Cloud dynamics and radiation database for improved rain retrievals within tropical cyclones

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Cloud-resolving model (CRM) simulations of multiple hurricanes formed over the Gulf of Mexico are used to first characterize hydrometeor profiles (H), throughout the life-cycle of these hurricanes, as functions of mesoscale, dynamical (D) and thermodynamical (T) atmospheric parameters including horizontal moisture divergence, moist static energy, vertical moisture flux, upper tropospheric vorticity, vertical wind shear, and Convective Available Potential Energy, among others. The (D) and (T) parameters, along with (H) and calculations of upwelling brightness temperatures (Tbs) at rain-sensing microwave frequencies (e.g. at TRMM-TMI and Aqua-AMSR frequencies), are used to form an extensive database which are used in a Bayesian-type rain retrieval algorithm together with observed TMI and AMSR Tbs , specifically for rain retrievals associated with tropical cyclones. Preliminary results show that inclusion of D and T parameters help in selecting H, yielding improved retrieval solutions of rain rates.