



Comparative evaluation of different satellite rainfall estimation products and bias correction in the Upper Blue Nile (UBN) basin

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Spatial rainfall information is the prime important element of basin water resource modelling and water resource analysis. It is, therefore, essential to reasonably estimate how much water is entering into the basin before any further hydrological component forecast and prediction. In a region where ground-based gauge data are scarce, satellite rainfall estimation (SREs) products are a viable option for proper space-time rainfall characterization. However, their accuracy and performances vary from region to region, and must be assessed. In this study, five high resolution products (TRMM, CMORPH, TAMSAT, SM2RAIN, and CFSR) are compared and analysed using the available rain gauges in one of the most topographically and climatologically complex region of the Upper Blue Nile basin. The comparison is based on the goodness-of-fit indexes against ground-based gauge rainfall. The confusion matrix is also used to investigate the detection ability of SREs for different rainfall levels. In addition to the identification of the best performing SREs, the study search for determining the bias correction of the estimates. Statistical based cumulative distribution (CDF) mapping techniques are used to correct the SREs distribution. This method provides an improved rainfall estimation, which can be used for hydrological modelling and water resource analysis.

Keywords: Rainfall , Satellite estimation, TRMM, CMORPH , SM2RAIN, Upper Blue Nile basin, Bias correction