

## Comments on GMD-2021-435

### General comments:

The daily highest air temperature is an important climate variable. The research proposed a framework to estimate the daily highest air temperature. Overall, the method is effective and the results are satisfactory. However, authors can further improve the manuscript with some effort. Please see the detailed comments below.

### Specific comments:

1. Abstract/Introduction: Please give the spatial resolution of the produced daily highest air temperature dataset in the Abstract and Introduction.
2. Line 26-27: I didn't find the MAE and RMSE in the Results, please supplement them in the Results. Besides, please clarify "the traditional method".
3. Introduction: Since an important part of the research is producing a new daily highest air temperature dataset, please summarize the existing daily highest air temperature datasets and their limitations.
4. Line 152: Please clarify the data assimilation you have performed.
5. Section 3: More detailed data information should be provided. Please add a table to clearly show more details about all the input data, such as title, variable, time span, time resolution, spatial resolution, reference, version, DOI/URL, date of access, preprocessing...
6. Line 236: How do you define "valid" and "poor quality"? Do you use threshold?
7. Line 238-239: Please confirm whether it is the "multiple linear regression method" or "linear regression method". Do you use any variables other than  $T_{\max}$ ?
8. Line 238-242: Is the linear regression equation established using station data of all days during 1979-2018? Is the IDW interpolation performed on each day separately? Please clarify the details.
9. Results: An overall introduction of the produced dataset is needed. Please add some paragraphs and figures to show your produced daily highest air temperature data.
10. Section 5.1: The overall performance of the dataset should be provided. Please supplement the accuracy evaluation of the dataset for the whole China.
11. Section 5.1: It will be better for data use and data improvement if more data

accuracy information is provided. Since the temperature is closely related to time, could you please supplement the accuracy evaluation of the dataset for different years and months?

12. Section 5.1: Since the highlight of the research is the production of data with the time-resolution of day, could you please supplement some evaluation to prove the dataset accuracy on the day scale?
13. Line 378: Please distinguish and regulate the use of “confidence” and “significance”, it should be “with a confidence level of 95%” or “with a significance level of 0.05”.
14. Table 3: Is the trend value in the table the change rate? Please clarify it in the title of the table.
15. Results: The research produced the daily data, however, the analysis are all performed at longer time scales such as season or year. Could you please supplement some analysis on the day scale to prove its usefulness and superiority?