Algorithm Validation in the Megha-Tropiques Framework: An Attempt to Improve the Microphysic Parameterization in a Radiative Transfer Model

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Abstract

In the framework of the Megha Tropiques Mission, we focus on the rain retrieval from MADRAS and other conical-scanning passive microwave imagers. The retrieval algorithm used here is a Bayesian-based algorithm known as BRAIN (Bayesian Rain retrieval Algorithm Including Neural network), which is described in the paper by Viltard et al. (2006). The retrieved rain rate is obtained through the use of a reference database built from a Radiative Transfer Model (RTM) simulation. In order to improve the simulation of the brightness temperatures, it is necessary to provide the RTM with an accurate parameterization of the ice particles. In this context, a study is in progress to evaluate if polarimetric radar hydrometeor retrievals are useful to distinguish the various ice species in precipitating systems and if it is possible to correlate these with the observed brightness temperatures. The goal of the study is to develop a series of parameterization corresponding to various meteorological situations to be used in the RTM . Datasets from the NCAR dual-wavelength S- and Ka-band radar (S-PolKa) collected during the Dynamics of the MJO (DYNAMO) field campaign that occurred in the Indian Ocean in 2011-2012 were compared with brightness temperatures from TRMM-TMI and MADRAS. Using the SPOLKA data, a PID (Particles IDentificator) classification is built using a fuzzy logic approach. To combine this information with the TMI and MADRAS brightness temperature we co-locate the polarimetric radar data inside the TMI radiometer pixel. A piewedge representation is chosen to show the proportion in the satellite pixel of the various species identified by the SPOLKA radar and associated with the PID.

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