

## Estimation Of Missing Rainfall Data Using Spatial Interpolation And Imputation Methods

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### ABSTRACT

This study is aimed to estimate missing rainfall data by dividing the analysis into three different percentages namely 5%, 10% and 20% in order to represent various cases of missing data. In practice, spatial interpolation methods are chosen at the first place to estimate missing data. These methods include normal ratio (NR), arithmetic average (AA), coefficient of correlation (CC) and inverse distance (ID) weighting methods. The methods consider the distance between the target and the neighbouring stations as well as the correlations between them. Alternative method for solving missing data is an imputation method. Imputation is a process of replacing missing data with substituted values. A once-common method of imputation is single-imputation method, which allows parameter estimation. However, the single imputation method ignored the estimation of variability which leads to the underestimation of standard errors and confidence intervals. To overcome underestimation problem, multiple imputations method is used, where each missing value is estimated with a distribution of imputations that reflect the uncertainty about the missing data. In this study, comparison of spatial interpolation methods and multiple imputations method are presented to estimate missing rainfall data. The performance of the estimation methods used are assessed using the similarity index (S-index), mean absolute error (MAE) and coefficient of correlation ( $R$ ).

**KEYWORDS:** Interpolation; Spatial analysis; Data analysis

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