

GROUND VALIDATION OF TRMM/PR RAIN RATE USING RADAR-AMEDAS DATA

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The Precipitation Radar (PR) on the Tropical Rainfall Measuring Mission (TRMM) satellite continues observation. Its good performance and accuracy of observed radar reflectivities by PR have been confirmed by comparing with radar reflectivities observed by reliable ground-based radars. At the same time, many ground validation efforts have been made to confirm the accuracy of rain rates estimated by standard PR algorithms from observed radar reflectivity. However, so far there have been no conclusive results giving the absolute difference of PR and estimated rain rates from the true rain rates from ground validation efforts. The difficulty of ground validation of rain is due to the large variance of spatial and temporal distributions of rain and the limitation of Ground-based rain observations, so it is difficult to obtain rain data for a large area that can be compared to satellite rain estimates. However, there is a dense rain gauge and radar observation network operated by Japan Meteorological Agency (JMA) that covers Japan. In this paper, TRMM estimated rain rates are compared to Radar-AMeDAS rain analysis data on a monthly averaged basis, and retrieval errors were estimated by assuming that Radar-AMeDAS is truth data. The estimated averaged retrieval (bias) error for five 5 degree by 5 degree areas was -24% for 31 months. However, the estimate exhibits seasonal dependency. Specifically, PR overestimates rain rates in winter and under estimates them in summer. Sampling errors included in TRMM monthly products were also estimated. The estimated sampling error was 19%. This magnitude of sampling error seems quite reasonable considering the results before TRMM was launched.