Spectral Analysis of Dual-Polarization C-Band Radar Observations during the RELAMPAGO Experiment

Swaroop Sahoo*(1), V. Chandrasekar(2) and Ivan Arias(2)
(1) IIT Palakkad, Palakkad, India, e-mail: swaroop@iitpkd.ac.in
(2) Colorado State University, Fort Collins, USA; e-mail: chandra@colostate.edu, idariash@rams.colostate.edu

Extended Abstract
Dual-polarization full spectral observations from range height indicator (RHI) scans of C-band radar are used for understanding the vertical microphysical processes during the Remote sensing of Electrification, Lightning, And Mesoscale/microscale Processes with Adaptive Ground Observations (RELAMPAGO) experiment. The RELAMPAGO experiment was conducted in the lee of the Andes Mountains in central Argentina region (in the second half of 2018) that is known for its high impact weather and some of the most intense convective systems in the world [1]. These systems have been observed during the RELAMPAGO experiment using multiple ground-based radars including the CSU-CHIVO radar (C-band radar from Colorado State University). CSU-CHIVO radar’s RELAMPAGO field campaign data provides a unique opportunity to perform spectral analysis of RHI scan data during various types of rain events i.e., stratiform and convective events. The RHI scans during the stratiform event can be further used to study and analyze microphysical processes by using spectral polarimetry. Spectral polarimetry is the Doppler spectral decomposition of an observation volume [2]. The parameters of interest for spectral polarimetry are reflectivity, differential reflectivity and copolar coherency spectrum [2-3]. Spectral decomposition of the above mentioned polarimetric products provide the altitude-velocity spectrographs. The spectrographs for RHI scan data analyses have to be generated at various altitudes above ground level for stratiform rain events. In addition to that, spectral polarimetry is also to be used to study convective storms in regions of mixture of heavy rain and hail. This study shows that there is higher spectral broadening of reflectivity, differential reflectivity and copolar coherency spectrum in mixtures compared to regions of individual hydrometers. These results will be presented and discussed during the conference. Further analysis with physical and statistical variation will also be presented.

References
