1.10 A MICROPHYSICAL RETRIEVAL FOR THE DUAL-FREQUENCY PRECIPITATION RADAR

K. MROZ[1], A. BATTAGLIA[1]

[1]National Centre for Earth Observation, UK
[2]University of Leicester, UK
kamil.mroz@le.ac.uk

The representation of microphysical processes in ice clouds is a longstanding problem for a modelling community. Remote sensing techniques can help in better constrain parametrization of ice microphysics in models. This paper presents a microphysical retrieval for stratiform regions suited for the Dual-frequency Precipitation Radar (DPR) on board of the Global Precipitation Measurement mission core satellite. The DPR is well suited for the retrieval of bulk properties of hydrometeors thanks to its dual-frequency capabilities. Moreover, low spatial variability of stratiform rain regions minimizes the problem of non-uniform beam filling. The algorithm accounts for the large degree of uncertainty in ice particle scattering properties and utilizes the measurements at both DPR channels accompanied by their corresponding path integrated attenuation estimates for producing a physically consistent three-dimensional structure of storms. The retrieved parameters include the mean mass weighted volume diameter and the water content of both rain and ice particles. Uncertainties in the retrieval are greatly reduced by incorporating statistical relationships between rain parameters gathered during GPM ground validation campaigns. By exploiting the flux preservation constraint, the information on liquid particles is transferred above the melting level. The radiometric consistency of the retrieval has been tested against the GPM Microwave Imager measurements. The performance of the retrieval is presented with a number of case studies.