Geophysical Research Abstracts
Vol. 16, EGU2014-16999, 2014
EGU General Assembly 2014

Separating stratiform and convective rain based on the drop size distribution characteristics

Merhala Thurai (1), Patrick N. Gatlin (2), Christopher R. Williams (3), and Martin Schwinzerl (4)

(1) Colorado State University, Fort Collins, CO, USA, (2) NASA-MSFC, Huntsville, Alabama, USA, (3) CIRES, University of Colorado, Boulder, CO, USA, (4) Johanneum Research, Graz, Austria

A technique for separating stratiform and convective rain using the characteristics of two of the main drop size distribution (DSD) parameters is presented. The method was originally developed based on observations from dual frequency profiler and dual polarization radar observations in Darwin, Australia. In this paper, we will not only present the method but also the testing of it using data from 2D video disdrometers (2DVD) from two very different locations, namely, Ontario, Canada, and Huntsville, Alabama, USA. One-minute DSDs from 2DVD are used as input to a gamma fitting procedure and our separation technique uses the fitted values of Nw and Do (the scaling parameter and the mean volume diameter respectively) and an 'index' to quantify where the points lie in the Nw versus Do domain.

For the Ontario location, the output of the classification is compared with simultaneous observations from a collocated, vertically-pointing, X-band Doppler radar. A 'bright-band' detection algorithm is used to classify each height profile as either stratiform or convective, depending on whether or not a clearly-defined melting layer is present at an expected height; if present, the maximum reflectivity within the melting layer as well as the corresponding height are determined. Similar testing is carried out for several events in Huntsville and compared with observations from a collocated UHF profiler and/or an X-band vertical profiling radar (both with Doppler capability). Results are very promising, and, furthermore, our separation technique seems to be applicable to many different locations and climatologies based on previously published data.