

# Review of: "Spatio-Temporal Analysis of Precipitation Patterns in Xinjiang Using TRMM Data and Spatial Interpolation Methods: A Comparative Study"

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Potential competing interests: No potential competing interests to declare.

## Summary of the review:

The article compares four different interpolation methods to improve the accuracy of the TRMM precipitation data. The manuscript needs to undergo major revision before being accepted for publication.

A major concern in the article is the novelty and the methodology. Methods used in the study are to be described clearly, e.g., how site measurements and TRMM values are compared, etc. New components/gaps must be identified and addressed in the region for the novelty aspect. Also, the quality of the figures must be improved.

Listed below is the detailed review of the manuscript.

Therefore, I propose to accept the manuscript only after **MAJOR revision**.

## Abstract:

The abstract of the article describes the process well.

## Keywords:

The given keywords are not sufficient; the phrase "Inverse Distance Weighted" could be replaced with "interpolation" to represent all the methods used in the study.

## Introduction:

1. This particular sentence needs citations or the exact problem, e.g., with respect to agricultural development: "The analysis of Xinjiang's precipitation patterns is essential not only for understanding these regional climatic shifts but also for managing water resources, fostering agricultural development, and safeguarding ecological protection."
2. Please reword "delineates" in the following: This research not only delineates the spatial and temporal trends of

precipitation in the region but also assesses the effectiveness of various interpolation methods, providing a novel perspective for a more accurate understanding and prediction of precipitation patterns.

1. The sentence discusses the novel perspective, but these interpolations have been done on the satellite data earlier (e.g., Pinheiro et al., 2023; Zhu et al., 2024, etc.).
3. The introduction is not sufficient to address the problem statement of the study. More details on the satellite data, bias correction, and differences in interpolations from the literature could help identify the existing gaps in the domain.
4. The need for the study is unclear, although generalized concerns are provided.

## Methodology:

1. Please change the text in Figure 1 to English
2. The figure caption reads "its site distribution". Please provide a clear description of the site (e.g., raingauge stations)
3. Please cite the TRMM data.
4. Please state the temporal resolution of the observed precipitation
5. **"By calculating the monthly precipitation"** - How is the monthly precipitation calculated? The TRMM data provides monthly data itself.
6. **"In this paper, four precipitation interpolation methods were selected and combined with TRMM data for interpolation analysis"** - The sentence has been used too often. Please provide a concise statement.
7. Please capitalize the sentences/headings.
8. Citations must be given for all the metrics in Table 2.
9. Equation 1 could also be included in Table 2.
10. **"Additionally, to enhance the accuracy assessment of TRMM precipitation data"** - State how the correlation coefficient improves the assessment when compared to other metrics in Table 2.
11. Please cite the Sen slope method / Equation 2.
12. Please justify the use of the bilateral trend test.
13. Also, justify clearly the use of two methods - Sen slope and Mann Kendall.

## Results and Analysis:

1. "TRMM Data Accuracy Validation Analysis" - Please refine the heading.
  1. This analysis was not mentioned in the methodology section.
  2. How each station was correlated with the TRMM grid is not clearly given?
  3. Text in the figure must be in English.
  4. "Municipal area" - This is mentioned for the first time here. Please mention it in the study area or methodology section.

2. Text in figure 3 must be changed to English.
3. Check the spelling in the heading of Section 3.3.1.
4. For all the sections, since the text in the figure is in Chinese, it is hard to understand the analysis of the results.
5. "Prefecture-level" - this is used for the first time in figure 6, which should be given in the methods section.
6. Please use a formal word for the term "sudden change analysis" in figure 7.
7. The discussion on the Mann-Kendall and Sen slope tests is very minimal in the manuscript. It would be better to have more analysis of the same.

## Conclusions

1. The conclusion section must use the terms and technology used in the previous sections.
2. Numerical evidence of the proposed methods should be discussed in the conclusion section.