P4.15 A STORM-SCALE ANALYSIS OF 16 JUNE 2008 SIGNIFICANT SEVERE WEATHER EVENT ACROSS NEW YORK AND WESTERN NEW ENGLAND

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Motivation

- CSTAR III with SUNYA at Albany (2007-2010) examined the sensible and extreme weather with warm season cutoffs

- Storm-scale environment is very important to understand the mesoscale substructure of the convection with cutoffs

- New technology was utilized in short fuse operations in this significant severe weather event

  -> GR2Analyst

  -> Four Dimensional Stormcell Investigator (FSI)

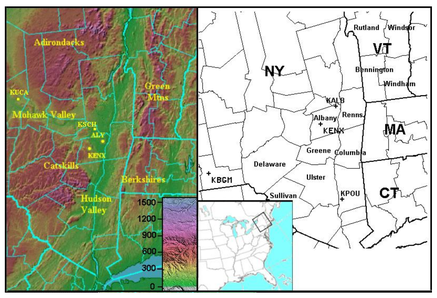
Background

- Numerous large hail reports in the Northeast with significant agricultural damage in upstate New York

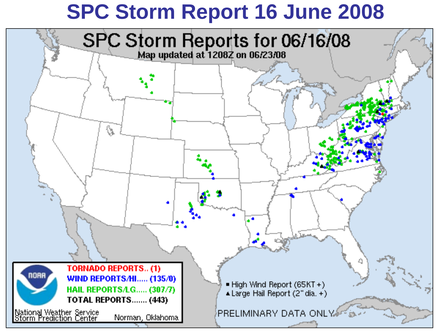
- Short wave trough and cold front ahead of cutoff focused convection

- Cold pool anomalies (steep lapse rates) coupled with sufficient shear and instability allowed multicell and isolated to scattered supercells to impact region

Albany Forecast Area

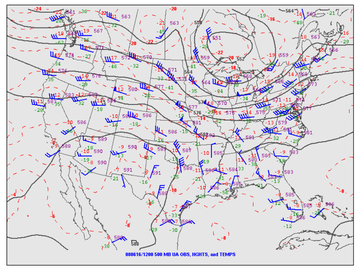


SPC Storm Report 16 June 2008

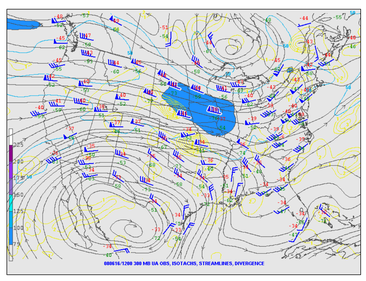


www.spc.noaa.gov

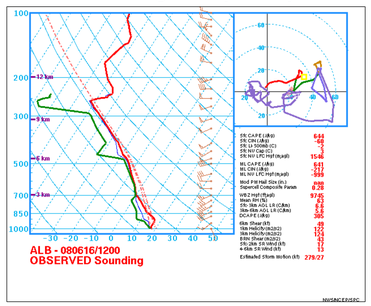
1200 UTC 16 June 2008 Upper Air & RAOB Analysis



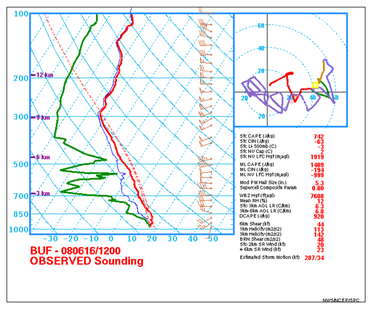
500 hPa Heights (dam), Temps (°C) & Winds (kts)



300 hPa Heights (dam), Streamlines & Divergence ($10^{-5}s^{-1}$)



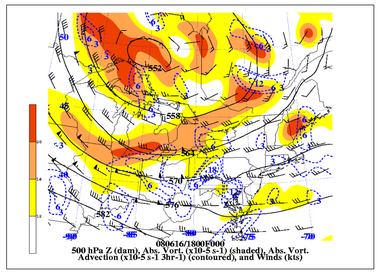
1200 UTC ALB Sounding



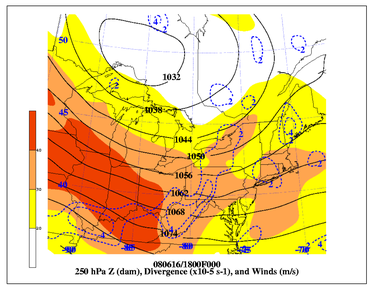
1200 UTC BUF Sounding

1800 UTC 16 June 2008 0.5° GFS Initial Analysis

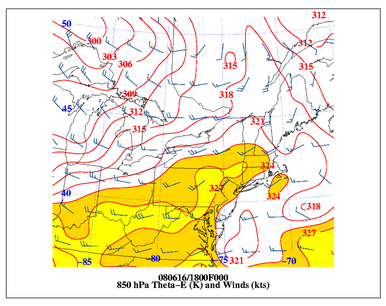
(Special thanks to Matt Scalora for these slides)



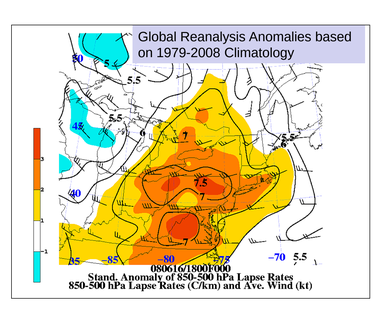
500 hPa Heights (dam), Absolute Vorticity ($10^{-5}s^{-1}$), Vorticity Advection ($10^{-5}s^{-1}$ 3 hr^{-1}) & Winds (kts)



250 hPa Heights, Divergence ($x10^{-5}s^{-1}$), & Winds(m/s)

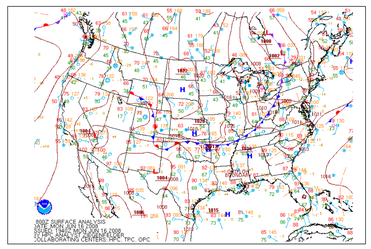


850 hPa Θe (K) & Winds (kts)

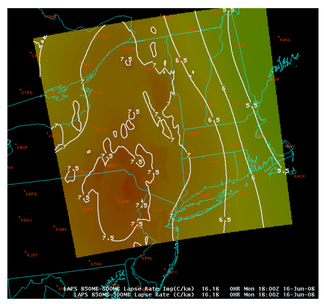


850-500 hPa Standardized Lapse Rate Anomalies (°C km^{-1})

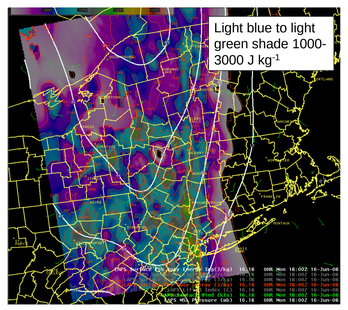
1800 UTC Mesoscale Analysis



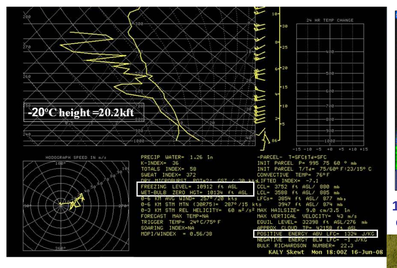
1800 UTC Surface Map



1800 UTC LAPS 850-500 hPa Lapse Rates (°C km^{-1})

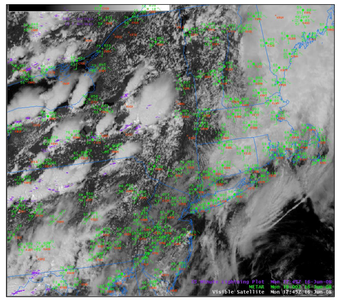


1800 UTC LAPS SBCAPES (J kg^{-1}) & MSLP (hPa)



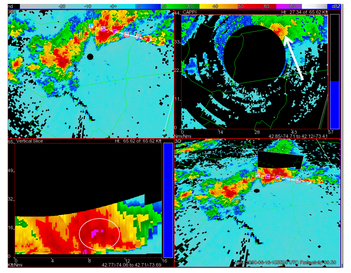
1800 UTC ALB Sounding

Satellite and Radar Analysis

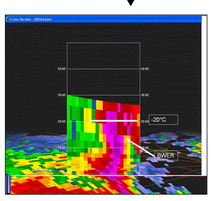


1745 UTC Visible Satellite, METARS & Lightning

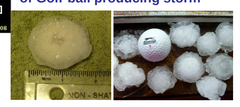
1832 UTC KALB 0.5° Base REF & Hail Icons from GR2Analyst



1855 UTC FSI 4-panel KALB storm



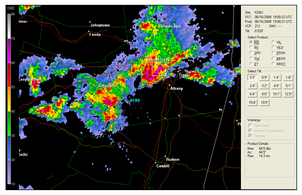
1855 UTC GR2Analyst X-section of Golf-ball producing storm



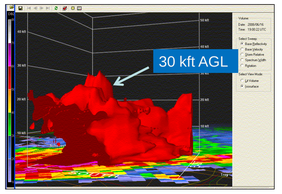
2" hail Colonie, NY

Golf-ball size in Guilderland, NY

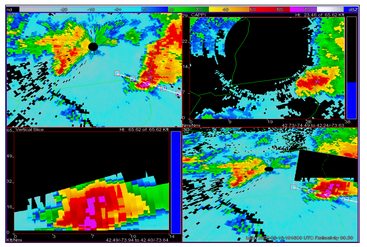
Storm-Scale Analyses



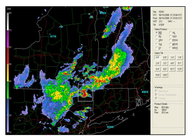
1900 UTC 0.5° Base REF



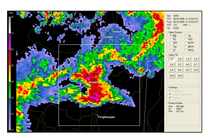
1900 UTC 50 dBZ isosurface



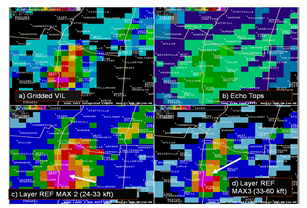
1949 UTC FSI 0.5° Base REF with 65 dBZ to 24 kft AGL



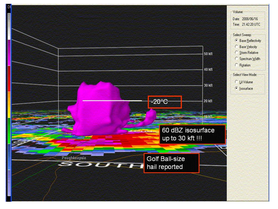
2133 UTC 0.5° Base REF with storm north of KPOU



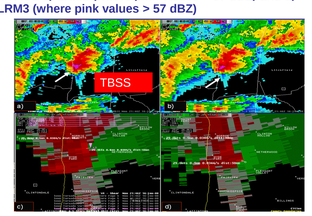
2133 UTC REF X-section



2142 UTC KALB: a) Gridded VIL (kg m^{-2} b) Echo Tops kft AGL c) LRM2 (where pink values > 57 dBZ) and d) LRM3 (where pink values > 57 dBZ)



2142 UTC KENX 60 dBZ Base Reflectivity Isosurface



2146 UTC KEN a) 0.5° Base Ref(dBZ), b) 0.9° Base Ref (dBZ), c) 0.5° SRM, V-R shear (kts, s^{-1}) and TVS Algorithm, d) 0.9° SRM, V-R shear (kts, s^{-1}) and TVS Algorithm

2" hail Hyde Park, Dutchess Co.

Summary

- Sufficient deep shear and an abundance of instability were in place ahead of a short-wave trough and a cold front for multicell clusters and supercells
- Strong mid-and upper-level jet dynamics (cyclonically curved jet)
- Anomalous mid-level lapse rates (due to cold pool) contributed to numerous large hail reports (around 165 reports in Northeast)
- New technology such as FSI and GR2Analyst helped forecasters put out timely warnings (3-D visualizations) on the storm-scale
- ALY: POD = 0.93 (40/43 events); FAR = 0.17; CSI = 0.78 & Lead-Time = 25.5 min
- 23 counties in NY had extensive crop damage (i.e. Ulster Co. over $16 million, and Columbia Co. over $5 million)
- The damaged crops included: apples, strawberries, grapes, peaches, and corn