

## Comment on **essd-2022-83**

Anonymous Referee #3

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Referee comment on "A global dataset of spatiotemporally seamless daily mean land surface temperatures: generation, validation, and analysis" by Falu Hong et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-83-RC3>, 2022

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spatiotemporally seamless land surface temperature at daily, monthly, and yearly scales are important for LST-related researches. This study presents a meaningful study with the use of MODIS LST product and reanalysis data to generate the mean LST value at different scales. It was well organized and the results were with good accuracy. Overall, the manuscript can be accepted with minor revision:

1. There are many other reanalysis data available and why you choose the MERRA2 dataset? What is advantage of this dataset?
2. The key steps are suggested to be clarified in in figure 2. The pre-processing is not included in this flowchart.
3. 175: A basic equation of the single-type and multi-type model is better to be provided here.
4. Figure 3: multi-type ATC models are identical? Why there is no differences? It will be a little confused on the naming of the ATC models for single or multi-type model and single or double-sinusoidal ATC model?
5. Section 3.1.3: I think it should be the interpolation of the missing LSTs but not overpassing times.
6. Actually, the DTC model should be not applied to get the DTCdm when there are cloud-

cover observations.

7. Besides the direct validation of the estimated mean values at different temporal scales, there is a lack of the evaluation of the reliability of the trend detection based on the generated dataset. How about the performance of the dataset on identifying the area with significant trends.

8. The threshold determination for the two criteria in Fig. 2 is a little objective. I think the determination can be automatically determined according to the differences between the average value from four observations and the fitted values.

9. The LSTs of cloud cover pixels are generated with the reanalysis data at coarse-resolution. Currently, there are some other reconstruction methods without the use of the reanalysis data. How about the applicability of these methods in this study.

10. The dataset produced in this study has the resolution of 0.5 degree. However, to some extent, the LST product at 1-km and higher resolution will be useful. What is the key issue should be addressed at this high-resolution level.