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Yalei You 5-3 A Bayesian precipitation retrieval algorithm for the Advanced Technology Microwave Sounder (ATMS)

A prototype precipitation retrieval algorithm over land has been developed utilizing a 3-yr Multiple Radar Multi-Sensor Precipitation Estimation (MRMS) and the Advanced Technology Microwave Sounder (ATMS) coincident datasets. The Linear Discriminant Analysis method and Bayesian framework are employed to detection and retrieve precipitation. One of the unique features of this algorithm is using the ancillary parameters (i.e., surface type, surface temperature, land elevation and ice layer thickness) to stratify the single database into many smaller but more homogeneous databases, in which both the surface condition and precipitation vertical structure are similar. In addition, the different scanning angles have also been taken into consideration when the databases are constructed in the Bayesian framework. It is found that the probability of detection (POD) is 82.3% and 71.6% for rainfall and snowfall, respectively. The correlation and root-mean-square-error between retrieved and observed rainrates are 0.63 and 1.80, while it is 0.45 and 0.72 for snowfall. More importantly, the error (variance) is also computed for each pixel and the one-standard deviation well covers the precipitation dynamical range. Additionally, it is demonstrated the retrieved precipitation clearly capture the geo-spatial distribution features.