



Preliminary Results from the 2016 and 2017 VORTEX-SE Project

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The first two field phases of the Verification of the Origin of Rotation in Tornadoes Experiment – Southeast (VORTEX-SE) project took place in northern Alabama and southern Tennessee in the spring of 2016 and 2017. The primary goals of this continuing project are to better understand the controls on the genesis, intensity and track of tornadoes, with a focus on attributes specific to the southeastern United States environment.

As part of this effort, Texas Tech University brought an array of observational platforms to the field, including 24 in situ “StickNet” probes, the Ballooning and Observation Lab for Thunderstorms (BOLT) and three portable Lightning Mapping Array (LMA) stations. The 24 StickNet stations were separated, 16 of which were dedicated to a fixed mesonet over a 120x120 km section of Alabama and Tennessee defining the VORTEX-SE domain. This “StesoNet” remained in place for the duration of each two-month project, permitting a continuous monitoring of heterogeneities in the atmospheric state across the domain. The remaining eight probes were used for short-fuse deployments in advance of specific targets. BOLT was used for the release of targeted upper-air soundings as well as the deployment of the LMA stations, which improved flash source detection efficiency and extended the footprint of the Northern Alabama Lightning Mapping Array.

This presentation will provide an overview of operations and preliminary results from the 2016 and 2017 intensive observation periods. In particular, a case from 31 Mar 2016 will be explored in greater depth, where a combined deployment effort from TTU and Purdue University sampled storm interaction prior to an identifiable increase in low-level vertical vorticity. Also, the measurements from the broader “StesoNet” will be used to identify mesoscale heterogeneities relevant to the rather varied success in tornado production across the spectrum of updrafts observed in this case.

The results from ongoing data assimilation experiments will also be shown, where StickNet data are assimilated into an experimental version of the High-Resolution Rapid Refresh (HRRR) model. Time permitting, an overview of work involving ensemble sensitivity analysis, to assess the fundamental predictability of attributes of these VORTEX-SE storms, will be presented.