

Reply on RC1

Linan Guo et al.

Author comment on "An integrated dataset of daily lake surface water temperature over the Tibetan Plateau" by Linan Guo et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-151-AC1>, 2021

1. Reply: Thank you for the comments. We strongly agree that it is valuable to validate the modelling results against the in-situ observation of lake surface temperature in the Tibetan Plateau. The in-situ observation data however are not widely available for lakes in the Tibetan Plateau to conduct an overall validation of the modelling results. Nevertheless, as suggested by the reviewer, we have compared the modelling results against the currently publicly available in-situ surface water temperature for lakes in the Tibetan Plateau, which include sequential observation in the Ngoring Lake, Serling Co, Dogze Co, Bangong Co and and sporadic observation for 41 lakes (Table S1). As shown in Figure S1 in the supplementary, the simulated lake surface temperature is in good agreement temporally with the sequential observations ($R^2=0.97, 0.92, 0.90, 0.97$ for Ngoring Lake, Serling Co, Dogze Co, Bangong Co respectively) and spatially with the sporadic observation ($R^2=0.94$). We would like to clarify that Figure 4 is presented to show the consistency of the two satellite-based observations for specific lakes. The comparisons between satellite and simulation for each specific lakes are summarized at Figure 5.

2. Reply: Thank you for the comments. We noticed that there are missing data in the MODIS LST, and the quality of the MODIS LST are not always of good quality due to issues mentioned by the reviewer. The limitation of the MODIS LST data (i.e., missing data, quality, and of relative short period) necessity the research to reconstruct the long-term LST via model simulation. Hence, in this research, the seasonal and annual LSWT as well as their trends are not investigated directly from the MODIS LST, but from the reconstructed LST. The MODIS LST is used only to calibrate and validate the simulation.

3. Reply: Thank you for the good question. We deeply agree that the spread of the meteorological stations in the Tibetan Plateau is a big constraint for earth system researches in the region. We noticed that quite a few researches efforts have been invested to provide reliable reanalysis climate datasets for the entire TP (e.g., China meteorological forcing dataset, DOI: <https://doi.org/10.11888/AtmosphericPhysics.tpe.249369.file>). In this research, however, we used the best available ground-based climate observations together with a simple interpolation approach (the nearest neighbor with elevation adjustment) to provide model inputs for LSWT simulation across the TP. This is because that the public available climate reanalysis datasets were found not necessarily suitable for the LSWT simulation when we compared them against the observations from the meteorological stations. The results

however were not demonstrated in our manuscript as it is out of the scope of the study. In addition, in the future research, it is worth exploring the effects of spatial interpolation algorithms for climate variables on the performance of LSWT modelling across the TP with specific considerations on the number of donor stations and the spatial distance between the lakes and the donor stations. We believe that it would be an interesting method-oriented research topic, from which the results could contribute to improve the understanding the spatial variability of climate in the Tibetan Plateau.

Please also note the supplement to this comment:

<https://essd.copernicus.org/preprints/essd-2021-151/essd-2021-151-AC1-supplement.pdf>