Karen Kosiba

Plains Elevated Convection At Night (PECAN): Multiple-Doppler Analyses of Severe Surface Winds

kakosiba@cswr.org

Authors

Karen/Kosiba, Center for Severe Weather Research,
Josh/Wurman, Center for Severe Weather Research,

The transition from surface-based to elevated convection and the subsequent organization and evolution of MCSs as the nocturnal stable boundary layer (NSBL) develops is not well understood. Importantly, these systems can produce severe surface winds, but the mechanisms through which intense-wind-causing downdrafts reach the surface in the presence of a NSBL remain uncertain, complicating the forecastability of severe wind events. Hydrometeor type, distribution, and evolution within these MCSs, as well as the evolving properties of the NSBL, environmental shear and other factors likely play important roles in the initiation, maintenance and cessation of intense, surface-reaching downdrafts.

The Plains Elevated Convection At Night (PECAN) experiment (1 June – 15 July 2015) provided a major opportunity for collecting integrated and targeted observations in severe-wind producing MCSs. PECAN deployed a diverse array of instrumentation, including mobile and stationary dual-polarization radars, including the DOWs, surface weather stations, mobile mesonets, and soundings in and near nocturnal MCSs and convection transitioning from daytime to nocturnal/MCS organization in the presence of a developing NSBL enabling the study of initiation/transition, evolution, internal kinematics and microphysics of severe-surface-wind-producing and potentially severe-surface-wind-producing MCSs.

During PECAN, several only marginally severe MCSs were observed, despite high probability forecasts of severe winds. The PECAN armada deployed several mobile radars in front on an MCS in Minnesota, allowing for multi-Doppler synthesis of the evolution of a potentially severe wind-producing MCS. We will present preliminary combined multi-Doppler, dual polarization, mesonet and sounding analyses and discuss why only marginally severe winds reached the surface. Additionally, we will discuss the overall PECAN project and the challenges of siting mobile radars quickly in this type of project.