



## Investigating the impacts of convective scale hazardous weather events in Santa Catarina State through the CPTEC/INPE local data assimilation system

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### Abstract

Santa Catarina (SC) State is located in southern Brazil (between 26,0° S and 29,5o S) with a climate characterized by frequent passages of frontal systems, mesoscale convective systems and isolated instabilities resulting in intense precipitation, hailstorms, gales and even tornadoes. Several studies have shown that southern Brazil is among the regions in the world where synoptic conditions are favorable for the development of severe convective storms including thunderstorms capable of producing hailstones of considerable size, damaging winds and tornadoes. The region is also affected by strong mesoscale convective systems that form over Paraguay and northern Argentina during the warm season. The development of a local data assimilation system at CPTEC/INPE permit to investigate the role of local observations, including radar, in the development of potential hazardous hydrometeorological events at convective scale. This system is based on the WRF-ARW and its data assimilation system (WRFDA/3DVar), run at 1km resolution. The boundary condition comes from the CPTECs Regional data assimilation system based on the GSI/3DVar with data assimilated every 3 hours. This work illustrates through a number of case studies of meteorological events that affected vulnerable areas in Santa Catarina, the role of local surface data and radar information, i.e., reflectivity and radial velocity, in the short-term forecasts. It is also discussed the mechanisms underlying severe weather development in that region.