

Comment on **essd-2022-278**

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Referee comment on "A long-term 1 km monthly near-surface air temperature dataset over the Tibetan glaciers by fusion of station and satellite observations" by Jun Qin et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-278-RC1>, 2022

1. The monthly near-surface air temperature dataset with 1 km * 1 km spatial resolution during 1961-2020 over the glaciers of the TP is useful and important. The data and method are reasonable. The data especially satellite data used in this research are huge and the methods of big data processing (regression, machine learning algorithm) are close to the advanced international level. Evaluations and warming trend analysis results are acceptable. Logical analysis and English expression in the manuscript are good. The figures, tables and results are enough. This paper may cause higher impact factor with more citations, considering the high spatial resolution, long time-series and the special location.

2. The key problems in this research are well resolved and described in the manuscript. (1) Parameter: from LST to air temperature. (2) Temporal preprocessing: from day/night MODIS observation to monthly data, from 2002-2020 to 1961-2020. (3) Spatial preprocessing: from observations at hundreds of stations and satellite retrieval LST in clear sky with 1 km * 1 km to this dataset with 1 km * 1 km spatial resolution. (4) clear/cloudy circumstance. (5) Choose ERA-5 land to evaluate, and select the typical stations (shown in Figure 1A, in blue) to reconstruct air temperature time series as basis functions.

3. Major comments.

3.1 Discuss. Why not keep monthly and 1 km in the title? Over the glaciers of the TP, how about over the TP? The coverage of the dataset with 1 km resolution may not only over the glaciers. It is larger if it is over the TP, with all these meteorological weather stations including automatic stations and glacier stations. L32. How about add "with altitude more than 3500 m" after "highest plateau".

3.2 L103 and L107. For the first one and the second one dataset used, do you choose homogenized products? If so, please add the description. If not, the authors should pre-process the data. The time series are long enough. Without homogenization processing, the trend results are not confident.

3.3 L123-125, what are these?

3.4 For clear-sky days, how to pre-process if it is than a certain criterion like 8 days or 5 days, or even 3 days? What is the criterion? Sometimes (what is the portion?) maybe the monthly LST results are missing in some 1 km pixels, the low-quality retrieval data are also not useful. The TP coverage of Terra and Aqua/MODIS is limited. The typical characters of LST in these months are kept missing or the interpolation from the adjacent two months?

3.5 Why not choose GeoTIFF and ASCII format both?

4. Minor comments.

4.1 It is suggested to change the word "own".

4.2 Figure 1 in L100. (a)(b), revise it to (A)(B). L100 and L105, 116. Figure 7 in Line 242, add (C). Figure 9 in L269, it is suggest to use A~I but not A2~D2 in the second column. Figure 9 is not clear, and the font size is too small.

4.3 Overfitting. Is it under fitting?

4.4 L16 and L140. Is it near-surface air pressure? It is suggest to add "near-surface" in the abstract and the main body when it is the first time to mention.

4.5 Maybe "minimum and maximum" is better.

4.6 Add a blank between 1 and km. Check it in other places.

4.7 It is suggest to add one sentence to describe larger DISO and better result here. Just

like it is mentioned in L276.

4.8 L338 and L446, 2021a and 2018a, delete "a" for the paper from the same first author is only listed once. Please check others. L370, 375, 400, 405, is the first author right or the order of the first name and the second name should be changed? Please check others.