A Multi-Scale Analysis of the 18 May 2017 Severe Weather Event across Eastern New York and Western New England

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On 18 May 2017, a widespread severe weather event occurred across much of eastern New York (NY), and portions of New England. The Mohawk Valley, the Capital Region of NY, the northern Berkshires of Massachusetts, the Adirondacks, Upper Hudson Valley, and southern? Vermont had a total of over 40 severe reports. The majority of the reports were damaging winds of 50 knots or greater, and there were also a half dozen reports of large hail (1.9 cm in diameter or larger). Most notably, a macroburst with extensive straight-line damage occurred in portions of southeast Warren and northern Washington Counties in the late afternoon into the early evening. The widespread wind damage included several downed trees, destruction of a barn, and damage to roofs of a few buildings mainly from Queensbury in Warren County, to Kingsbury in Washington County. The NY Mesonet site in Glens Falls recorded a gust to 59 knots (68 mph), and winds were estimated from the damage to be as high as 78 knots (90 mph) just north of the location towards Queensbury.

The air mass was anomalously hot ahead a cold front and its associated prefrontal surface trough and lake breeze boundary that afternoon. Max temps were in the 32-35°C range across portions of eastern NY and western New England with several maximum temperature records tied or broken. The 1200 UTC 18 May 2017 North American Ensemble Forecast System showed standardized low and mid-level height anomalies 1 to 2 standard deviations above normal, as well as 850 hPa standardized temperature anomalies 1 to 3 standard deviations above normal. During the afternoon, the mesoscale and pre-convective environment became unstable ahead of the approaching boundaries, as indicated by Rapid Refresh data with surface based convective available potential energy (CAPE) values in the 1000-2000 J kg^{-1} range along with steepening low and mid-level lapse rates. The 1800 UTC 18 May 2017 KALY sounding exhibited an inverted-V signature with an extremely high Downdraft CAPE value of 1501 J kg^{-1} and 0-6 km shear of 40 knots. High resolution models indicated that? Some supercells were possible initially before evolving into a squall line due to the fairly unidirectional flow in the low to mid-levels of the troposphere with damaging winds becoming the main threat.

This talk will focus on a detailed mesoscale and radar analysis of the event. Some NY Mesonet data will be shown in the case analysis. Traditional base and derived WSR-88D radar products will also be shown in conjunction with Dual-Pol data. The storm-scale analysis will focus on forecast techniques utilized by the WFO ALY during the event found to be useful. These included applying results from a local 1-inch hail study and preliminary results on an extreme damaging wind study potentially using differential reflectivity arches and specific differential phase spikes to determine what caused the large hail and damaging wind reports. Finally, a brief review of the performance of the High Resolution Ensemble Forecast output (versions 1 and experimental version 2) will be shown for the event in the Albany forecast area.