The Multi-Hazard Severe Event of 21 August 2019 across eastern New York and western New England

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On 21 August 2019, a major severe weather event occurred across much of upstate New York (NY), and portions of western New England. Eastern NY and western New England had nearly three dozen severe reports of damaging winds in excess of 50 knots (58 mph), large hail (> 1.9 cm) and a couple of flash floods. Three tornadoes were also confirmed in the Albany forecast area; two EF0's and an EF1. A high end EF1 tornado (winds estimated to 95 knots) in southern Vermont (VT) not only produced significant tree damage but also damaged a home in the sparsely populated town.

Observational data, as well as short-range deterministic forecasts from the High-Resolution Rapid Refresh suggested a highly impactful severe weather outbreak would likely occur. The impacted area had just entered a warm sector with a warm front north of the Mohawk Valley, Greater Capital Region, and southern VT. An approaching strong upper level short-wave and prefrontal trough would focus the strong to severe convection that afternoon. A moderate-to-abundant instability and high-shear pre-convective environment were in place before the severe weather. Surface based convective available potential energy values ranged from 1000 to 2500 J kg^{-1} with increasing effective bulk shear values of 30 to 45 knots. 0-1 km Storm-Relative Helicity values were in the 100-200 m^2 s^{-2} range. The effective bulk shear values suggested the possibility of mini-supercells with rotating updrafts capable of producing, damaging winds, large hail and tornadoes. Anomalous precipitable water values, intense rainfall rates, and the potential for "training" convection hinted at isolated flash flooding, which did occur over Rensselaer County in the Capital Region including the city of Troy.

This poster presentation will focus on a detailed mesoscale and storm-scale analysis of the event, utilizing legacy and dual polarization data (differential reflectivity, correlation coefficient, and specific differential phase (K_{DP})). A bow echo along the northern book end vortex of a line echo wave pattern will be analyzed where extensive wind damage and tornadoes occurred. Traditional base and derived WSR-88D radar products will also be shown in conjunction with the Dual-Pol data. The storm-scale analysis will focus on helpful forecast techniques, including applying results from a local rotational velocity (Vr)-shear study, to determine what caused the tornadoes and how the tornado warning process can be improved. Also, the role of collapsing K_{DP} columns with wet microbursts will be examined based on recent local and CSTAR research.