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.

The manuscript studied the spatio-temporal analysis and spatial interpolation of precipitation (1998-2019) from TRMM data in the Xinjiang region of China using different techniques such as IDW, KRG, RBF, and TPS with ANUSPLIN, and IDW performed best with more accuracy. The study also examined the trend in precipitation in a given period using Theil-Sen slope and Mann-Kendall analysis. The results from the study could help researchers evaluate precipitation in terms of global climate change and obtain precipitation data, especially where there are scarce weather stations. However, this article would only be acceptable following a major revision.

Below are my comments and suggestions about this article.

Abstract

1. In the abstract, you can give some interpolation statistics; keywords could be changed with other words not used in the title.

Introduction

1. The manuscript should be enhanced with additional related studies; the references used in the paper are very limited.
2. The introduction does not fully reflect the importance and history of the subject or the relevant studies and methods used in or outside the region. Therefore, it needs to be developed with additional references.
3. In the introduction section, the 2nd paragraph states the limitations of TRMM data's spatial resolution, and therefore, it needs regional accuracy adjustment with effective spatial resolution and ground-based observations. Please briefly explain the constraints and state why you used the TRMM data instead of others.
4. At the end of the introduction, the aim of the study should be given briefly. For example, the paragraph at the beginning of the Results and Analysis section could be moved there with some modifications.

Results and Analysis

1. The common name of this section is Results or Results and Discussion. Please check and correct it.
2. The results should include only findings, e.g., observational or statistical, without comments or interpretations. Comments and interpretations should be in the discussion.

3. The legends, values, and names on the maps, and the names of the axes and legends on the plots, should be in English, not Chinese.
4. In Table 3, mean annual precipitation values should be added to the table to understand error metrics, e.g., RMSE, better.
5. If Table 4 indicates the interpolation accuracy for monthly mean precipitation, then it is better to give the range (min. - max.) values for error metrics instead. The modification in Table 4 should also be made in the text.
6. Which form of the coefficient of determination was used in this study, and which form should be used, R2 or R2adj?
7. The title of Figure 1 could be changed to “Digital elevation model (DEM) of the study area and sampled weather stations.”

Discussion

1. In the manuscript, no discussion section profoundly analyzes the study results and compares them with related studies performed in both the same region and others using the same techniques and others. Therefore, the addition of a discussion is necessary to me. The included references will also help researchers better evaluate their findings.
2. Although many related studies exist to analyze and interpolate climate data, e.g., precipitation, the authors have used a limited number of related studies. With the addition of new references, the quality of the manuscript will be improved, and the results of the research will be better understood. For example, the authors stated that ANUSPLIN resulted in higher values in the region's northern and partly southern parts. Still, they did not stress the reasons for this situation based on other related research. Could it be attributed to the consideration of topography, especially elevation, in ANUSPLIN, compared to other methods?
3. Why IDW performed best among the methods used in interpolation in this study should be stated and interpreted based on proper references.

On the other hand, the figures and plots could help the authors appropriately interpret the findings in the discussion section. For example, the topographical structure, e.g., the elevation of the mountains in the area, could help the authors interpret.