Assessing satellite rainfall accuracy in dense Tropical Sabah east coast forest, Malaysia: a crossvalidation of downscaling technique

ABSTRACT

Rainfall is one of pivotal elements in the hydrological cycle that essential for ensuring the water balance in present and in the future. Traditional in-situ observations have been the conventional method for obtaining rainfall data, but their limitations arise from discrete point measurements that fail to represent the entire area. To overcome these limitations, this study utilizes satellite based TRMM data products for rainfall estimation. The research aims to cross-validate the TRMM 3B43-v7 product against corresponding in-situ measured rainfall, focusing on error localization in Sabah's east coast. The derivation of the rainfall rate from TRMM data is adequate with additional data from three manual gauges within the plots. The correlation between TRMM and ground was good ($R2 = 0.78$, RMSE = 65.65 mm). The Nash and Sutcliffe Error results closed to value 1 indicate that the accuracy of the TRMM data compared to the rain-gauge data in Danum has a good agreement. This is due to the IDW downscaling method for satellite rainfall data using additional data from three manual-gauges within the plots to increase the accuracy of the TRMM data. In summary, the downscaling method proves capable of providing fine spatial resolution and increasing the number of pixels in the study area. Future research endeavours may benefit from incorporating more station data to further improve the interpolation of satellite data and derive more precise results.