

A response was already posted on 19 May 2022 to the reviewer's initial review. We add some information below. We also note that the latest version also includes many changes made in response to Anonymous Reviewer #2 on 16 June 2022.

1. It is very difficult to follow the scientific content of the paper. The manuscript seems to be very well suited for an internal report - where readers already know about the models details - and less to a scientific manuscript. The manuscript has to be profondly revised. I do not see how other research group can benefit from this study with the current layout. I need much more technical details for a paper in GMD. Note that I am not questionning the quality of the work here.

The unique aspect of our paper is the data assimilation used to provide improved initial conditions for lake model when coupled to a weather model. This technique is unique in North America, and our paper is to provide evidence that this data assimilation method works very well, We are not aware of other papers that provide such a comparison for the lake initialization methods.

2. litterature review. The litterature review missed many important contributions on the two way coupling lake atmosphere exchanges. I have added a non exhaustive list: I was surprised to not see references to COSMO/FLAKE (http://www.borenv.net/BER/archive/pdfs/ber15/ber15-218.pdf **, http://www.cosmo-model.org/content/model/modules/flake/**), Simstrat (https://doi.org/10.1038/s41598-021-04061-6), CRCM (https://doi.org/10.1080/07055900.2000.9649657) etc

Additional references were added in our previous revision.

3. Figures. I do not see the added values of most figures showing maps of North America. Figures looks more like print screens than carefully designed visual information

The latest version of our manuscript is improved in particular in this regard with much improved figures. The maps are necessary to provide information on the specific testing for the 19 lakes as described in Fig. 8 and the associated text.

4. L37 "errors in lake temperature from as much as 5-10K " I am not aware of any model with such range of error. This error range does not make sense.

The results in Fig. 8 show that indeed the use of the interpolated SST data can result in such errors.

5. L86 "However, lake temperature initialization is still a problem. " It is not clear why it is a problem. 1-D models are fast to run and can easily be run for long period with no memory from the initial conditions.

The results of our paper demonstrate that the alternative method used by the previous US NOAA models have provided poor lake temperatures. The new data assimilation by continuous simulation with updated atmospheric conditions (hourly for the HRRR model) result in an improved result, as shown in Fig. 8.

6. I question the reproducibility of this study. The authors do not provide their codes/working examples. Again, I do not see how other research group can benefit from this study. This study is not FAIR-compliant and do not make a contribution valid for GMD in the present form

We again underscore that the new data assimilation method is the unique aspect of our manuscript, not a change to the lake model. We think that we have been successful in demonstrating its success.

Below is a summary of the changes made in this version.

Fig.1. In this figure, as in many of the others, a white background is used. The overall quality is much sharper. The areas of actual lake cover are somewhat more evident than in the previous version.

Fig. 4. Topic: Sample of lake depth data resolved by the 3-km HRRR weather prediction model. Again, a similar new white background is used with much sharper.

Fig. 5. Topic: comparison of lake surface temperatures. In this new version, we show only the lake temperature data and have removed all of the distracting soil temperature data. Again, the background is now white.

Fig. 6. Similar changes as in Fig. 5**.**

Fig. 7. Similar changes as in Fig. 1.

Fig. 8. Completely redone to represent the lake surface temperatures trends into a single-page figure. This figure is the most central result of our paper and represents evidence that our continuous lake simulation with constantly updated atmospheric conditions (e.g., “cycling”) is effective.

Fig. 9. Again, a white background is now used. The representation of the 3-km lake areas in this local-area graphic is sharper is much improved over the previous version.

There are a few modifications to the text in this new version including a clarification on the meaning of the term ‘cycling’ to this: a continuous lake simulation forced by atmospheric conditions updated regularly by new atmospheric observations to obtain realistic lake water temperatures.

We hope this new version of our manuscript will be found as acceptable as a lake initialization paper in GMD.