The 20 July High-CAPE-Low-Shear Severe Weather Event in Eastern New York

Michael Evans

NOAA / NWS Albany NY

Thunderstorms developed over the Mohawk Valley in eastern New York late in the day on 20 July, 2019 in an environment characterized by large mixed-layer convective available potential energy (MLCAPE), light deep-layer shear, and little to no large-scale forcing for upward vertical motion. The storm prediction center had most of New York in general thunder on this day, with a marginal risk confined to far western New York and a slight risk over Michigan. A severe thunderstorm watch was never issued. The weather over eastern New York on the 20th was unseasonably hot and humid. The convection was initially discrete, then evolved into clusters and bow echoes as it moved east-southeast down the valley. Radar analysis indicated high reflectivity cores extending to no more than about 25000 feet. Velocity signatures were initially weak with inbound speeds on the Albany WSR-88D of less than 40 kt. Velocity signatures became slightly more impressive as the storms approached the radar, with inbound values increasing to 40 to 50 kt. Despite these rather unimpressive radar indicators, numerous damaging wind reports were received by the National Weather Service as these storms progressed eastward down the Mohawk Valley.

Previous research funded by the Collaborative Science, Technology and Applied Research (CSTAR) Program at U Albany has shown that severe events with a low probability of detection often occur in high CAPE, low shear environments. Conceptual models from this research are compared to analyses from this day to illustrate that 20 July fit this model for low-detection severe weather events. A comparison between radar observations and severe reports indicates that the severe winds occurred at very low altitudes, and were overshot by the radar beam, leading to challenging warning scenarios. On this day, an observation from the New York State Mesonet was critical for providing warning meteorologists with awareness that damaging winds were occurring, which helped lead to many successful warnings downstream from this initial observation.