



Physical and Climatological Radar Rainfall Relations in Florida

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As part of the NASA's Tropical Rainfall Measuring Mission (TRMM) ground validation efforts, a disdrometer system has been operating at the University of Central Florida in Orlando, Florida during the past two years. The disdrometer system consists of a Joss-Waldvogel disdrometer and two or three tipping bucket rain gauges. The site is 35 distance to the nearest operational S-band Doppler radar which is located in Melbourne, Florida.

This study intends to determine the long-term characteristics of raindrop size distribution (RSD) and derived radar rainfall relations. Our preliminary analysis demonstrated that at 40 dBZ, the RSD has three modes. The first mode had large concentration of small (< 1 mm diameter) and midsize (1-3 mm diameter) drops and lack of large drops (> 4 mm diameter) and occurred during tropical cyclones and disturbances. The second mode showed broadening spectra with the presence of large drops and corresponded to the frontal systems and thunderstorms. The third mode had a broad size spectrum but relatively less small and midsize drops and occurred during sea breeze and local convection. These preliminary findings have pronounced effect on the reflectivity rainfall relation, known as ZR relation. Both reflectivity and rainfall are integral products of RSD. Therefore, rather than climatological based ZR relations which is currently used in TRMM ground validation algorithm, physical based ZR relations may improve radar rainfall estimation as long as the precipitation is classified by synoptic setting. We plan to apply climatological and physical based ZR relations to the radar rainfall mapping and compare the rainfall maps with independent rain

gauges. The results will be presented during the conference.