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Polarimetric Signatures of Initiating Convection during MC3E

Amber Emory

One of the goals of the Mid-latitude Continental Convective Clouds Experiment (MC3E) field campaign was to provide constraints for space-based rainfall retrieval algorithms over land. This study used datasets collected during the 2011 field campaign to combine radiometer and ground-based radar polarimetric retrievals in order to better understand hydrometeor type, habit and distribution for initiating continental convection. Cross-track and conically scanning nadir views from the Conical Scanning Millimeter-wave Imaging Radiometer (CoSMIR) were compared with ground-based polarimetric radar retrievals along the ER-2 flight track. Polarimetric signatures for both airborne radiometers and ground-based radars were well co-located with deep convection to relate radiometric signatures with low-level polarimetric radar data for hydrometeor identification and diameter estimation. For the time period of study, Z_{DR} values indicated no presence of hail at the surface. However, the Z_{DR} column extended well above the melting level into the mixed phase region, suggesting a possible source of frozen drop embryos for the future formation of hail. The results shown from this study contribute ground truth datasets for GPM PR algorithm development for convective events, which is an improvement upon previous stratiform precipitation centered framework.