

Interactive comment on “A combined Terra and Aqua MODIS land surface temperature and meteorological station data product for China from 2003–2017” by Bing Zhao et al.

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Land surface temperature (LST) is one of the most important essential climate variables for climate change studies. Given the cloud contamination and discontinuous satellite observations, it is challenging to analyze the trend of LST for a specific region and time frame by solely relying on a satellite product. To tackle this issue, the study targets to provide a temporal-consistent LST dataset for China in 2003-2017 by utilizing both MODIS LST product and local LST measurements from meteorological stations. The authors applied their data reconstruction method and validated their dataset. The validation suggests that the accuracy of reconstructed LST is reasonable well for the

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long-term trend analysis.

I am particularly interested in the imbalanced temperature-trends for different regions and seasons in China from this study. I would have the following suggestions and look for the authors responses:

1. From Fig. 1, we can see that the distribution of weather stations is sparse in the western China. Can you discuss how the non-uniform distribution of weather stations affects the dataset accuracy and your potential method for improvement?
2. The authors has made significant contribution in analyzing the historical temperature changes in China. The imbalanced LST trends in China are revealed. The authors has made an amount of discussions on the reasons. First, can the author add the significance of trends to the maps (or in the supplementary materials)? Second, the authors mentioned that the increase in aerosol may reduce the “cooling effect”, while I think that the aerosol is recognized for the cooling effect. Can the authors clarify that? Third, the authors attributed the cooling trend in Northeast China to negative Arctic oscillation; while I found that the cooling trends are mostly located in cropland; the increasing agriculture and irrigation may contribute to increased evapotranspiration and therefore, the lower LST; more discussion is expected in this regard.

I look forward to seeing your peer-reviewed and refined revision.

Some specific comments:

Fig. 1 and table 1: it is unclear from the captions what's the difference between key zone and region?

Figs. 3 and 4: Areas of invalid data are in 'blank'.

Fig. 5: need more information in the caption: is the linear trend derived from “National average”, is the “National average” derived from the corrected MODIS LST time-series?

Fig. 6: it is desirable to show a separate map for each pixel if the correlation is signifi-

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cant.

Table 2: for some records, the RMSEs after corrections are increased.

L607: examine "Sahara Desert region".

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