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Assessing the satellites and radar rainfall estimates for flood forecasting in the context of hydrological modelling

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Hydrological modeling can play a pivotal role in the absence of hydrological data for water resources management, flood forecasting services and drought monitoring. The purpose of the present study was to examine the accuracy of rainfall estimation from four commonly used satellites CMORPH, Era-Interim, GPM, TRMM (3B42RT) and S-band radar on Qinhuai River catchment in Nanjing, China. All sources used in this study are capable recording rainfall at high spatial and temporal resolution. All the data from satellites, S-band rain and flow converted into 3 hourly time steps. The data used in the Probability Distribution Model (PDM) and distributed hydrological model HEC-GeoRAS to simulate stream flow. The discrepancies between satellites and radar data were analyzed by comparing with the rain-gauge data on the basis of various performance statistics. Results of this study recommend that rainfall estimates by GPM outperformed than other remote sensing rainfall data; however, the performance of Era-Interim is better for hydrological modeling. This study also suggests that we can use satellite and radar data as an alternate to gauge data in hydrological applications for ungauged or poorly gauged basins.