

Dear referee,

Thank you for your valuable comments on our manuscript and help us to improve the quality of our paper. We have carefully studied all the comments and have made revisions for manuscript. Please find our detailed responses below. Thanks again.

Sincerely,
Wang Ping and co-authors

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.

Response: Thank you very much for taking the time to read our paper and giving such detailed comments, all the comments have been carefully addressed. Enclosed below are our point to point responses to these comments.

Specific comments:

1. Abstract/Introduction: Please give the spatial resolution of the produced daily highest air temperature dataset in the Abstract and Introduction.

Response: Thanks for your guidance, we have made corresponding supplementary explanations.

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".

Response: "the traditional method" refers to only estimating T_{\max} by using the near surface air temperature diurnal variation model without further correction for T_{\max} .

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.

Response: Thank you for the valuable guidance, and we have made revisions.

4. Line 152: Please clarify the data assimilation you have performed.

Response: Data assimilation here refers to sampling the ERA5 data to the same spatial resolution as the CMFD data.

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...

Response: Thank you for the valuable guidance, and we have made revisions.

6. Line 236: How do you define “valid” and “poor quality”? Do you use threshold?

Response: If the difference between the estimated T_{\max} and the measured T_{\max} is less than 1°C , we consider the T_{\max} of this pixel to be valid.

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} ?

Response: Here is the "linear regression method", we only use the T_{\max} as a variable.

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.

Response: Both the linear regression equation and IDW interpolation were performed on each day separately.

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.

Response: Thank you for the valuable comment, and we have made revisions.

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.

Response: Thank you for your guidance. We have made revisions.

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?

Response: Thank you, and we have made revisions.

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?

Response: Thank you very much for your careful review, and we have made revisions.

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”.

Response: Thank you, and we have made revisions.

14. Table 3: Is the trend value in the table the change rate? Please clarify it in the title of the table.

Response: The trend value in the table 3 is the change rate, and we have modified it in the manuscript.

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?

Response: Thank you for your guidance. We have made verification and analysis of the temperature data of the daily scale. The changes in the daily -scale temperature data are mainly random, and there is no obvious laws of time and space, and no meaningful conclusions are obtained. In addition, we consider the length of the paper. Therefore, we did not make specific analysis.