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Evaluation of remotely-sensed precipitation products for streamflow predictions in ungauged catchments in Thailand

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Streamflow predictions in ungauged catchments with sparse gauge networks are challenging. The accuracy of streamflow predictions primarily relies on the quality of observed precipitation data which are used as a driver of the hydrologic cycle and the main input of rainfall-runoff models. However, precipitation data obtained from ungauged catchments are commonly of limited quality. While investing in denser gauge networks could contribute to better characterisation of natural variability and extremes, this solution may not be optimal because of economic and environmental constraints, especially for mountainous or remote catchments. The problem of data scarcity in ungauged catchments highlights the importance of remotely-sensed precipitation products for streamflow predictions. Using remotely-sensed precipitation products in conjunction with ground-gauge data has been found to improve the accuracy of streamflow predictions. This study, therefore, attempts to address the issue of precipitation estimation by evaluating the value of using the Tropical Rainfall Measurement Mission (TRMM) 3B42 Version 6 and Version 7 for streamflow predictions. An ungauged catchment in the northwest region of Thailand where precipitation is highly variable due to tropical climate and monsoons was selected as a study site. Specific interest is to assess the ability of the product to produce spatial and temporal precipitation and streamflow data at a monthly time scale. When merging the TRMM products with relatively high spatial and temporal resolutions to raingauges, TRMM 3B42 Version 6 and Version 7 performed equally well in detecting rainfall event and capturing rainfall pattern and amount. The spatial and temporal variabilities of the precipitation values over catchments obtained from both TRMM products were similar. However, both TRMM products showed dif[U+FB01]culty in capturing high precipitation values. Reduced uncertainty and increased efficiency for streamflow prediction were achieved by both products. Slight differences between the performance of the TRMM 3B42 Version 6 and Version 7 were found.