Dear Dr. Lin, thank you for taking additional precious time to review our manuscript, and your comments are really supportive of improving our work. We are glad to answer each of your comments in the following. In the track-changes file, the updated parts are shown in blue color.

Specific comments:

2.1 Harmonization of geographical information

Table 1: Could you remove the first column of this table and add one more column to indicate the number of water systems (or the percentages of area and volume accounted for the total area and volume of all lakes) were processed by the specific method? I noticed that you add the information in the text, but it will be more intuitive to see them in the table.

Response: We add Table 3 in the Sect. 5.1 instead of this section as follows, because the resolved lakes depend on the spatial resolution in an experiment. In addition, we apologize that we don't remove the first column because it is one of data processing.

Table 1: Summary of the lakes resolved in the dataset and all the lakes in HydroLAKES (Values in the brackets indicate the fraction of the resolved lakes to all ones).

Type	Volume (10^3 km^3)	Area (10^6 km^2)
Lakes resolved in the 15-min dataset	172.9 (92.0%)	1.494 (51.1%)
All lakes in HydroLAKES	187.9	2.927

3.2 Lake model

The reference for lake model mainly states where the input data come from. Could you refer some literature applying this model?

Response: The lake model was firstly developed for this manuscript, so we do not refer to any literature using it.

5.7 Vertical profile of lake water temperature

Figure 12: Why Lake Huron has two sets of observations?

Response: It is because observations were conducted at multiple sites on the same date.

Line: 601-602: Followed by my comment in the previous round, could you make a more specific discussion about the effect of underestimation of water depth, not just say it can cause bias? For example, the overestimation of water temperature in Lake Ontario and Huron (Figure 12) during the spring and fall time may be due to the underestimation of the water volume? And the coupled model, to some extent, enhanced the bias. Could you discuss the reason of these biases?

Response: We review the previous research again to update the discussion of the reproducibility of the water temperature profile in this study. It was reported that the bias (over- and underestimation) of water depth affects the

reproducibility of lake surface temperature via the heat capacity and vertical diffusion of the lake water, but the target site was a shallower lake (~5m) (Stepanenko et al., 2013).

However, according to Figure 12, our model overestimates the temperature during the winter season by about two Celsius degrees. It is thought that the model physics is the main reason for it. The model assumes that the maximum water density assumption at 4 °C and simulates the bottom temperature gets close to the temperature. On the other hand, the observed data shows a different pattern, in which temperature decreased to about 2 or 3 °C. The temperature difference implies that the conductive heat from the bottom sediment.

So we replace the discussions in the section as follows;

> Figure 12 shows three representative examples of vertical water temperature profile comparisons over six days. As shown in the results for Lake Ontario and Huron in Figure 12 (a) and (b), in summer, the vertical water temperature pattern in the upper layers (up to approximately 60 m from the surface) was reproduced well in all lakes. The "lake-only" simulation also reproduced the profile, but it was found that consideration of riverine in- and outflow reduced the underestimation of surface temperature, which is in accordance with Sect. 5.6. The observed water depths in all the Great Lakes (except Lake Erie) are approximately double the simulated water depth. Previous research focusing on a much shallower lake reported that input water depth affects the reproducibility of the lake temperature via heat capacity and vertical diffusion (Stepanenko et al., 2013). Still, our results suggest that the energy exchange at the water surface is the governing factor in the season.
>
> However, the model overestimated the temperature in early spring. The calculated water temperature near the bottom was close to 4 °C, consistent with the maximum water density assumption at four °C, while the observed data indicates a slightly lower temperature (2–3 °C). It is known that a more significant vertical mixing coefficient leads to a good reproducibility of the lake surface temperature (Gu et al., 2015), but it does not improve the overestimation in the entire depth in Lake Ontario. Therefore, the temperature gap between the observation and simulation can be attributed to the conductive heat from the bottom sediment requiring further studies to solve the bottom's energy budget.

Code and data availability

Authors have updated the source code and dataset in Zenodo, but to improve the reproducibility of the model, I think it is better to add a simple 'readme' file to clarify how to execute the model and what are the files in the 'map_glob_15min_lake' folder.

Response: We updated the zenodo repository to version 1.1 to add README for the map dataset as you suggested. So we also updated the zenodo URL to https://zenodo.org/record/5152668.

Technical corrections:

Line 674-678: Why is this sentence in bold?

Response: The manuscript was revised according to your instruction.

Table 4: In the third column, what do the values inside the basket indicate? Could you add the explanation into the caption?

Response: We revised the caption from “Table 4 Summary of comparison of reproducibility indices between coupled and uncoupled (“river-only” for riverine and “lake-only” for lacustrine variables) simulations” to “Table 4 Summary of reproducibility indices of coupled simulation. Values in the brackets are those of uncoupled (“river-only” for riverine and “lake-only” for lacustrine variables) simulation."