

## **Rainfall Estimation and Drop Size Distribution Retrieval from Dual-polarization Radars at Ku- and S-band: Application in NASA IFloodS Field Campaign**

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The Global Precipitation Measurement (GPM) core satellite was launched on February 27th 2014. As an indispensable part of the GPM mission, ground validation is critical to test the assumptions of space-borne algorithms and further evaluate the precipitation products. Chandrasekar et al. (2008) discussed the potential rationale and opportunities of ground dual-polarization radar in the validation of satellite precipitation measurements. Considerable research has been done on the microphysics retrieval and rainfall estimations for radars at S-band. However, the Ku-band study is rare due to some practical issues such as attenuation.

In this paper, we investigate the rainfall algorithms and drop size distribution (DSD) based on the S-band radar measurements. The rainfall rate and DSD retrieval from ground-based dual-polarization radar at Ku-band frequencies is the main focus. The rainfall rate and DSD parameters, namely,  $D_0$  and  $N_w$ , are derived based upon the dual-polarization radar measurements including reflectivity ( $Z$ ), differential reflectivity ( $Z_{dr}$ ), and specific differential propagation phase ( $K_{dp}$ ). In order to demonstrate the estimation algorithms, radar data collected from the S-band NASA dual-POLarimetric (NPOL) and the Dual-frequency, Dual-polarization, Doppler Radar (D3R) during NASA Iowa Flood Studies (IFloodS) field campaign is used for the implementation purposes. In addition, 4 Autonomous Parsivel Units (APU) under the D3R and NPOL radar coverage are used for evaluating the radar quantitative precipitation estimation (QPE) products and characterizing the DSD observations. The evaluation results will be presented here.

### References:

Chandrasekar, V., V. N. Bringi, S. A. Rutledge, Arthur Hou, Eric Smith, Gail Skofronick Jackson, E. Gorgucci, W. A. Petersen, 2008: Potential Role Of Dual- Polarization Radar In The Validation Of Satellite Precipitation Measurements: Rationale and Opportunities. Bull. Amer. Meteor. Soc., 89, 1127–1145.