

1. This is an excellent work with great significance for regional climate, environment and sustainability studies. The absence of complete and continuous time series LST datasets have challenged thermal studies for centuries. The dataset provided in this study is able to support the spatio-temporal analysis of climate change in China, and also the related sustainability assessment. The structure of the paper is well-organized, and the analysis based on the dataset is also sufficient.

Response: We would like to express our sincere appreciation to Anonymous Referee #1 for his/ her comprehensive review and such encouraging comments on our manuscript.

2. However, the temperature data collected from meteorological stations are actually air temperature (AT), not land surface temperature (LST). The relationship between the two temperature datasets is complicated and still not totally understood over heterogeneous land surfaces. I understand it is impossible to use actual LST collected artificially to reconstruct new datasets or for verification on large scales. Nevertheless, the relationship between AT and LST should still be investigated, and the impact on your results should also be discussed.

Response: These comments are all valuable. We have carefully addressed all the issues raised by the referee and the reply is presented below.

In the past, meteorological observation stations generally only measured near air temperature (AT). Over the past 20 years, many meteorological observing stations have observed more parameters, especially land surface temperature (LST). For our study, first, most meteorological stations have added observations of LST data since 2000. For sites with LST data, the LST data is used in the reconstruction or verification process. However, for some stations, LST may not be measured. For this case, we performed a regression analysis based on the MODIS LST and AT in clear days to increase the amount of LST data. Second, we also took into account the situation pointed out by the referee, and the error is relatively large in a single day with clouds, so the dataset we produced is a monthly scale product. Because somewhere is not always covered by the cloud, the error in monthly LST product is weakened compared to the daily LST product. Finally, as shown in Fig.11 of the original manuscript, the verification results indicate that our dataset accuracy is relatively high. Therefore, we believe that the reconstructed LST dataset can meet the research needs. We will do some explanation and discussion in the revised manuscript. Thanks again.