

7.23 A COMPARISON OF TOTAL LIGHTNING REFLECTIVITY PROXIES AND WEATHER RADAR DATA IN SOUTHERN BRAZIL FOR HIGH IMPACT WEATHER MONITORING AND NOWCASTING

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A comparison between total lightning-based reflectivity proxies (PulseRad, from Earth Networks) and S-band Weather Radar was yield for convective events in western Parana State, Brazil. PulseRad uses, as reflectivity proxies, total lightning data which includes both intra-cloud (IC) and cloud-to-ground (CG) flashes from the Earth Networks Total Lightning Network (ENTLN) with sensors installed in Brazil. The lightning proxies were compared and evaluated with reflectivity data from a dual-polarization S-Band Weather Radar of the Simepar (Meteorological System of Parana) located in Cascavel City in western Parana State, southern Brazil. Usually, the convection in this area is triggered by heat and moisture advection from South America low-level jet as well as when occur an alignment with cold fronts. It was chosen four convective events: a typical cold front; a summer ordinary cell convection and two Mesoscale Convective Systems (MCS), one during spring 2016 triggered by a high level trough and another during fall 2017 associated with an interaction between a cold front and the South America low-level jets. The comparisons indicate a very well agreement in the identification of convective cells during all events, although PulseRad could not capture mesoscale patterns as well as the weather radar data. The shape and values of reflectivity for convective areas of all the meteorological systems, such as the MCS, cold front and ordinary convection, were very well detected by PulseRad, while for stratiform region (in this study, represented by reflectivity < 35 dBZ) the reflectivity pattern was undetected or underestimated. In this study, it was not found significative delays between total lightning reflectivity proxies and the weather radar data, as established by the correct positioning of convective cells and the MCS cores. Finally, it was found an encouraging outlook to use the PulseRad as reflectivity proxies in areas without weather radar coverage for convection monitoring and nowcasting, but it is not clear its efficiency for QPE, which will be pursued in the near future.