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.

Overall Comment on the Paper:

This paper presents a comprehensive and methodologically sound study on the spatio-temporal analysis of precipitation patterns in Xinjiang, utilizing TRMM 3B43 V7 satellite data in conjunction with ground observations. The authors have undertaken a significant task of comparing various spatial interpolation methods to enhance the understanding of precipitation variability in this region, which is commendable for its relevance to climate change studies and water resource management.

The strengths of this paper lie in its clear structure, detailed methodological approach, and the effective use of statistical analysis to validate data and interpret results. The inclusion of visual aids like figures and tables significantly aids in the presentation and interpretation of the findings. Moreover, the paper successfully highlights the practical significance and theoretical value of the study, making it a valuable contribution to the field.

However, there are areas where the paper could be further strengthened. Firstly, a more explicit connection between the study's conclusions and its initial objectives, as well as its relation to existing literature, would provide a clearer context and demonstrate its contribution to the broader field. Acknowledging the limitations of the study would enhance its academic rigor. Additionally, while the technical details are comprehensive, a more accessible presentation of complex methodologies for a broader audience could be beneficial. Lastly, providing specific recommendations for future research based on the study's findings would enhance its practical applicability.

In summary, this paper makes a substantial contribution to understanding precipitation patterns in Xinjiang and offers valuable insights for future research in climate change and water resource management. With some enhancements in terms of contextualization, accessibility, and detailing of future research directions, this paper could have an even more significant impact in its field.

Below are some detailed comments based on some subdivisions:

- "Introduction: Could you provide more detail on the specific trends in Xinjiang's climate mentioned in reference [1]? This would help in understanding the existing research landscape."

- "Introduction: It's mentioned that specific spatial interpolation methods are used due to the limitations of TRMM data. Could you briefly elaborate on why these particular methods were chosen over others?"
- "Introduction: The objectives of the study are mentioned, but could they be stated more explicitly, possibly as research questions or hypotheses?"
- “Introduction: The paper claims to offer a novel perspective. Could you clarify what aspects of this study's approach or findings are novel compared to existing research?”

- “Data and Analysis: The selection of spatial interpolation methods is well-presented, but could you provide more rationale behind choosing these specific methods? How do they compare to other possible methods?”
- “Data and Analysis: A direct comparison or discussion of the advantages and disadvantages of each method in the context of your study would be valuable.

Overall, this section is comprehensive and technically detailed, providing a solid foundation for your study's methodology. Enhancing the clarity and depth in a few areas, as suggested, could make it even more robust and accessible to a wider audience.

"Accuracy Assessment and Trend Analysis: The statistical methods used are well-chosen, but could you provide more rationale for selecting Theil-Sen and Mann-Kendall methods for this study?"

- “Accuracy Assessment and Trend Analysis: Could you elaborate on how the results from these statistical analyses will be interpreted in the context of Xinjiang's climate and water resources?”
- "Results and Analysis: The findings are well-presented, but could you provide more in-depth interpretation of the results? For instance, what are the implications of the observed precipitation trends for the region?"
- "Results and Analysis: Are there any anomalies or unexpected findings in the data? If so, these could be discussed and explored further."
- "Results and Analysis: Ensure that all figures are consistent in terms of numbering (figures 3 are repeated twice), scale, quality, and presentation to aid in interpretation and comparison." Both of the figures named as 3 have too small sized fonts in the coordinates; please make them visible.
- "Results and Analysis: It would be beneficial to consistently link the results back to the study's original objectives and research questions.
- “Conclusion: Could you make a stronger connection between these conclusions and the study's initial objectives? Also, how do these findings relate to or expand upon existing literature in the field?”
- "Conclusion: Consider mentioning any limitations of your study. Acknowledging limitations is important for the integrity of research and can guide future studies."
- "Conclusion: While you suggest future research directions, providing more specific recommendations or identifying potential areas of focus would enhance this section."