

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

Thomas A. Wasula, Brian J. Frugis, & Michael S. Evans  
NOAA/National Weather Service, Albany, NY

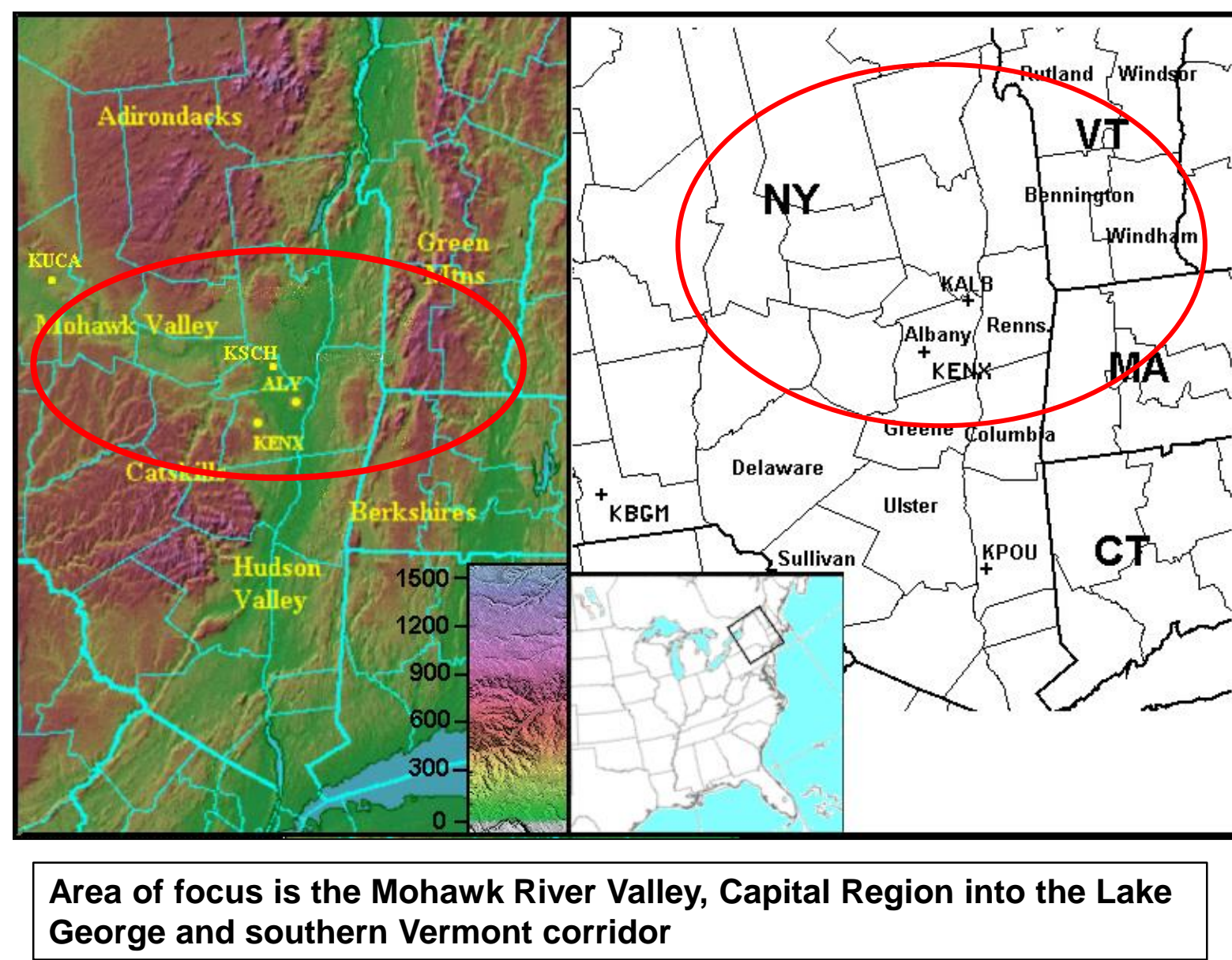
## Motivation

- Tornadoes in the Albany Forecast Area are rare (~85% are EF0/EF1) with about 3 per year.
  - CSTAR V - VI Goals (2010 – Present)
  - (1) To examine severe weather cases with application of the new (April 2012 to 2019) dual polarization radar data (differential reflectivity, correlation coefficient, and specific differential phase)
  - (2) Expand ALY Tornado V<sub>r</sub>-R Shear Climatology from 1998-2000 in COMET partners project
- CSTAR Grant #: NA16NWS4680005

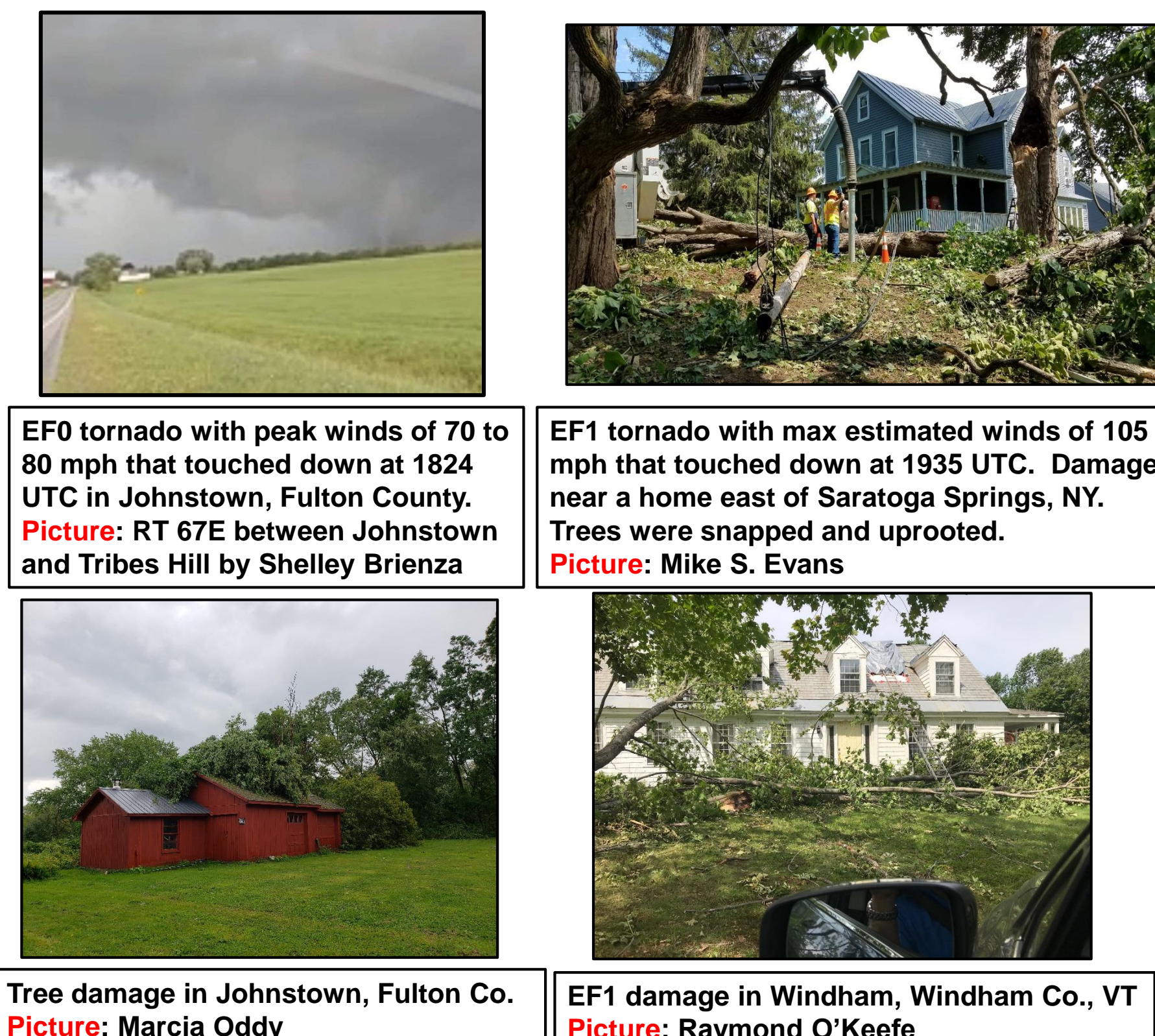
## Outline

- Tornado Climatology
- Brief Synoptic Overview
- Mesoscale Analysis: SPC Rapid Refresh & NYS Mesonet
- Storm-scale Analysis with new V-R Shear Nomogram
- Utilization of K<sub>DP</sub> descending columns for forecast wind damage
- Brief Flash Flood Threat review

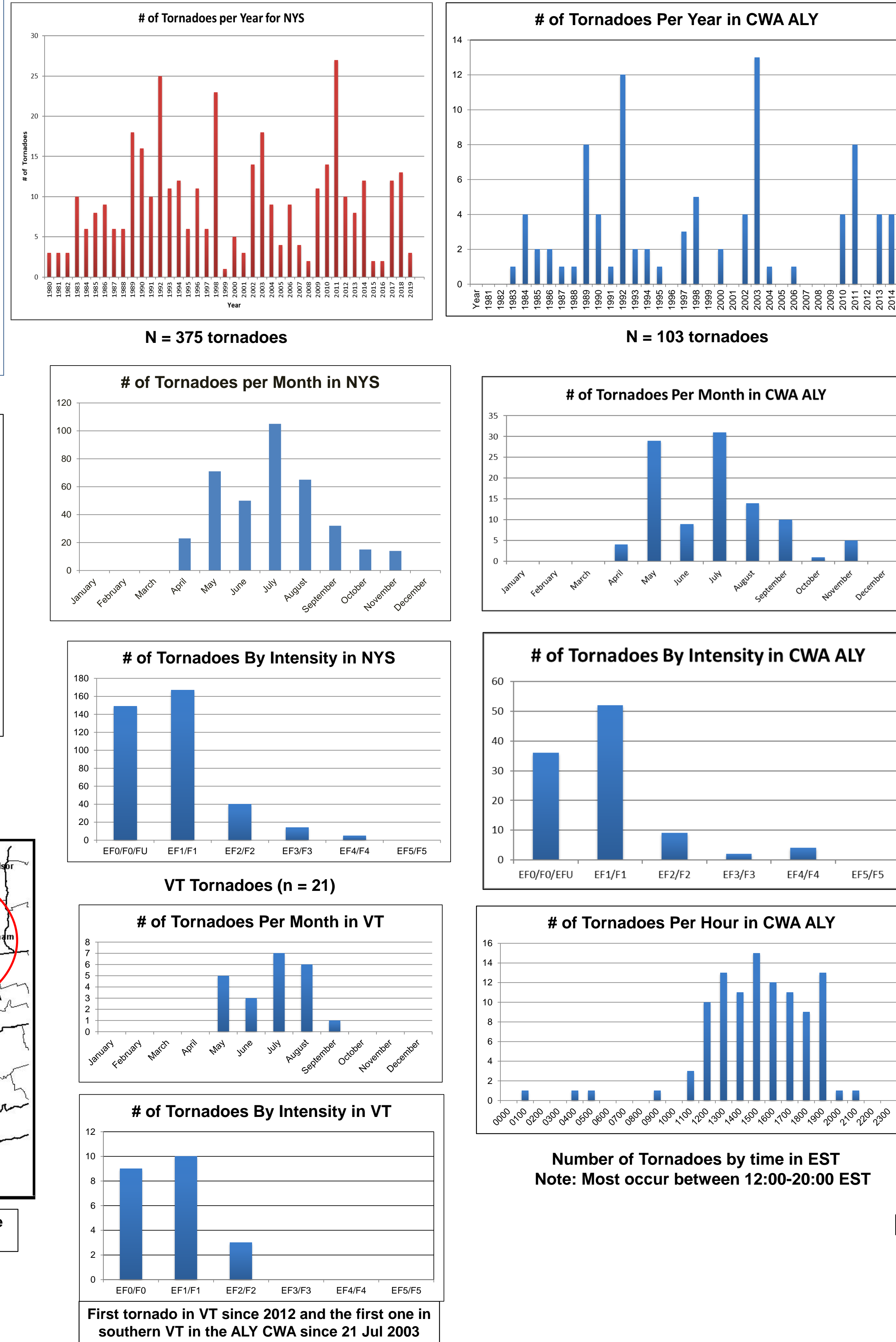
## NWS at Albany Forecast Area



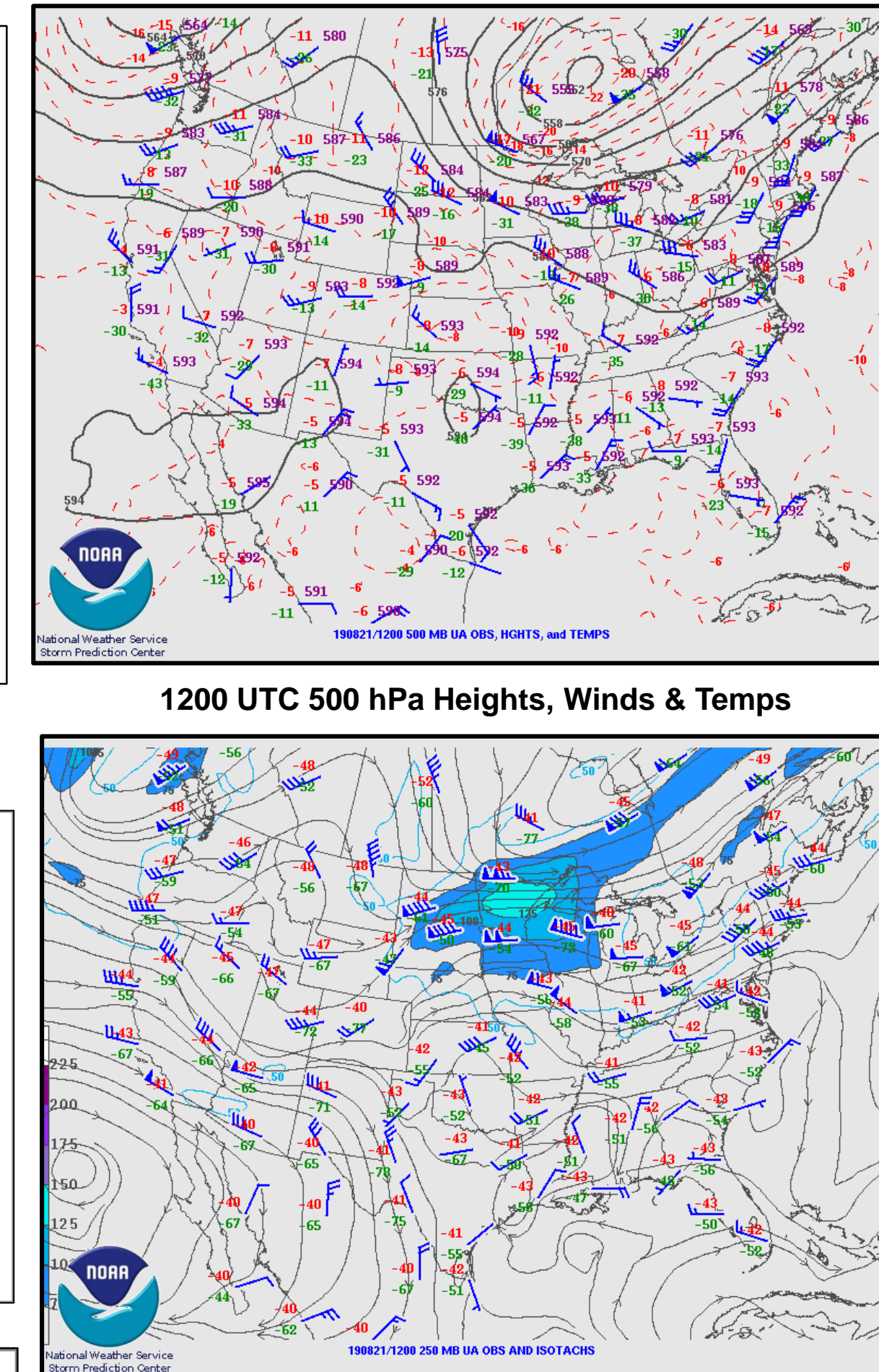
## August 21, 2019 Tornadoes



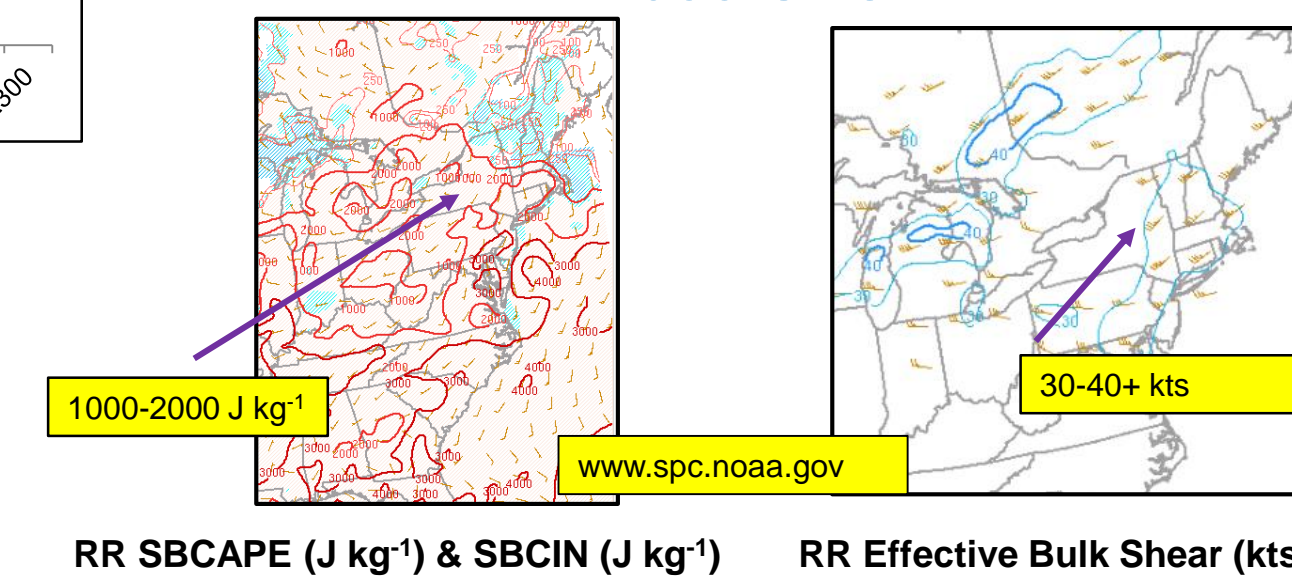
## Tornado Climatology 1980 - "AUG" 2019



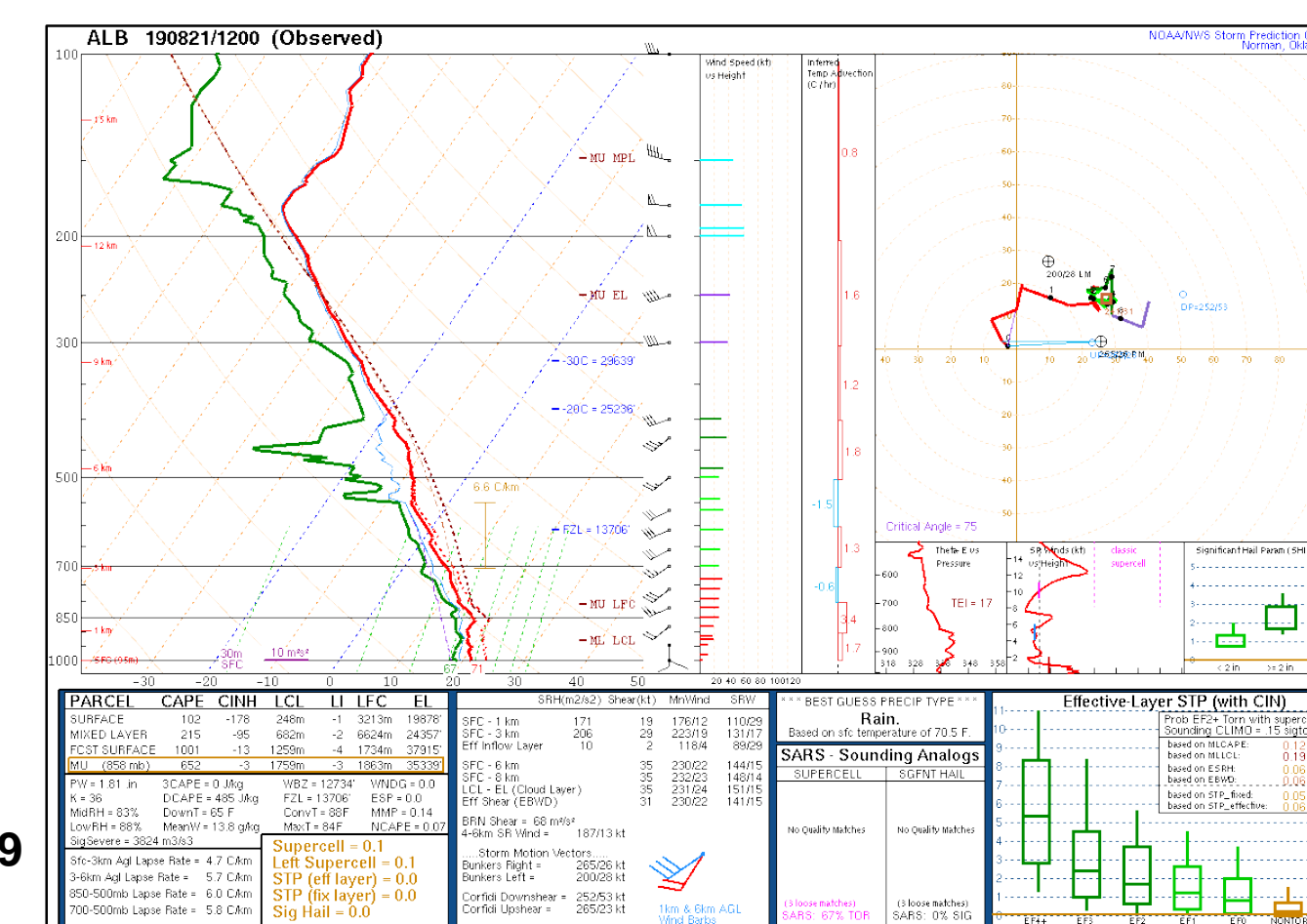
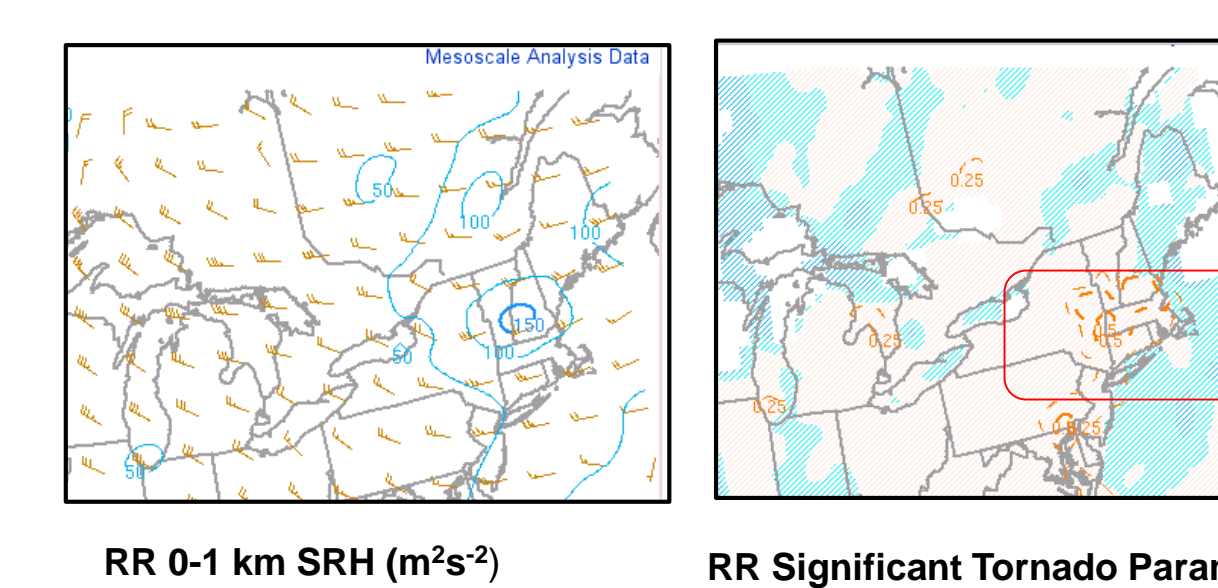
## Synoptic Overview 21 August 2019



## Mesoscale Analysis 1800 UTC

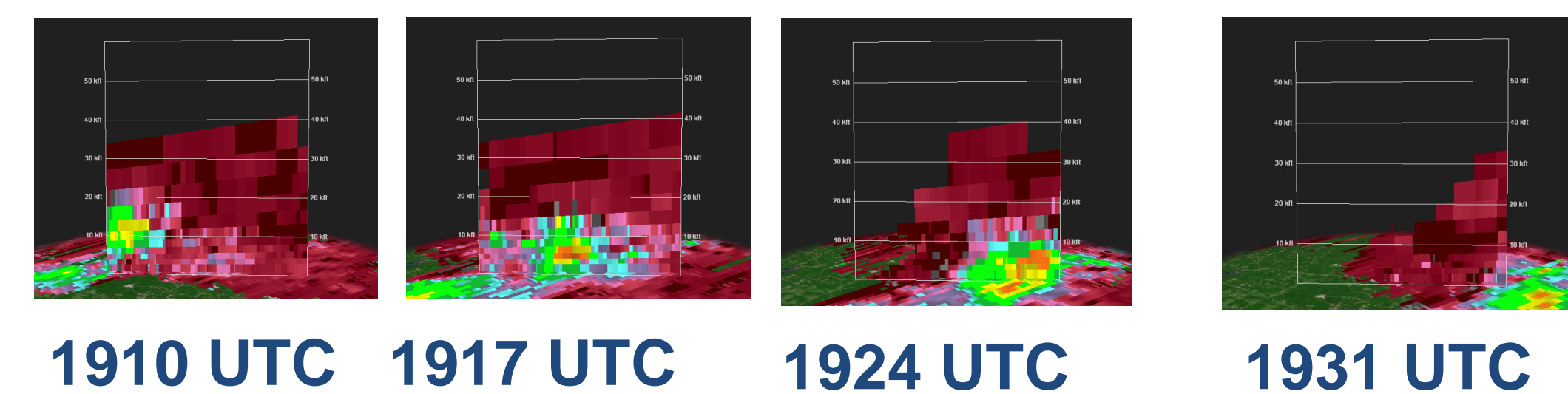
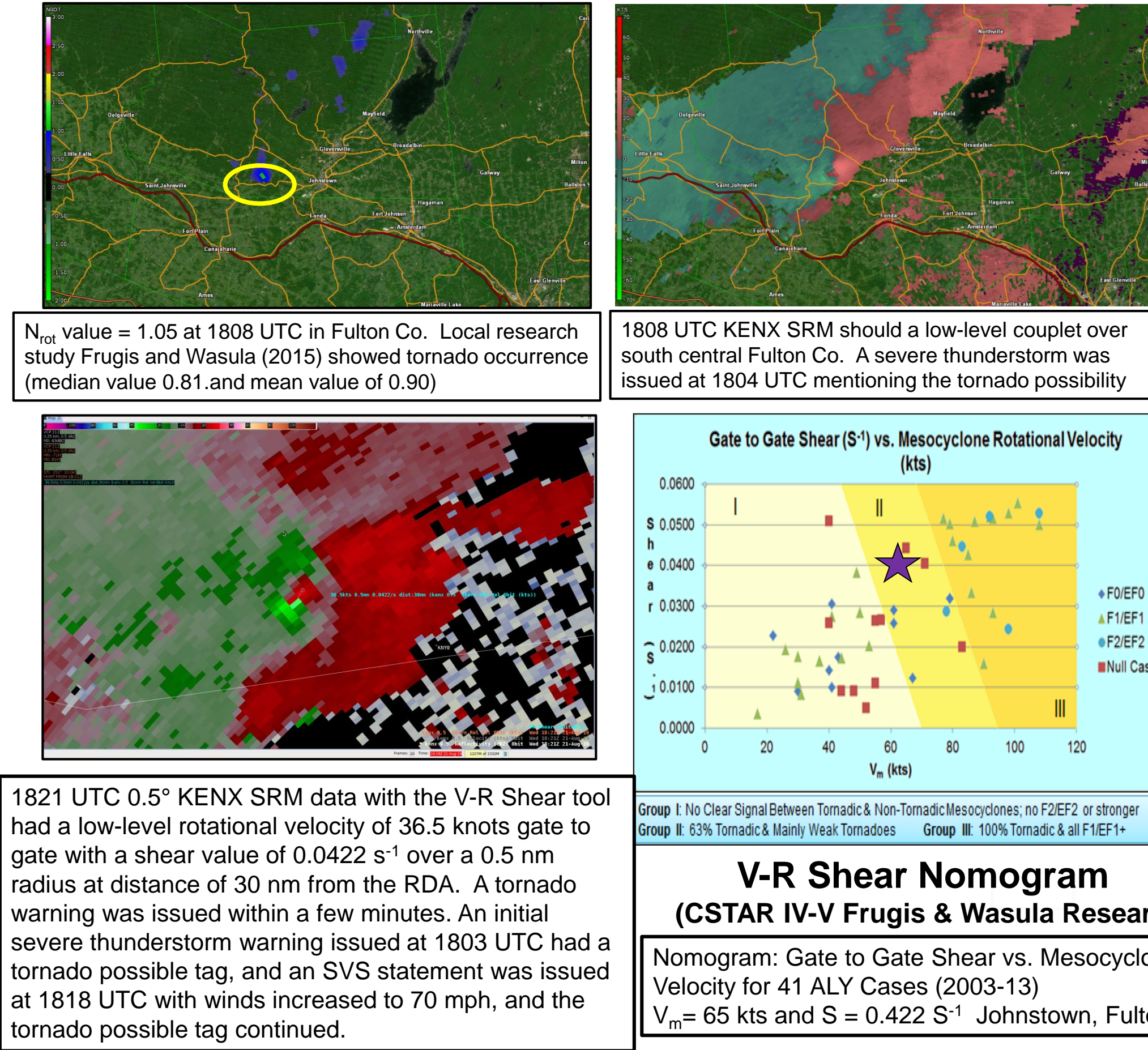


## 1900 UTC

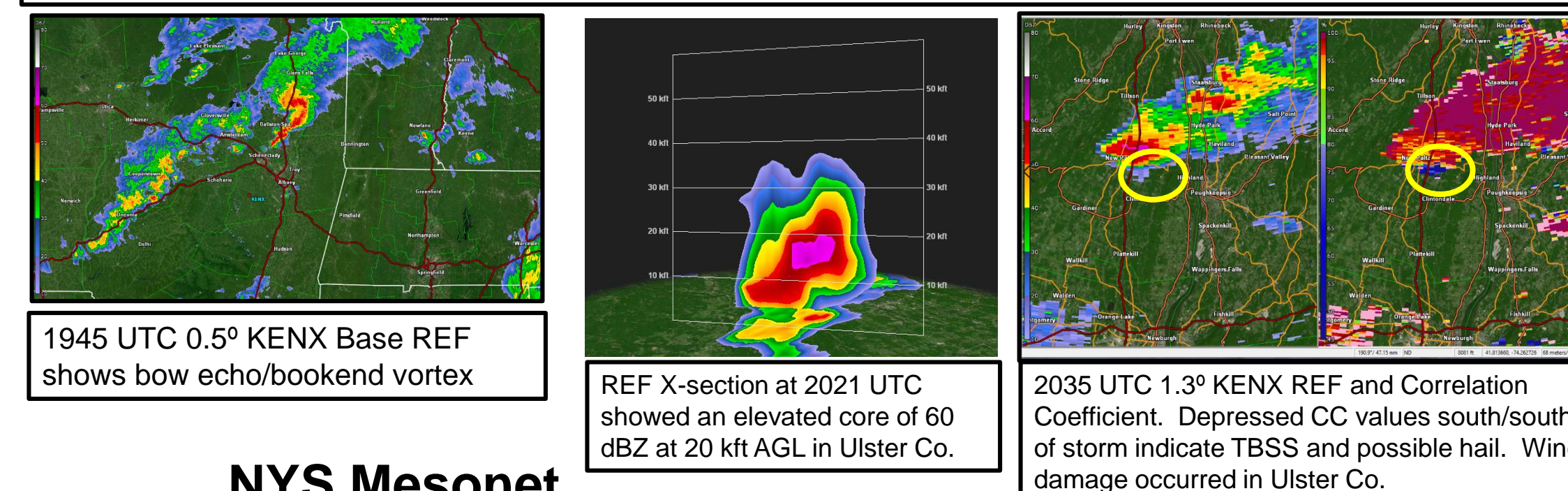


1200 UTC 21 August 2019 ALY Sounding

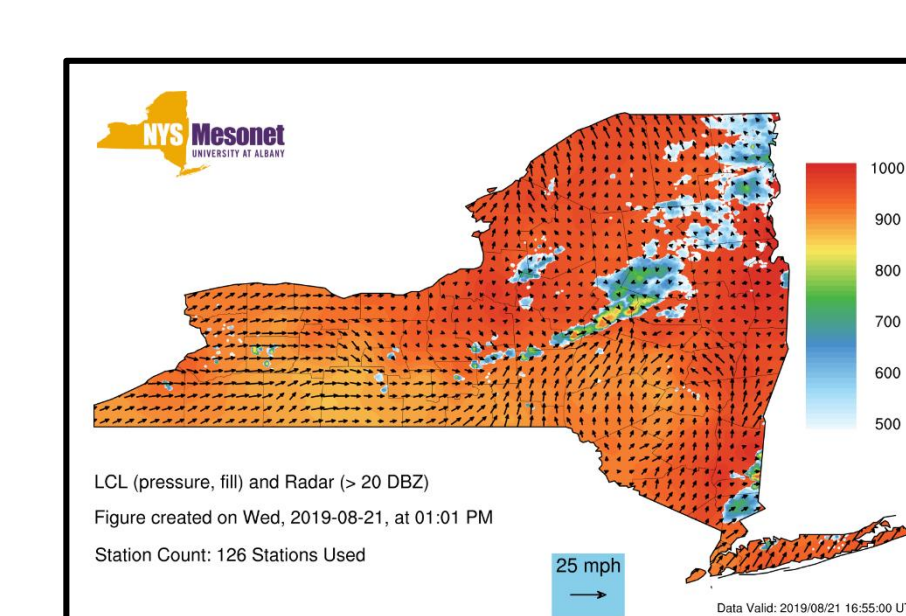
## Storm-Scale Analysis 1808 UTC



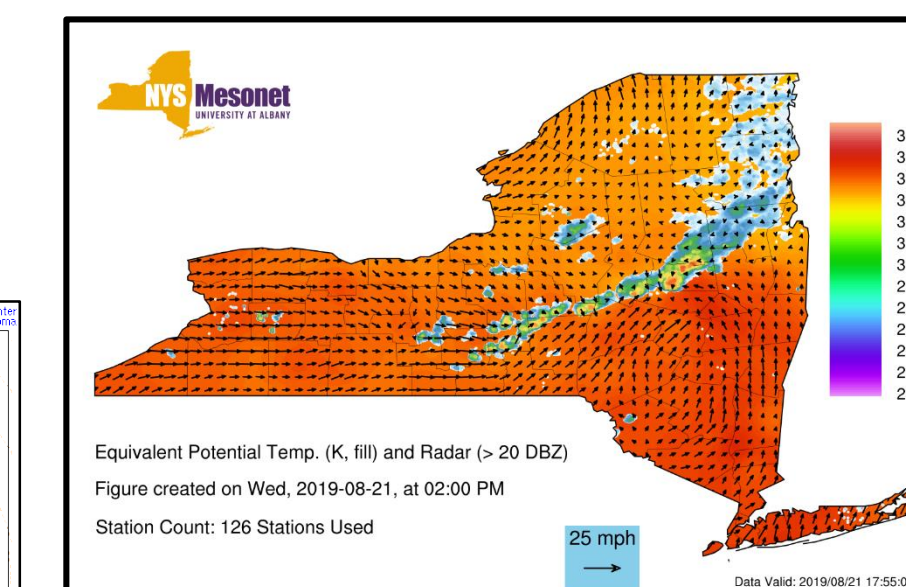
A microburst occurred near Saratoga Springs with a descending KDP column that collapsed with values of 3-5 deg/km rose above the freezing level (~13.5 kt AGL), and descended with widespread wind damage at 1925-1935 UTC. The tornado occurred at the end of the life cycle.



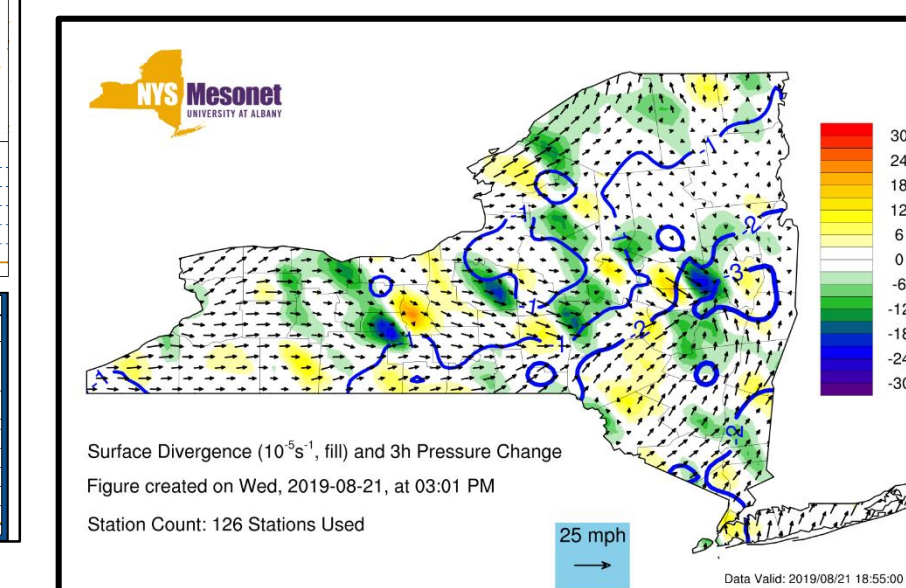
## NYS Mesonet 1700 UTC



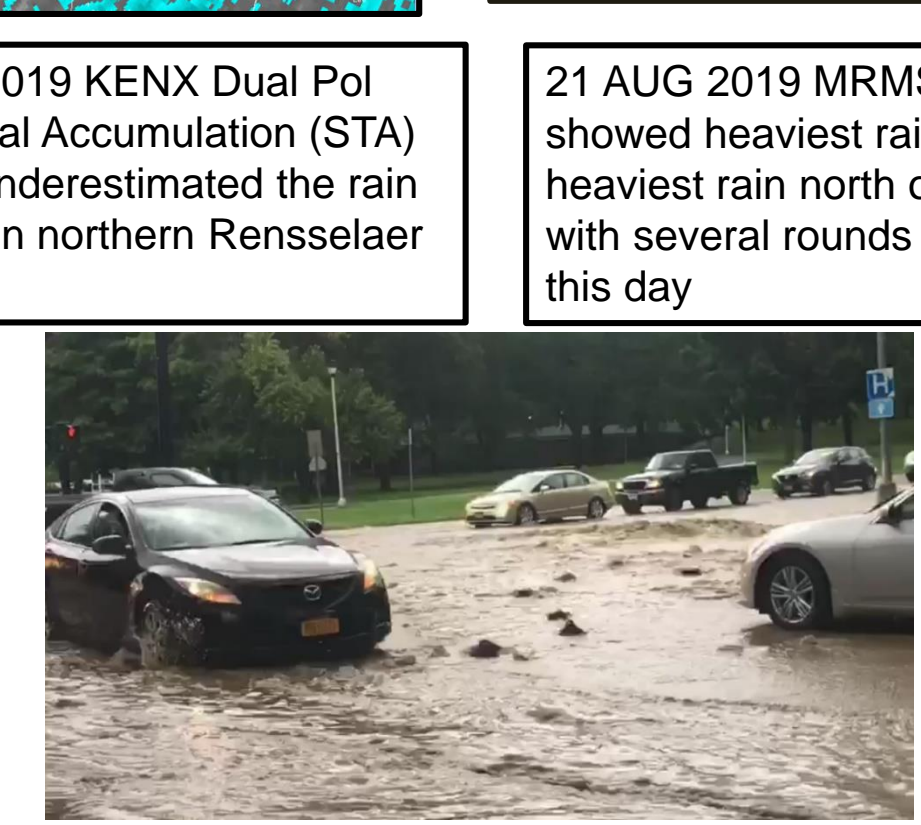
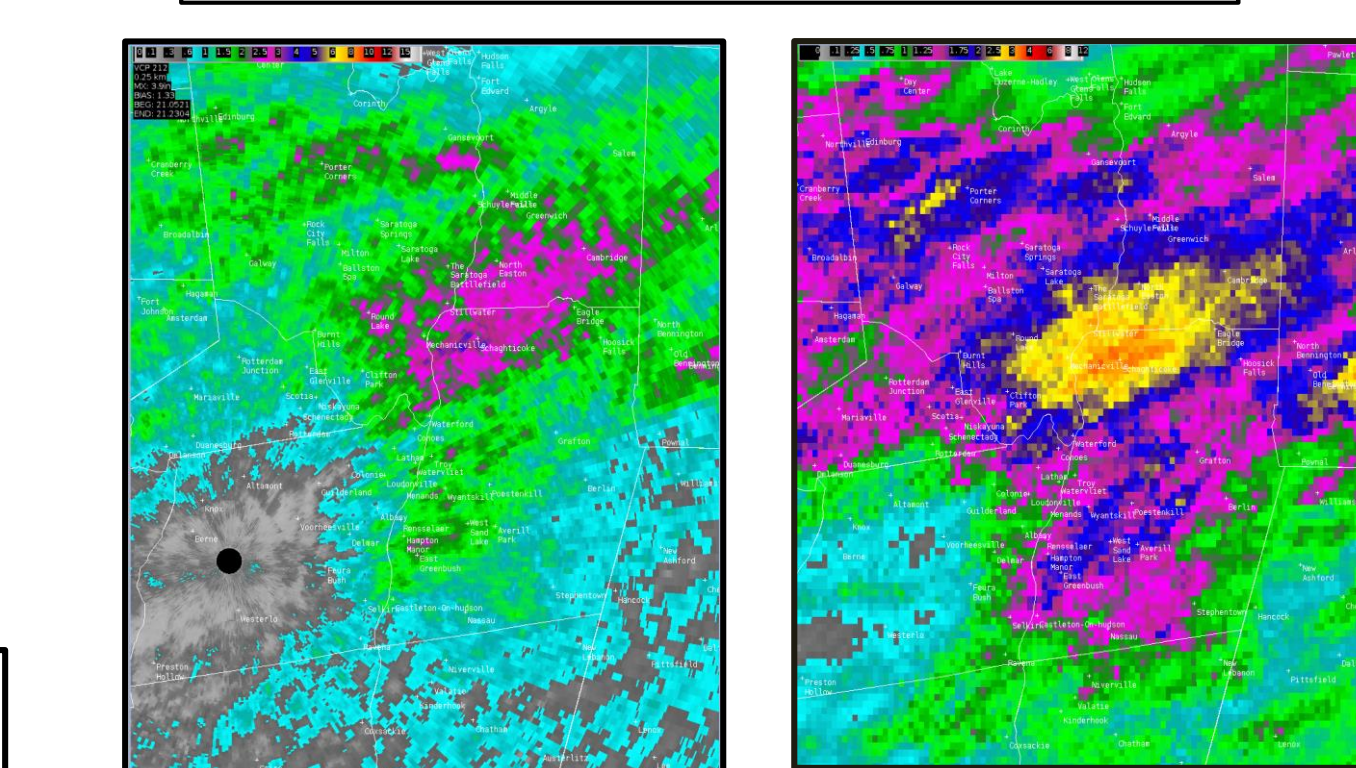
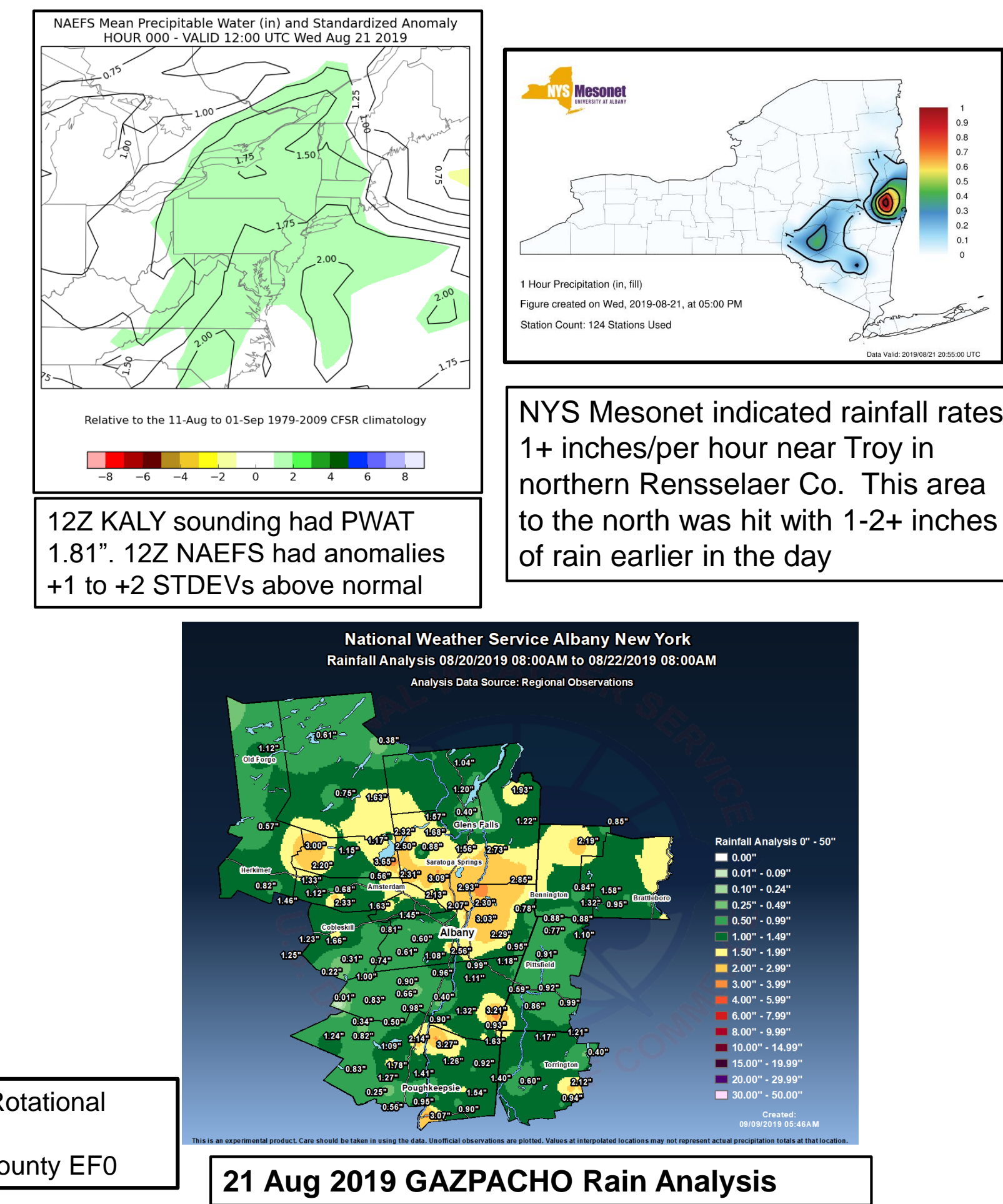
## 1800 UTC



## 1900 UTC



## Flash Flood Analysis



## Summary

- 3 tornadoes in the ALY forecast area (last time was 29 May 2013)
- Moderate CAPE – Moderate Shear pre-convective environment for mini discrete supercells & bows. 0-1 km SRH increased to 100-200 m<sup>2</sup>/s<sup>-2</sup>
- Along low-level theta-e and CAPE gradient, severe convection migrated along in the Mohawk River Valley, Capital Region into the Saratoga Region and southern VT
- A bow echo and a well defined northern bookend vortex to a line produced widespread wind damage with descending K<sub>DP</sub> column(s) present. EF1 spin-up tornado occurred with bow echo
- Applied collaborative research from CSTAR for tornado warning decision (V<sub>r</sub> - R Shear Study) showed fairly high confidence for a weak EF0/EF1 tornado in Fulton County
- Windham, VT tornado difficult to detect due to beam height close to 7 kt AGL, and obstruction of mountains
- Flash flood(s) were isolated, but anomalous PWATs, intense rain rates, and repeated rounds of rainfall due to "training" echoes were plausible reasons