

Assessment of gauge-based APHRODITE precipitation estimates over Bangladesh

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Reliable estimation of precipitation is of great importance for many applications such as flood warnings, landslide modelling, and drought monitoring in developing countries as the ground-based rainfall observations are very limited in these countries. This study evaluates gauge-based Asian Precipitation-Highly-Resolved Observational Data Integration Towards Evaluation (APHRODITE) of water resources precipitation products over Bangladesh against rain gauge records for a period of 5 years from January 2003 to December 2007. APHRODITE precipitation data set is assessed using various statistical indices such as coefficient of correlation (CC), bias, relative bias (RBias), mean absolute error (MAE), and root mean square error (RMSE) with respect to different extreme precipitation thresholds i.e. 50th and 75th percentiles of reference observations at daily and monthly scales. Some categorical and volumetric skill matrices i.e. probability of detection (POD), volumetric hit index (VHI), false alarm ratio (FAR), and volumetric false alarm ratio (VFAR), are also used to explore its performance in detecting the occurrence of rainfall events and in estimating the corresponding rainfall amounts. The results reveal that APHRODITE, with a CC value of 0.82, bias of 0.91, RBias of -9.0%, MAE of 8.4 mm, and RMSE of 15.5 mm, shows a reasonably good agreement with the rain gauge measurements at daily scale. Location-wise analysis of the statistics exhibits that this precipitation data set tends to underestimate daily rainfall accumulations. As the extreme precipitation threshold increases, the underestimation becomes more significant during the study period. However, APHRODITE rainfall estimates perform better at monthly scale over the study region and the detection skill does not change considerably with the increase of extreme quantile thresholds.

Keywords: Bangladesh, APHRODITE, Extreme, Precipitation

