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“Development on the margin”

## Comparison of Spatial Interpolation Methods for Filling Daily Rainfall Missing Data, Blue Nile Basin, Ethiopia

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### Abstract

Hydrological modelling and water resources development project designs need sophisticated procedures that require continuous meteorological data for better water resource management. Rainfall is one of these important meteorological variables that determine water availability and the hydrological processes in the hydrosphere. In addition, rainfall is more variable with in short distance in space than other meteorological variables. However, input data from most of the meteorological stations are missing and there is shortage of long-term continuous database in important watersheds of developing countries like the Blue Nile River Basin in Ethiopia, where water resource developments have been practised at large. Four methods (arithmetic mean (AM), normal ratio (NR), inverse distance weighting (IDW) and coefficient of correlation weighting (CCW)) were compared to estimate daily rainfall data around *Gumara* watershed in the Upper Blue Nile basin. Daily rainfall data of nine meteorological stations from 1987 to 2008 was used for this study. The result shows that AM and CCW gave promising estimation for missing daily rainfall data of the study area and thus it enhances better understanding and decision making. Arithmetic mean method gave better daily rainfall estimates for meteorological stations found on the lowland plain and around the Lake Tana shore while CCW estimated better for stations found on the upstream steep and mountainous area as compared to IDW and NR. Normal Ratio is not a good estimating method for the area at all. Meteorological stations with high number of missing data, that were not considered before, can use near-by stations that have a better data availability by using AM and CCW methods for water management activities of the area.

**Keywords:** AM, Blue Nile basin, CCW, missing data, rainfall