Spatial Variability of Raindrop Size Distribution and Radar Observables

Ali Tokay
JCET/UMBC - NASA/GSFC, USA
Leo Pio D'Adderio (University of Ferrara)
David B. Wolff (NASA Wallops Flight Facility)
Walter A. Petersen (NASA Wallops Flight Facility)

E-mail: ali.tokay-1@nasa.gov

The retrieval of raindrop size distribution (DSD) from dual frequency precipitation radar (DPR) on board GPM core satellite is one of the key objectives of the NASA's Global Precipitation Measurement (GPM) mission. The DPR algorithm developers adopted three-parameter gamma distribution and suggested methodologies for the DSD retrieval process. The footprint of the DPR is nearly circular at approximately 5 km diameter and the DSD variability within the footprint is one of the uncertainties of the retrieved size distribution. The highly variable nature of DSD is also evident in retrieved precipitation estimates from ground-based radars. This study investigates the spatial variability of DSD at two different spatial scales. The small-scale variability of DSD was studied through disdrometer measurements at NASA Wallops Flight Facility (WFF). Six two-dimensional video disdrometers (2dvd) were distributed around WFF base with minimum and maximum distances of 500 meters and 2.3 km, respectively. Each 2dvd was collocated with a Parsivel2 (P2) disdrometer and rain gauges. This set-up allows quality control of the disdrometer measurements and determination of spatial variability with 2dvd and P2. At the larger scale, fourteen P2 were operated during Iowa Flooding Studies field campaign where the minimum and maximum distances were 140 meters and 100 km, respectively. The spatial variability of gamma parameters and of radar observables from two field studies will be presented during the conference.