RAINDROP SIZE DISTRIBUTION AND RAINFALL CHARACTERISTICS FROM CHUVA FIELD EXPERIMENTS

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ABSTRACT

Raindrop size distribution (DSD) measurements collected during CHUVA field experiments are presented in the context of radar meteorology. CHUVA is a Brazilian research program for characterizing the main precipitating systems observed in Brazil in conjunction with the GPM ground validation program. CHUVA conducts a series of field campaigns in the time frame of 2010-2014 that sample raining systems from maritime to continental regime in polluted and clean environments. Here we present the preliminary results on the DSD measurements by 3 different disdrometers (Joss-Waldvogel, Thies and Parsivel). The cumulative distribution of rainfall and reflectivity occurrence, and rain amount showed substantial variability between the field campaigns. Precipitation in North and Northeast Brazil (first 3 campaigns) show characteristic of oceanic and localized tropical convection, while in Southeast Brazil the precipitation is characterized by larger DSD and larger radar reflectivity due to continental convection.

A study of the rain rate estimation algorithms, and its dependency in the choice of the geographic location and algorithm were also done. The differences in radar rainfall relationships between the first 3 field campaigns revealed no major differences with respect to the rain volume retrieved. It was also shown that an hybrid algorithm that employs polarimetric observables improves the rain rate estimations. The hybrid algorithm is a useful tool to polarimetric radar rain estimate and can be adjusted for different climatic region and radar wavelength.