P1.15 THE MAY 26-27, 2010 EASTERN NEW YORK AND WESTERN NEW ENGLAND BACKDOOR COLD FRONT SEVERE WEATHER EVENT

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Motivation

- Backdoor cold fronts and their associated significant weather are a part of the CSTAR IV project (2010-2013) with SUNY at Albany
- Intriguing anomalous severe weather with this case in the Northeast to address the following questions:

(1) What happened ?

(2) Why did it happen ??

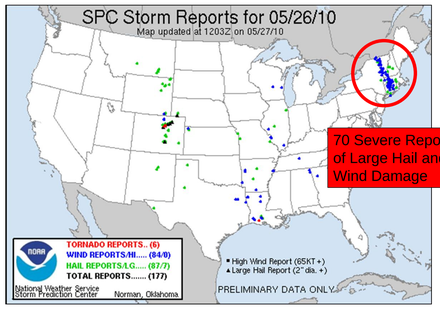
(3) What can be learned from what happened ???

CSTAR Grant #: NA01NWS4680002

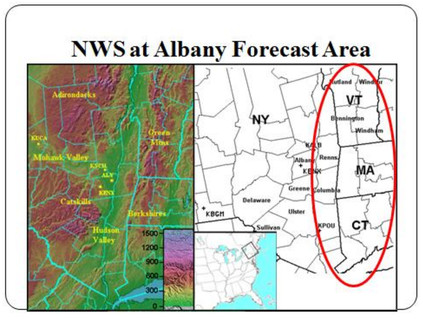
Outline

- Brief overview of the concentrated severe event
- Summary of the 1200 UTC May 26 2010 Record Heat…and Upstream MCS
- 0000 UTC Synoptic Overview
- 0000 UTC North American Regional Reanalysis (NARR) Anomaly Data
- 0000 UTC Meso-scale (RUC40 and LAPS) and Sounding Analysis
- Brief Regional and KENX radar storm-scale review of the event

What Happened ???
26 May 2010 SPC Storm Reports

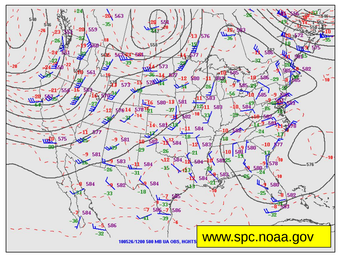


Topography of Eastern New York and Western New England

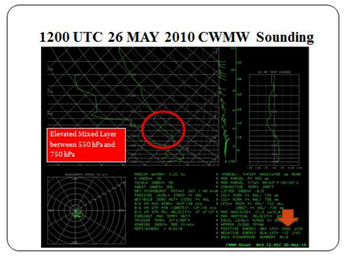


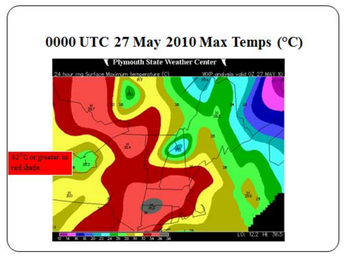
Overview:

Anomalous Heat
1200 UTC 26 May 2010



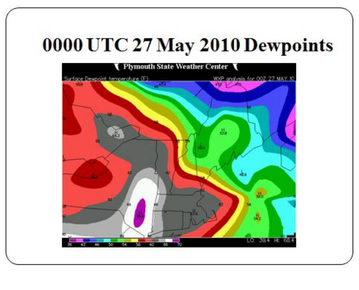
500 hPa Heights (dam), Temps (°C) & Winds (kts)





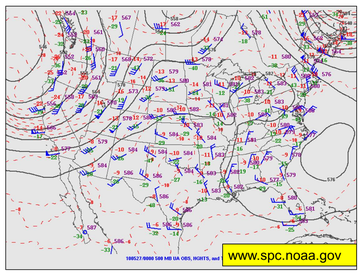
Record High Temperatures

- ALB: 94°F (1874-2010)
- GFL: 92°F (1944-2010)
- DDH: 91°F (2000-2010)
- PSF: 91°F (1925-2010)
- POU: 95°F (1948-2010)
- HFD: 99°F (1905-2010)
- ORF: 97°F (1892-2010)
- BTV: 92°F (1883-2010)
- MSS: 96°F (1948-2010)
- SLK: 90°F (2000-2010)

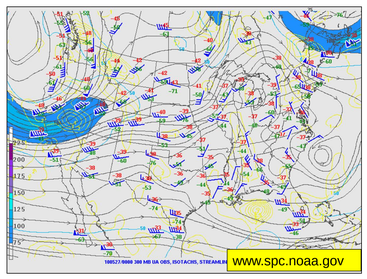


26-27 May 2010 Case

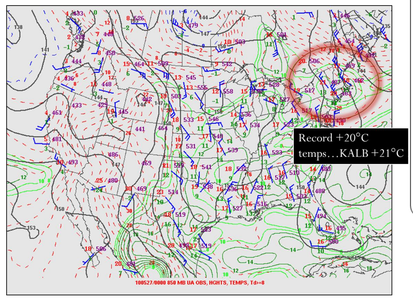
0000 UTC 27 May 2010 Upper Air Analysis



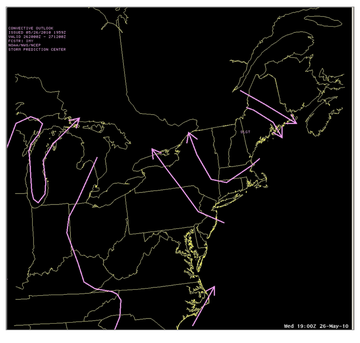
500 hPa Heights (dam), Temps (°C) & Winds (kts)



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

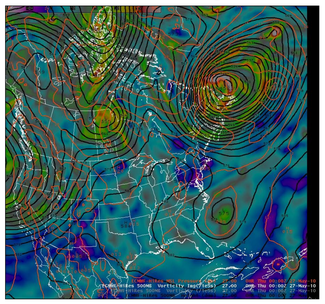


850 hPa Heights (dam), Dewpoints(°C), Temps (°C) & Winds (kts)

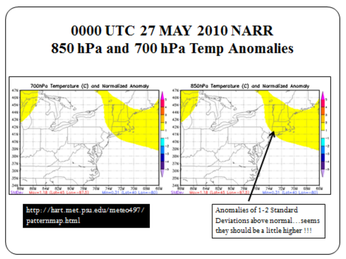


2000 UTC: SPC DAY 1 OUTLOOK

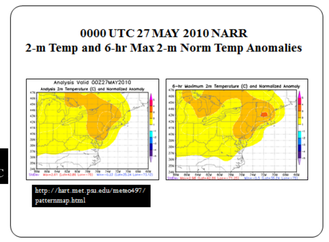
0000 UTC 27 May 2010



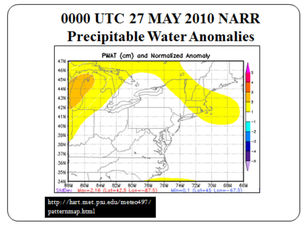
HIRES ECMWF 500 hPa Heights (dam), ζ_a (10^{-5} s^{-1}), and MSLP (hPa)



NARR Temp Anomalies

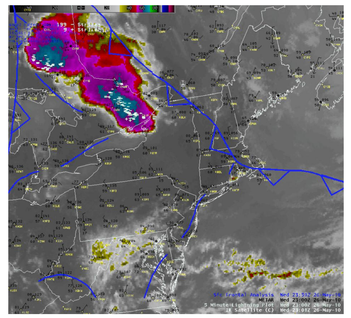


NARR 2-m Temp Anomalies

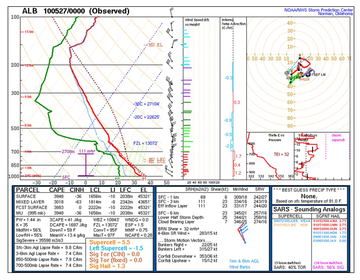


NARR P-WAT Anomalies

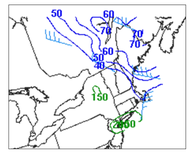
Satellite, Surface, Sounding, & Meso-analysis



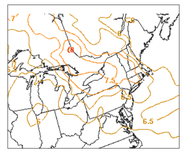
2300 UTC Surface Map (MSLP and Fronts), METARS, & IR Image



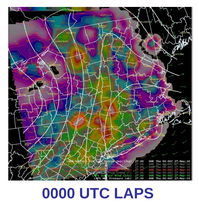
0000 UTC KALB Sounding



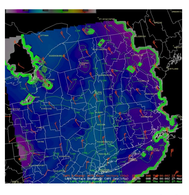
RUC 0-6 km Shear (kts) & 0-3 km SRH (m^2s^{-2})



RUC 700-500 hPa lapse rates (°C/km^{-1})

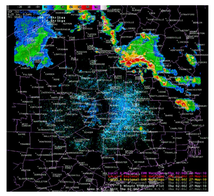


0000 UTC LAPS SBCAPES (J kg^{-1}) & MSLP (hPa)

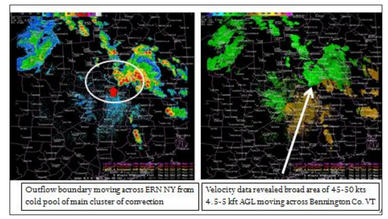


0000 UTC LAPS DCAPE (J kg^{-1}) & 0-6 km Bulk Shear (kts)

Storm-Scale Analysis

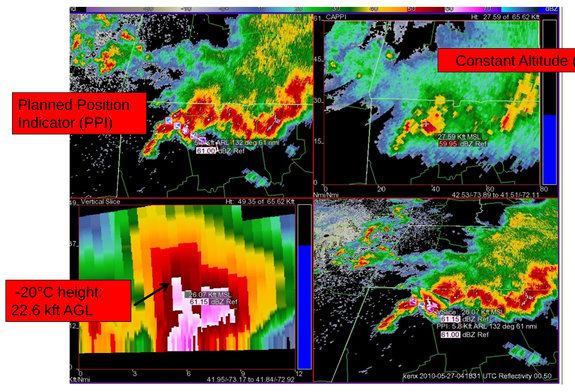


0200 UTC 0.5° KENX Base REF (dBZ) and Lightning

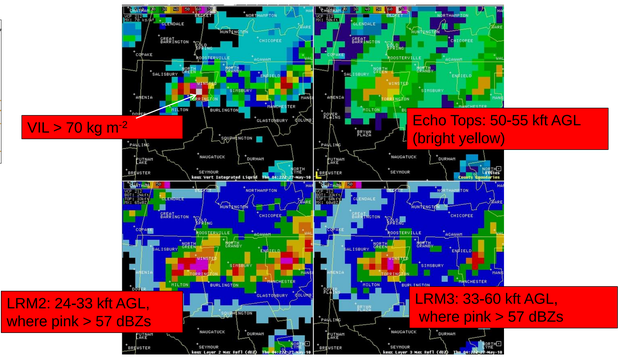


0230 UTC 0.5° KENX REF & VEL

0418 UTC Four Dimensional Storm Cell Investigator: Severe Cell NW CT



0422 UTC: Quarter-size (1") Hail & Wind Damage in Litchfield County, CT



Summary

- **Anomalously hot and humid air mass was in place with 2-m temperature anomalies 2 to 3 standard deviations above normal**
- **Abundance of instability (> 3000 J kg^{-1}) over the region with modest deep shear (20-30 kts) for MCS focused by back door cold front**
- **The steep mid-level lapse rates (7-8°C km^{-1}) played a critical role for severe convection (impressive Elevated Mixed Layer viewed at 1200 UTC CWMW sounding)**
- **An outflow boundary moved from VT to southern NY with new strong to severe convection forming along it.**
- **WFO ALY issued 10 SVR polygons: POD=0.94; FAR=0.10; CSI=0.86 and an average Lead-Time=31.6 minutes. Patience kept the situational awareness focused !!!**