

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.

Due to global climate change, regional climate pattern studies are essential for grasping climate variability and for shaping water resource management. Hence this work is of great importance for precipitation changes in China's Xinjiang regions. The study examines the efficacy of four spatial interpolation methods - inverse distance-weighted, kriging, radial basis function, and thin-plate spline to evaluate their accuracy in mapping annual precipitation distribution. Study indicate that the inverse distance weighting method, when used with TRMM data, yields the most accurate results. They found that 63% of Xinjiang exhibited this increasing precipitation trend, predominantly in the north.

Considering the temporal resolution of TRMM data, they need to aggregate the data into monthly, seasonal, or yearly intervals based to get a better and accurate results and use GIS Software for spatial analysis and visualization which offer a range of interpolation methods.

The Validation of the interpolated results using ground-based measurements is missing that helps assess the accuracy of their interpolation. Statistical analysis using metrics like RMSE (Root Mean Square Error) or correlation coefficients be attempted, along with the impact of LULC and other relevant factors. The potential improvements for further research and directions is to be added.

The errors, biases, or missing values of TRMM data are to be highlighted along with Ground truth checking for enhancing the accuracy of the interpolated results. They should mention appropriate scale which is crucial for accurate representation. The limitation of the study be highlighted. The Sensitivity analyses and robust statistical methods will be of helpful to reduce the uncertainties in this study which has been highlighted here. It has contributed to the change in precipitation pattern and fill up the data gap in the region for water resource management for agriculture and other purposes. Hence this paper may be considered for publication after they incorporated the reviewers comments.