Overview of RELAMPAGO mobile radar observations

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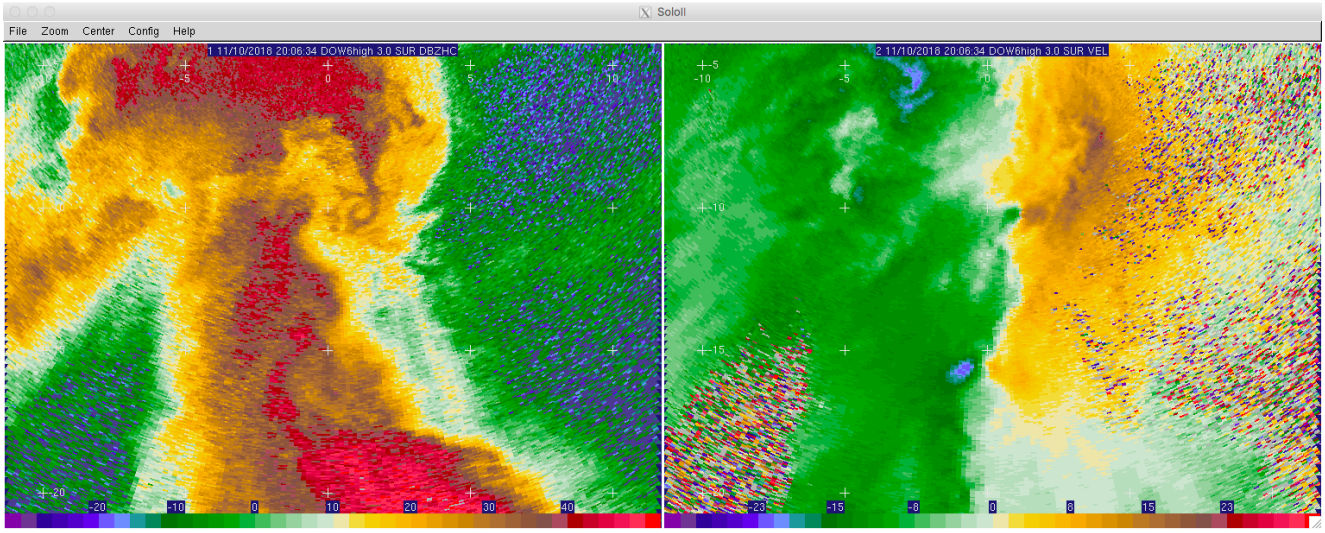
During November and December of 2018, the RELAMPAGO project deployed ground-based and airborne instrumentation to better characterize and quantify potentially hazardous convection in South America. An international team deployed aircraft, stationary radars, a fleet of mobile DOW radars, mobile mesonets, mobile soundings, disdrometers, hailpads, flux towers, and other instrumentation to observe convective initiation, severe storms, hail, upscale growth and hydrology. Mobile radars and surface assets were deployed for 19 events. This presentation will detail the mobile radar observations and integrated surface observations obtained during RELAMPAGO.

Of particular interest are data collected on 10 November 2018. RELAMPAGO mobile radars and other surface assets sampled a supercell, which produced a short-lived tornado-scale vortex. This vortex was sub-tornadic in strength (delta-V < 40 m s-1) and, although it formed within a supercell, its genesis mechanism may have been more typical of non-supercell tornadoes. Large hail was observed, but primarily east of mobile radar coverage. Dual-Doppler data between 1920 UTC and 2030 UTC from the DOW 6 and DOW 7 mobile X-band radars captured much of the tornado-scale vortex genesis and evolution. Frequent, proximate soundings allow for assessment of the near-storm environment. Surface weather stations and mobile mesonets provided further information about the near-storm environment and storm-generated boundaries. In addition to kinematic and dual-Doppler analyses, the dual-pol products from DOWs 6 and 7 allow for assessment of the microphysical evolution and associated mesoscale processes that may have contributed to vortex genesis. DOW6, for the first time, operated in simultaneous LDR and fast-45 mode and may provide additional microphysical insights regarding storm structure and evolution.

Preliminary analyses suggest a complicated genesis of the tornado-scale vortex, as it formed in a region where the storm-generated gust front interacted with linear environmental boundary layer features. Although preliminary proximal environmental soundings suggest the low-level shear was sufficient for supercells, preliminary analysis of the DOW radar data suggest that the shear associated with the storm-generated cold pools exceeded the environmental shear. We will discuss our initial findings, including the storm structure, updraft/downdraft and microphysical evolution, and the interaction of the storm with its environment, as well as how this storm fits into the spectrum of storms and pre-convective environments observed during the RELAMPAGO field campaign.

Keywords: field project, severe convection, integrated observations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