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Parametric form of the raindrop size dsiribution

Elisa Adirosi (1,2), Ali Tokay (3,4), Luca Baldini (1), and Nicoletta Roberto (1)

(1) Istituto di Scienze dell'Atmosfera e del Clima - CNR, Rome, Italy (elisa.adirosi@artov.isac.cnr.it), (2) Dipartimento di Ingegneria Civile, Edile e Ambientale, Sapienza Università di Roma, Rome, Italy, (3) JCET - University of Maryland Baltimore County, Baltimore, Maryland, USA, (4) NASA - Goddard Space Flight Center, Greenbelt, Maryland, USA

The TRMM precipitation radar algorithm uses a three-parameter gamma DSD with a fixed shape parameter equal to three, and this assumption is considered for the GPM dual-frequency precipitation radar algorithm. This study uses surface based disdrometer measurements to evaluate assumptions on the gamma model distribution. Large database is provided from seven two-dimensional video disdrometers, which were operated during the Midlatitude Continental Convective Clouds (MC3E) field campaign in North Central Oklahoma. This study investigates how well the gamma distribution represents observed DSD focusing on truncation effects on the drop size distribution parameters. Different fitting methods are used to retrieve the DSD parameters and a comparison among the methods is presented. In general, parameters of gamma distribution have a narrower distribution with lower mean values when the truncation effects have been counted for. Relations between gamma DSD parameters are presented, and the influence of the choice of the method is studied. The effects of the truncation on the integral parameters that are closely related to the radar observable have also been examined using simulated size distributions. The study also offers the distribution of integral parameters including Ka- and Ku-band attenuation as a function of Ku-band reflectivity.