Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on essd-2022-79

Anonymous Referee #2

Referee comment on "HRLT: a high-resolution (1□d, 1□km) and long-term (1961–2019) gridded dataset for surface temperature and precipitation across China" by Rongzhu Qin et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-79-RC2, 2022

This paper introduces a new high resolution dataset of surface temperature and precipitation across China over a long term period. The data is obtained from original coarse (0.5°) resolution meteorological observations and downscaled to 1km using machine learning techniques. The algorithm employes a suite of techniques and the most performing is retained in the final estimate. A validation and intercomparison is conducted using station data and shows the improved score of the present dataset with respect to similar datasets already available. While the temperature downscaling is already very good in all the products, the improvements here are only marginal but more significant for precipitation. Yet even if improved the precipitation remains less well downscaled than temperature in a significant manner. A trend analysis is offered as an illustration of the interest of the dataset.

Overall the paper is clearly written and provide a very complete perspective on the dataset. The algorithm and the input data are well documented so are the intercomparison products. As such the paper is a good realization of a "data paper" and is very well suited for ESSD. I nevertheless have some remarks below that should be adressed prior to publication.

1) Figures 5 and 6 are unreadable. Please make these two figures more clear. For instance I suggest to plot the difference between the two variables in the hope it will show more their small departure that the currently useless figures.

(2) Also I think there is a geographically distributed bias in the performance of the new products that is barely mentioned and not enough discussed. In particular for precipitation where the correlation map (Figure 4 e) shows a west-east gradient in the scores that is different from the north-south gradient in the MAE map (figure 4f). This should be discussed in more depths and possible, if not definitive, explanations for such a pattern to be proposed.

(3) In the final sentence of the abstract (line 45), the authors state that such a data is fit for various studies especially for extreme weather related studies. This last statement is not supported by the paper and should be removed. In particular in light of the still weak, even if improved, performances for precipitation for which the more intense rain rates are not well reproduced by the gridded dataset.

On a smaller note I would like to ask for more details on the rain-gauges dataset, in particular about the under catch corrections (if any) that is known to influence strongly the rain gauges estimates and likely the interpolation procedure.

Overall I support publication of the paper once the major items above are adressed.

miscellaneous: I suggest to add "surface" to the title
"gridded dataset for temperature and precipitation across China"-> "gridded dataset for surface temperature and precipitation across China"