Nowcasting Using Dual Polarization Radar in Southeast Brazil

Bruno Lisboa Medina
National Institute for Space Research (INPE), Brasil
Mattos, Enrique Vieira (National Institute for Space Research, Brazil)
Machado, Luiz Augusto Toledo (National Institute for Space Research, Brazil)

E-mail: bruno.medina@cptec.inpe.br

This study is related to Nowcasting that is the short-term weather forecasting for a time period of 0-6 hours, spatial scale of no more than a few kilometers with an update frequency less than 1 hour. The development of nowcasting tools is released from information collected by the radar dual-polarization X-band CHUVA Project of experiments performed at the Vale do Paraiba region in São Paulo state, Brazil. CHUVA, meaning “rain” in Portuguese, is the acronym for the Cloud processes of tHe main precipitation systems in Brazil: A contribUtion to cloud resolVing modeling and to the GPM (GlobAl Precipitation Measurement). CHUVA's main scientific motivation is to contribute to the understanding of cloud processes, which represent one of the least understood components of the weather and climate. An intense event, with maximum radar reflectivity greater than 60 dBZ, is selected, beyond a non-intense event with non-destructive feature to be used as a control set. The Forecast and Tracking the Evolution of Cloud Clusters (ForTraCC) algorithm are used for tracking the convective cells for lagrangian time derivation, as well the evaluation of diverse nowcasting tools as polarimetric variables and vertical integrated parameters. The parameters are calculated for each event to obtain signatures of severity at the initial stage of the cell before it has an intense convective feature. This study describes the remarkable differences among ordinary and intense convection in the layer between the melting layer and -15°C for reflectivity, Zdr, and Kdp. These signatures are obtained by evaluating parameters in view of the potential predictability of severe short-term event and classify them according to the intensity of events in southeastern Brazil.