

Earth Syst. Sci. Data Discuss., referee comment RC3
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Comment on **essd-2022-233**

Anonymous Referee #3

Referee comment on "A global dataset of daily maximum and minimum near-surface air temperature at 1 km resolution over land (2003–2020)" by Tao Zhang et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-233-RC3>, 2022

A global dataset of daily near-surface air temperature at 1-km resolution (2003-2020)

Review Comments

General comments:

Near-surface air temperature (Ta) has extensive applications in climate and environment studies. This study, based on a newly developed Spatially Varying Coefficient Models with Sign Preservation (SVCMS-SP) algorithm, generated a global dataset of daily maximum and minimum Ta (Tmax and Tmin) at 1 km from 2003 to 2020 by integrating ground Ta observations from weather stations and gridded LST and DEM data. The assessment shows that the employed algorithm can effectively capture the negative relationships between Ta and elevation and the positive relationships between Ta and LST. The cross-validation indicates the estimated Ta show satisfactory accuracies, and the RMSEs of Ta estimates range from 1.20 to 2.44 °C for Tmax and 1.69 to 2.39 °C for Tmin.

The study designed a global maximum and minimum Ta estimation scheme and developed an applicable time-series (2003-2020) daily Ta dataset. I think this work is important because the generated datasets are of great demand and value in practical applications (e.g., urban climate research). However, some issues in the manuscript still need to be addressed before being ready for publication. The specific comments are given as follows.

Specific comments:

1. Line 18, Please add the unit for '2.44'.
2. Line 20, There is ambiguity in the expression. The positive and negative relationship is suggested to be expressed separately.
3. Line 30, Why is the LST mentioned here?
4. Line 70, What does 'these' refer to?
5. Line 88, It is recommended to add the region name represented by each color boundary, or to label the region name directly in Figure 1.
6. Line 90, Do these ground measurements provide hourly Ta observations?
7. Line 96, What are the DEM data years used?

8. Line 136-137, What does this sentence mean?
9. Line 216-227, There are too many introductions about previous studies, which are already discussed in the Introduction. It is suggested to simplify these contents.
10. Line 227-239, Some contents (e.g., Line 228-232) that have been mentioned similarly in the Introduction are also suggested to be simplified.
11. Line 228, What does the "which is not always true in other gridded Ta datasets" mean?
12. Line 244, Why is the UHI effect mentioned here? The previous description of the Ta dataset does not seem to refer to UHI.
13. Line 278-281, This is more appropriate for the discussion section than for the conclusion.