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Bias Adjustment of Satellite-based Rainfall for Flood Forecasting: Case Study in Yom River Basin, Thailand

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Thailand is among the countries that have regularly affected by floods. Flood forecasting and warning are necessary to prevent or mitigate loss and damage. A number of previous studies suggested that merging near real time satellite-based precipitation estimation with relatively high spatial and temporal resolutions to ground gauged precipitation data could contribute to reducing systematic biases and increasing efficiency for flood forecasting application. The objectives of this study are to assess systematic biases associated with satellite-based precipitation estimation, to perform bias adjustment for satellite-based precipitation estimation and to evaluate the performance of flood forecasting system when bias-adjusted precipitation data is used as an input to the model. This study was conducted for Yom River Basin, Thailand for the period of 2008-2015. Data used in the study included observed daily rainfall and near real time satellite-based precipitation estimation from GSMaP and PERSIANN. Quantile mapping method was applied to adjust systematic biases of the satellite-based precipitation. The historical data during 2008 – 2012 are used to calibrate the methodology. The adjusted satellite-based precipitation during 2013 – 2015 is used as input to a flood forecasting system using the Rainfall-Runoff-Inundation model for validation. Based on the evaluation, adjusted satellite-based rainfall estimation contributes to reduction in biases and an improvement in flood forecasting in the study area.