

Comparison of Geospatial Interpolation Techniques for Assessing Spatio-Temporal Variation of Rainfall

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Abstract

Precipitation is an important phenomenon which contributes in the constant supply of water over entire earth. Atmospheric water accounts for less than 0.001% of total water yet it is responsible for the constant supply throughout the globe. It is important to know the distribution of precipitation along with space to know the pattern of precipitation spatially. In order to know this spatial pattern five different geospatial interpolation techniques totaling to 20 different models are applied for 30 years (1988 - 2018) of monthly average precipitation. These models are compared to know which one of these gives the best resemblance of the phenomena. Six performance measures, MAE, MBE, MSE, RMSE, ME and R2 are used to compare the different models. The model for which error is minimum (close to zero) and efficiency is maximum (close to unity) are preferable. After application of various models, it was found that IDW technique with weight parameter of 3 gives the best result with MBE of -0.1397, MAE of 2.9372, MSE of 13.0708, RMSE of 3.6154, ME of 0.7842 and R2 of 0.7744. Other models that performed well were Universal kriging and RBF. After evaluating the best model, error in the estimation of data by that model was also carried out to know the locations where error is intense. It is seen that where the precipitation is intense the errors associated increases. Temporal variation of rainfall is equally important to know have a clearer picture about the pattern of precipitation spatially as well as with seasonally. Therefore, after figuring out the best model, temporal variation of precipitation was also determined showing monthly variation of rainfall. So, after plotting spatial and temporal variation of precipitation it becomes easier for us to determine the precipitation at places which are not gauged.

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