May 16, 2009 (Part II) - A Mesoscale and Radar Perspective of the Tornadic Supercells

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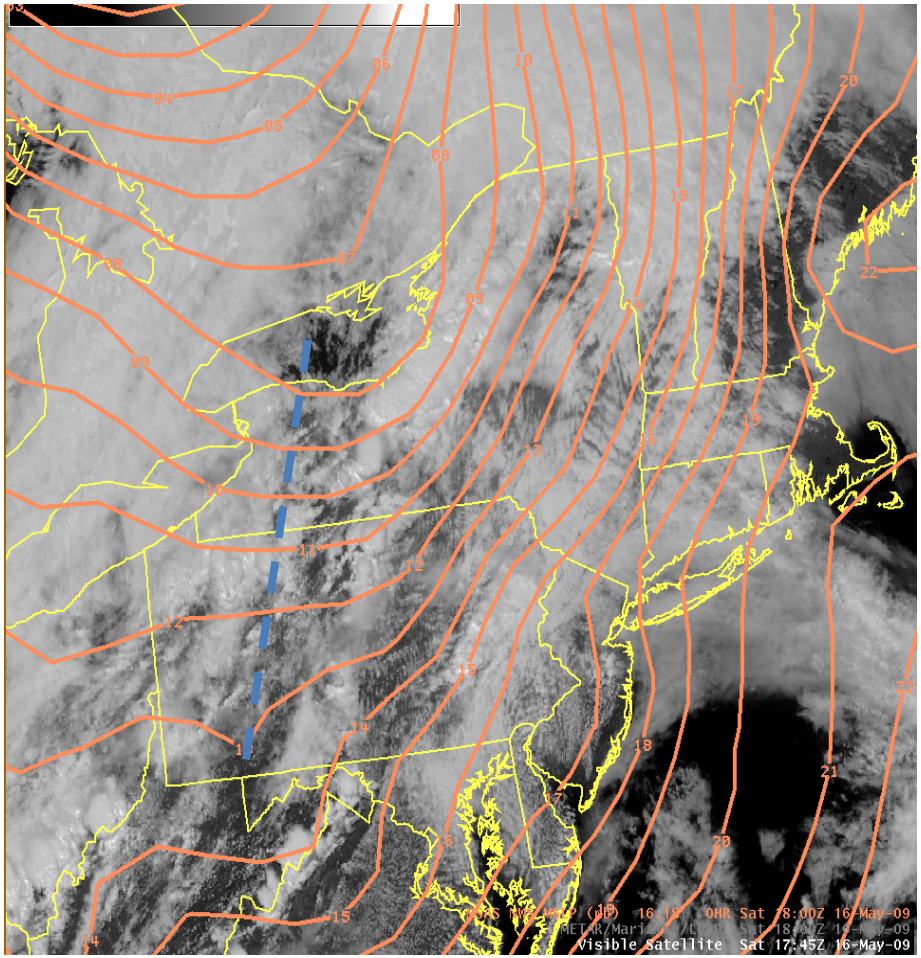
WFO BGM

Mesoscale

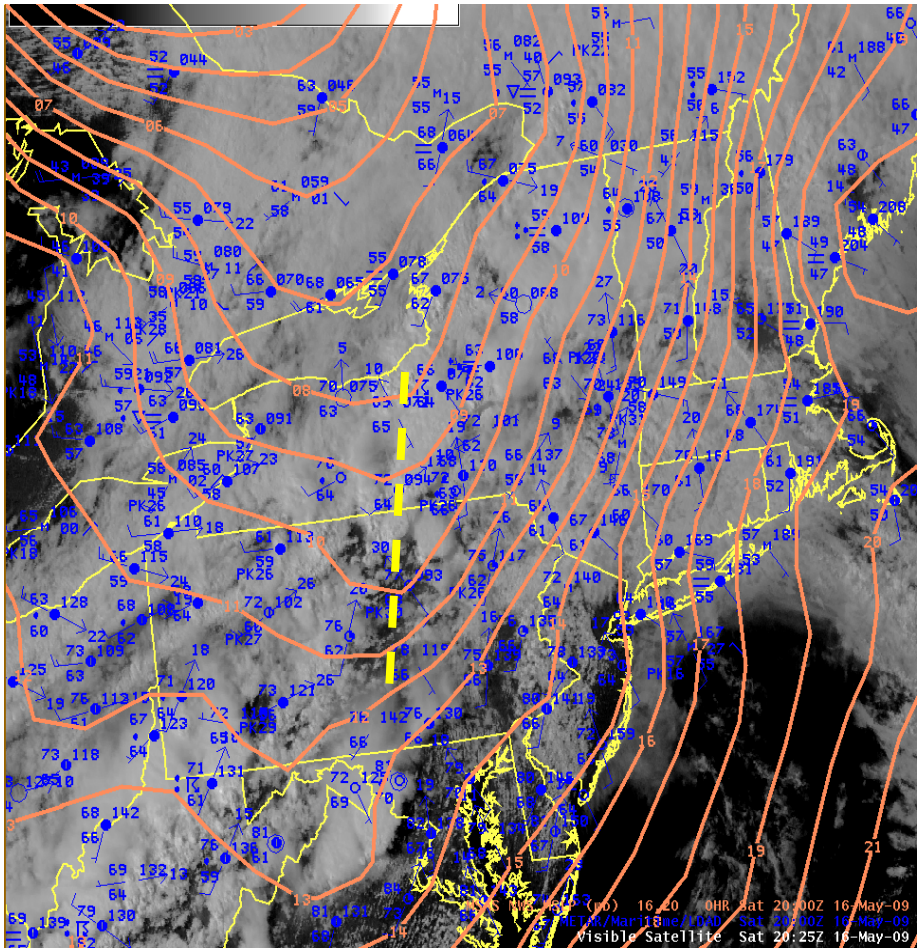
Boundary Assistance

- A pre-frontal trough formed across Western NY / PA early in the afternoon

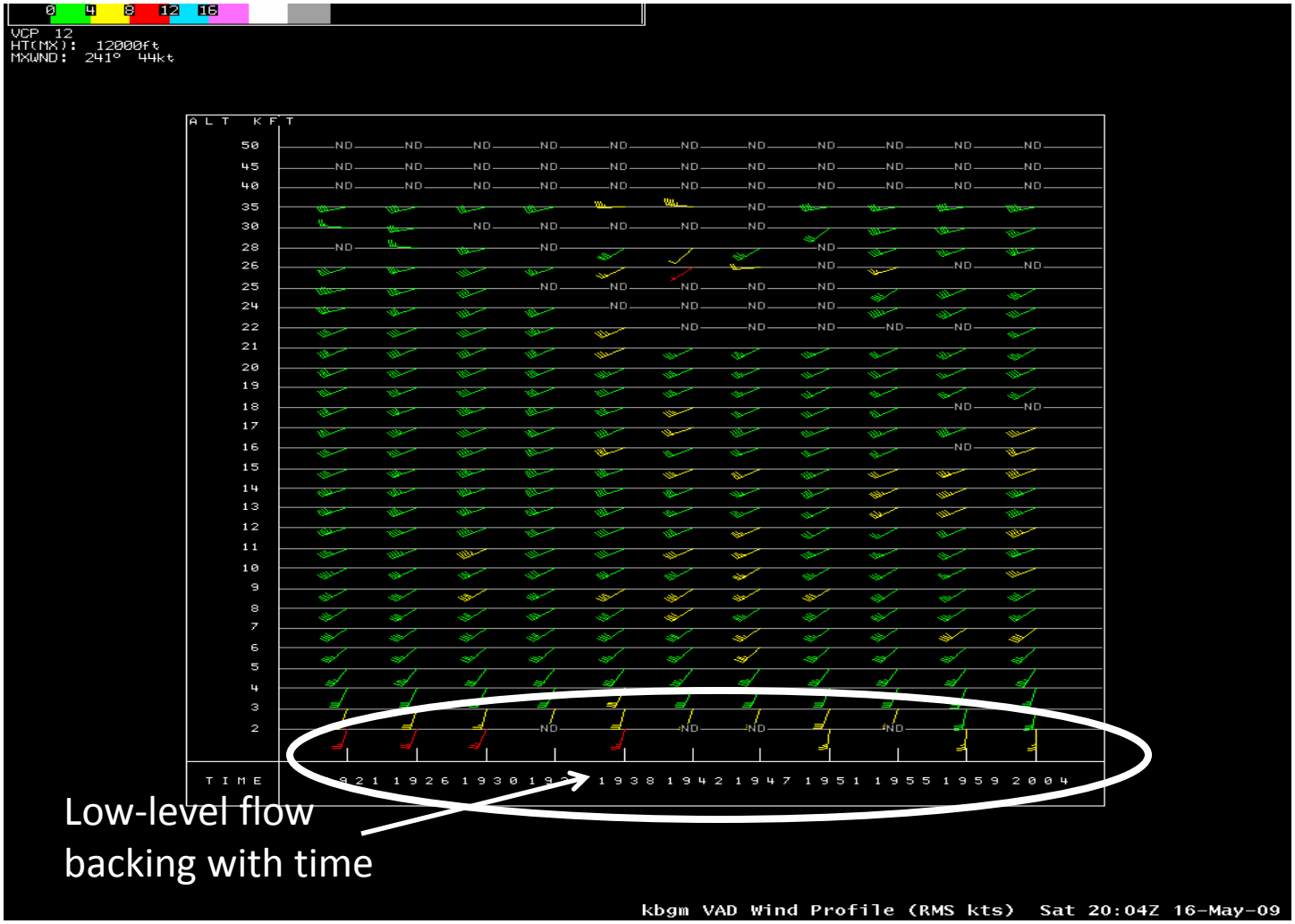


Boundary Assistance (Continued)

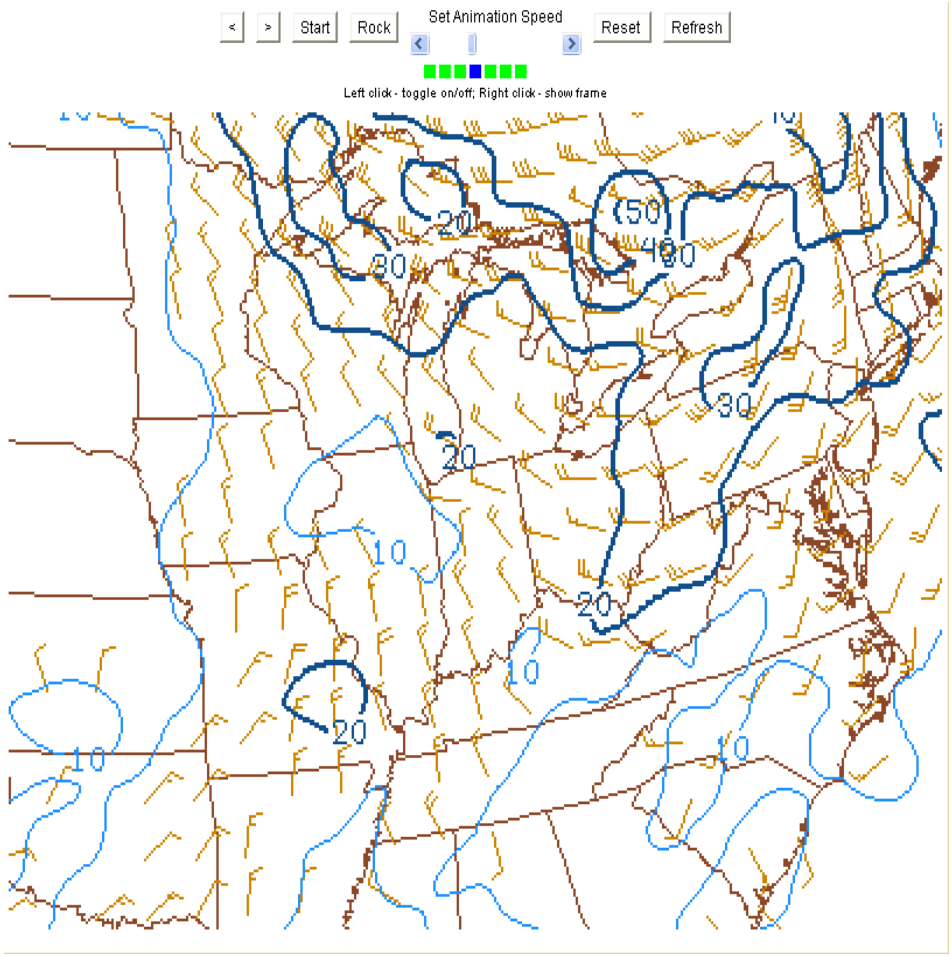
- As this trough sharpened up, the low-level flow backed, with helicity and convergence enhanced over time

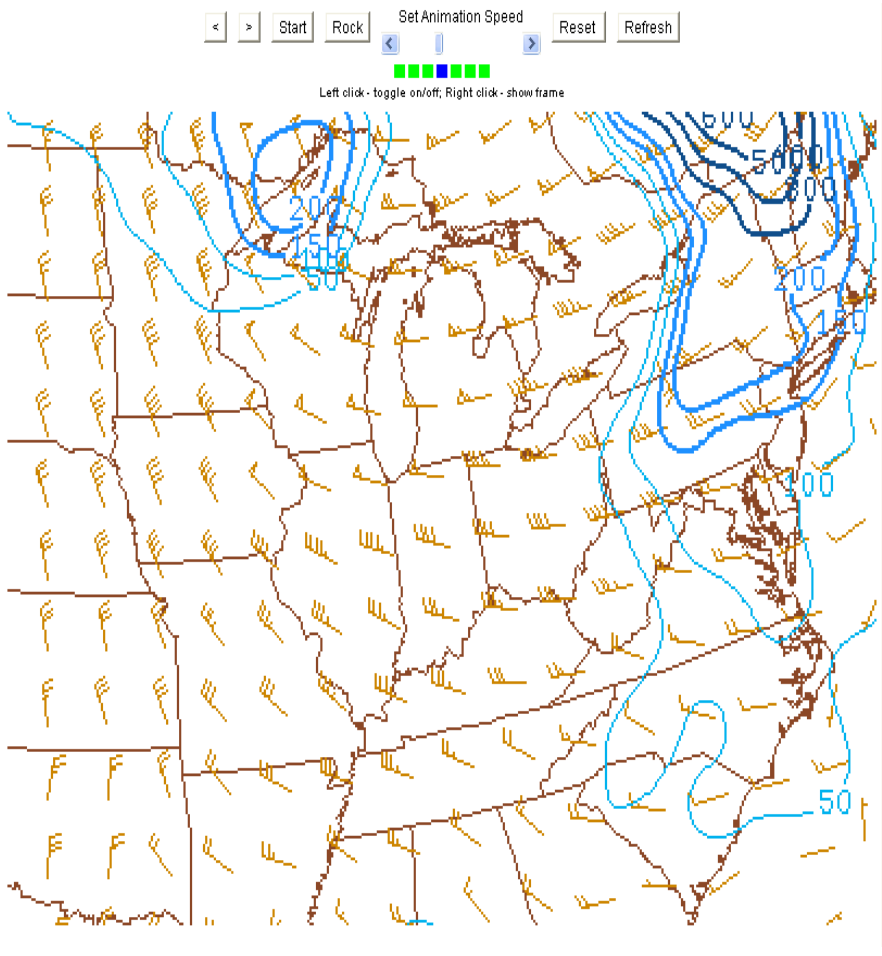


KBGM VAD Wind Profile



0 to 1 km Shear and Helicity

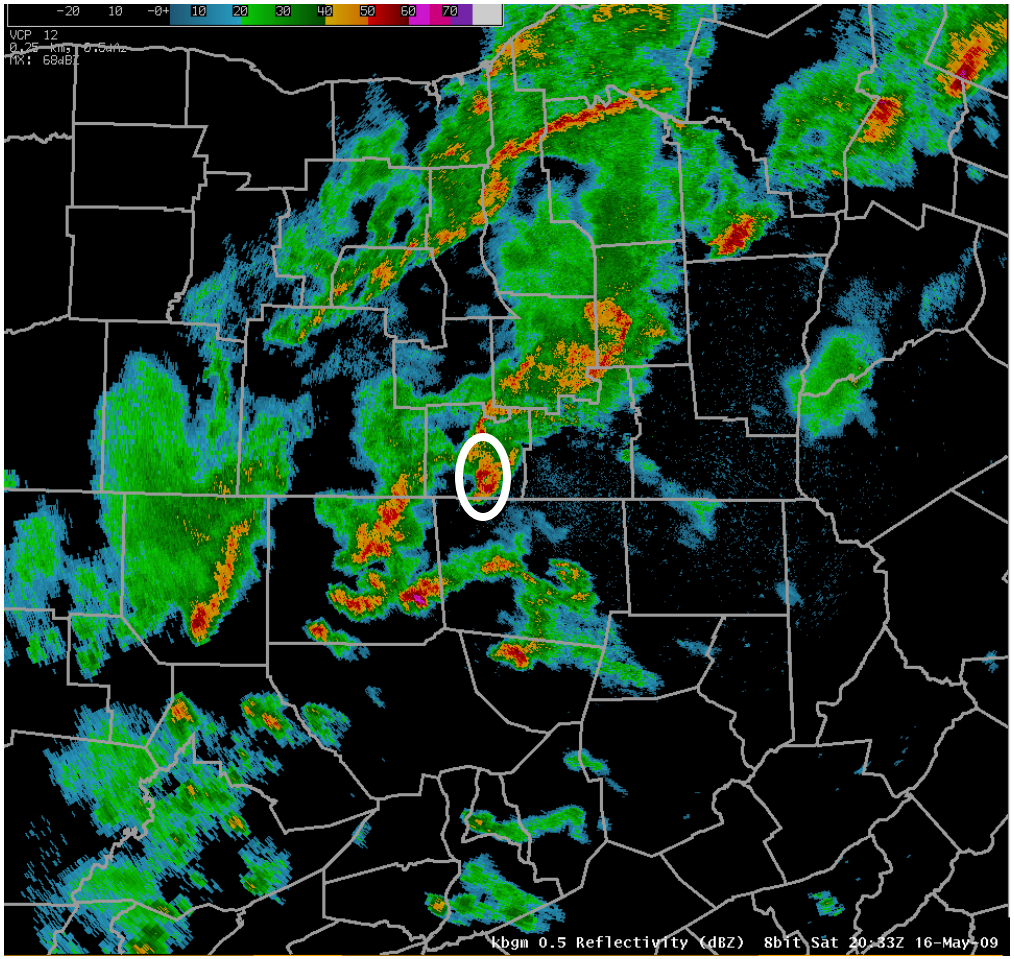




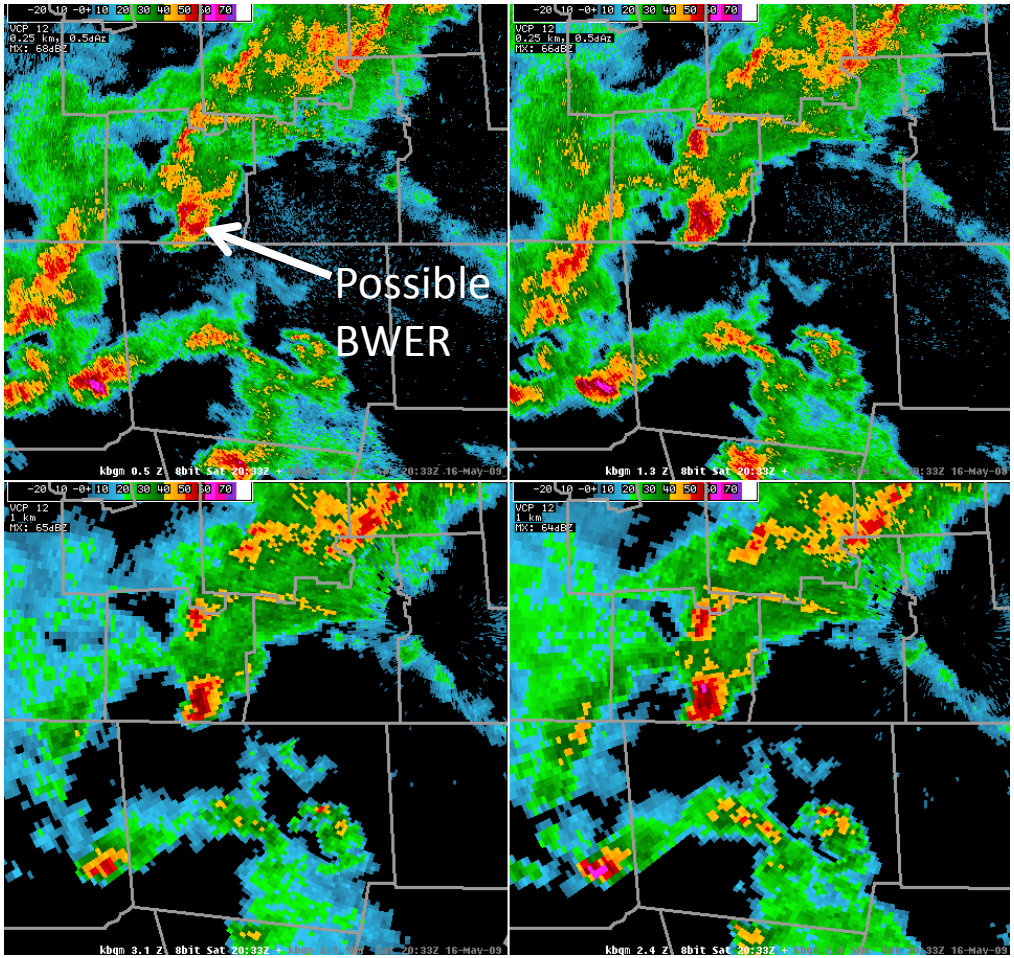
Storm-scale

Chemung / Tioga Supercell

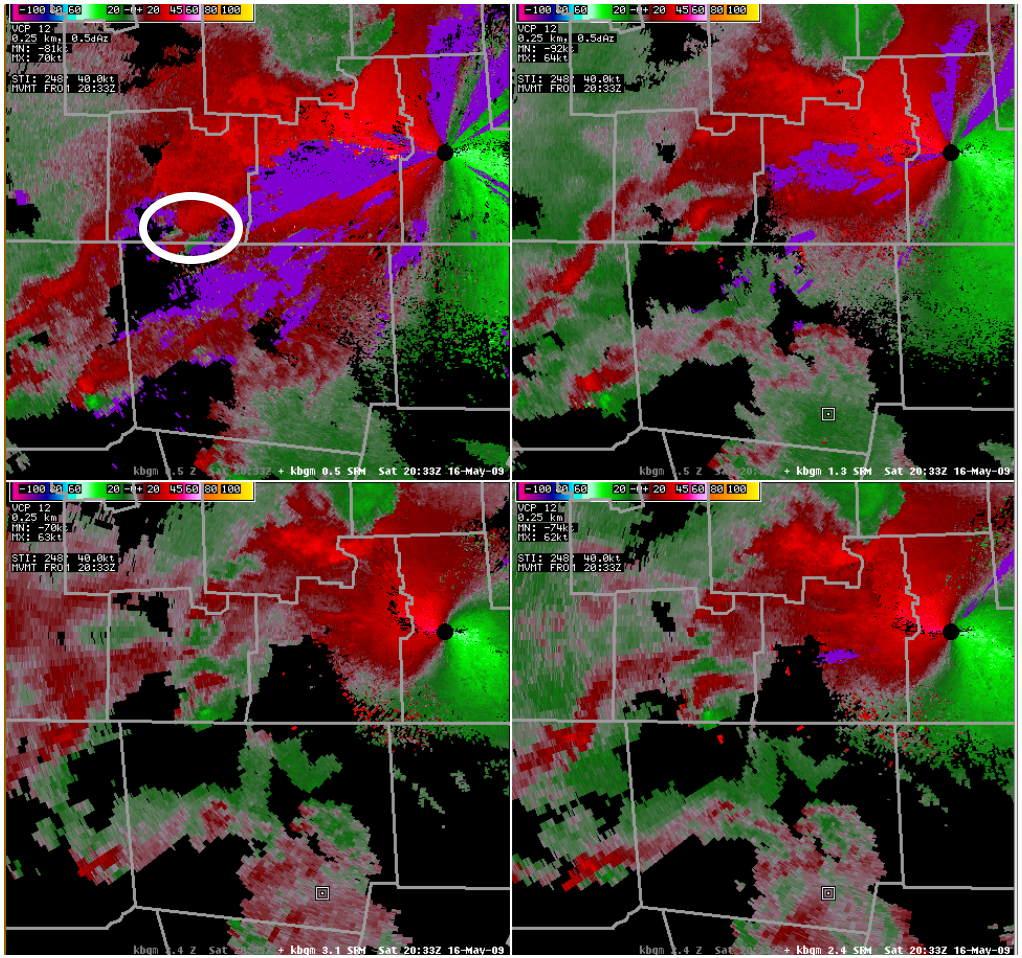
KBGM 0.5 Reflectivity, Just before SVR was Issued (2033 UTC)



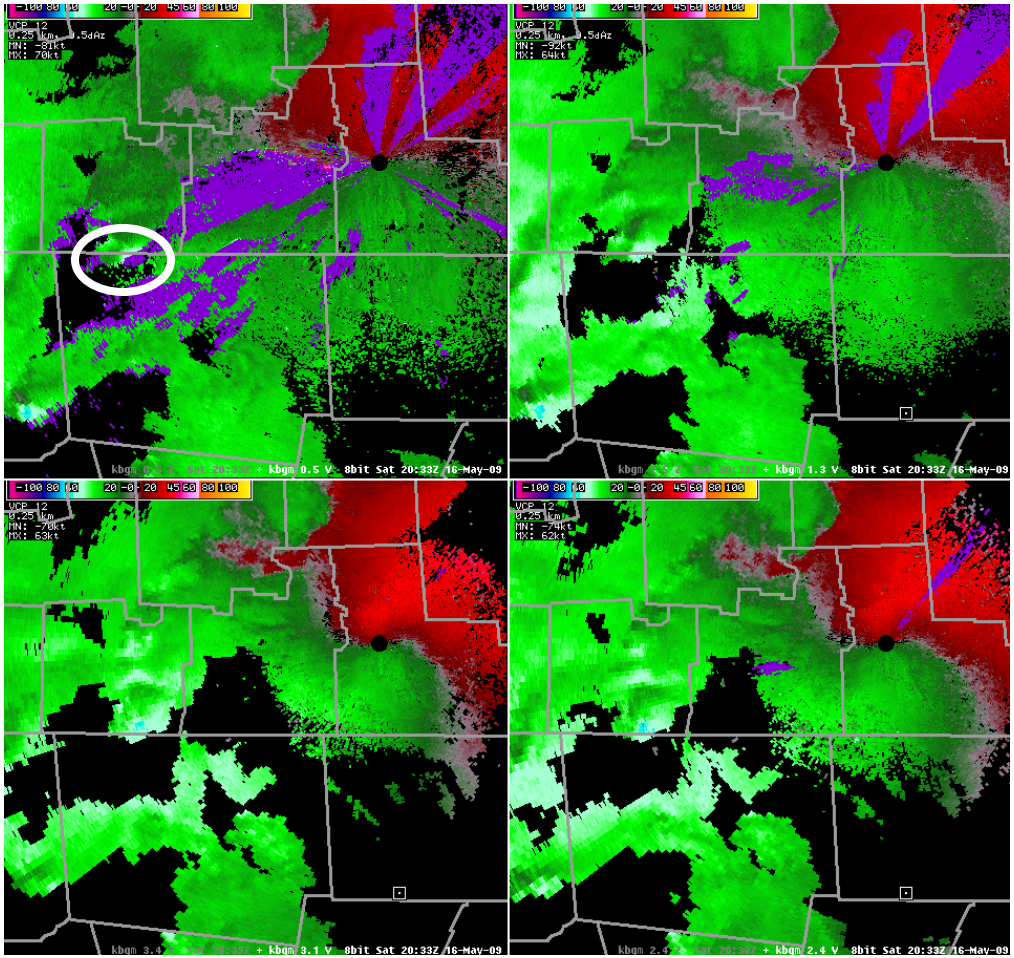
4-Panel Reflectivity at 2033 UTC



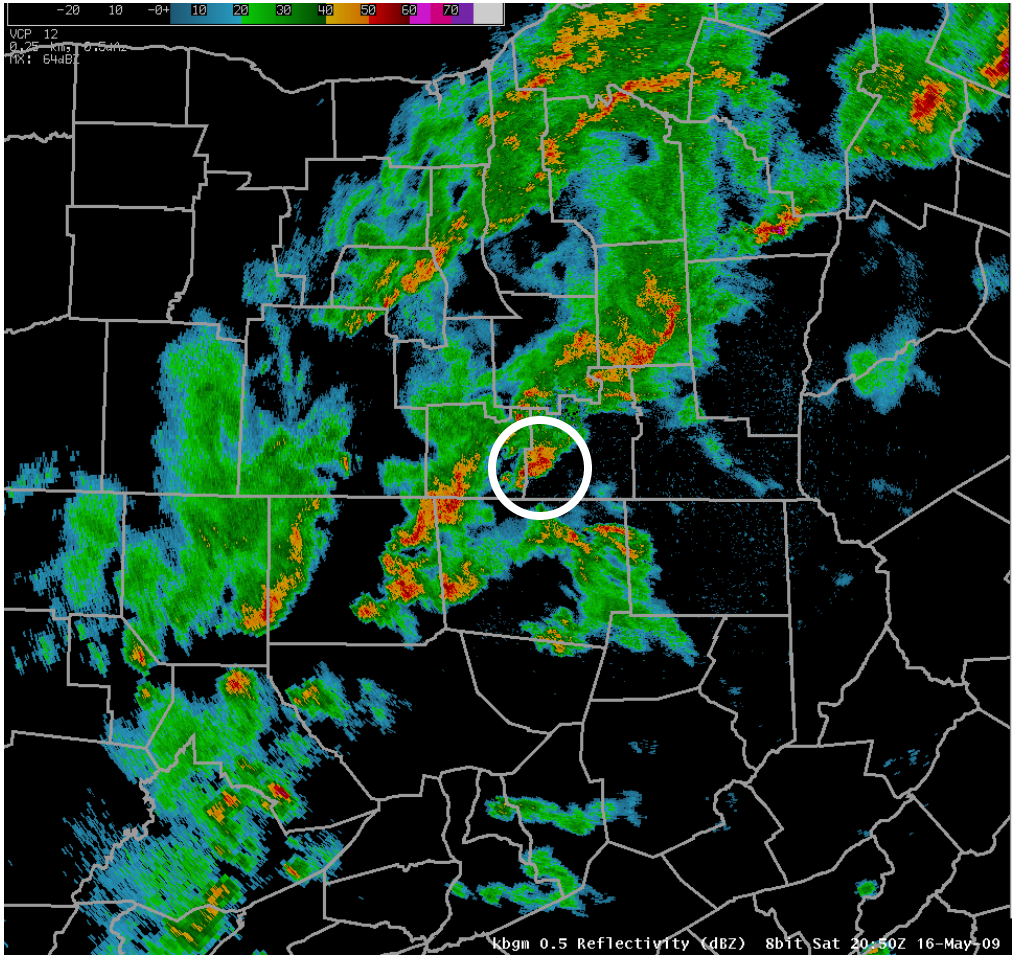
4-Panel SRM at 2033 UTC



4-Panel Velocity at 2033 UTC

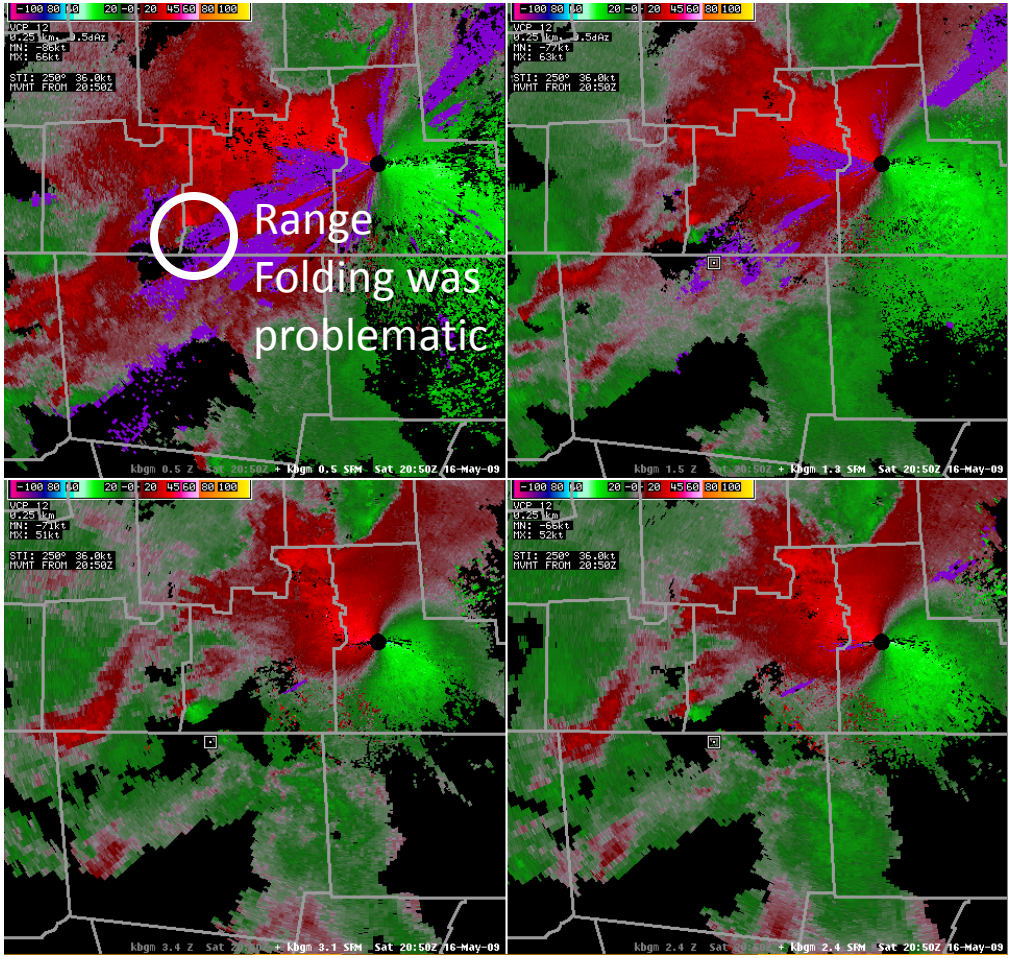


KBGM 0.5 Reflectivity, Just before TOR was Issued (2050 UTC)

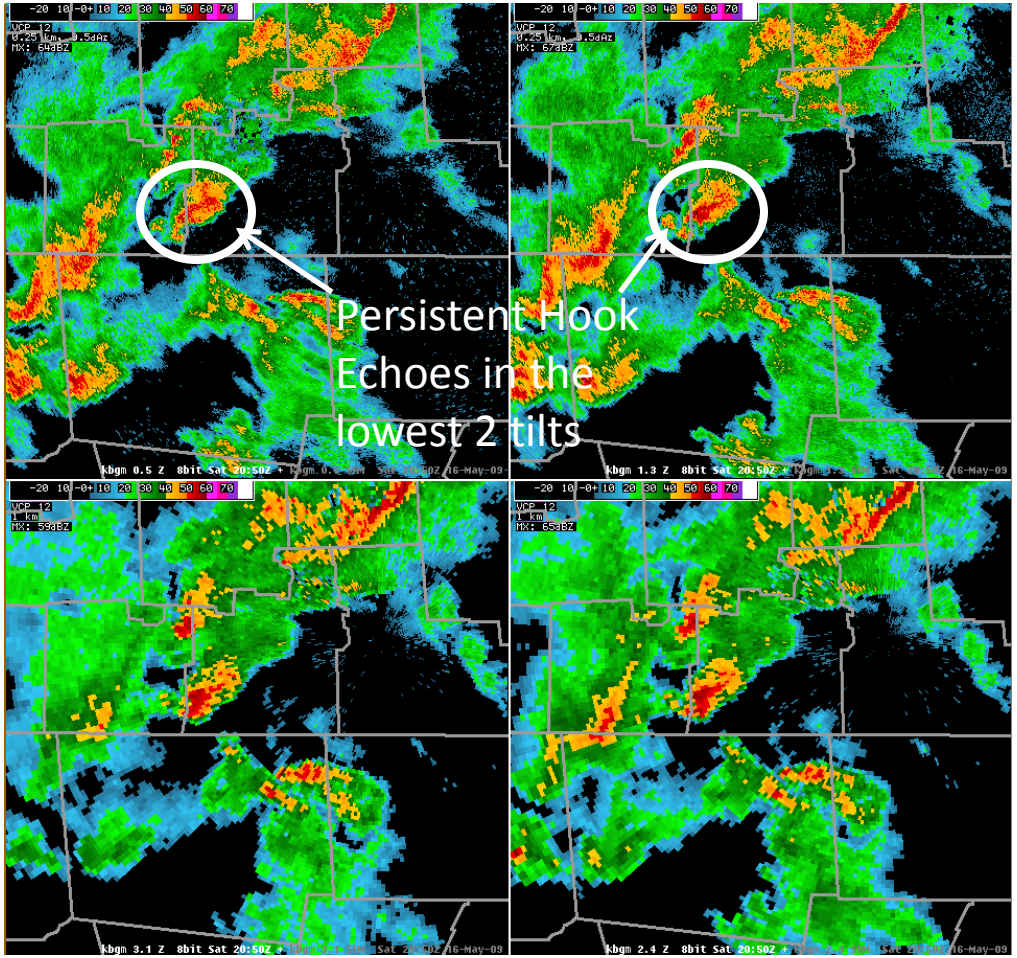


4-Panel SRM at 2050 UTC

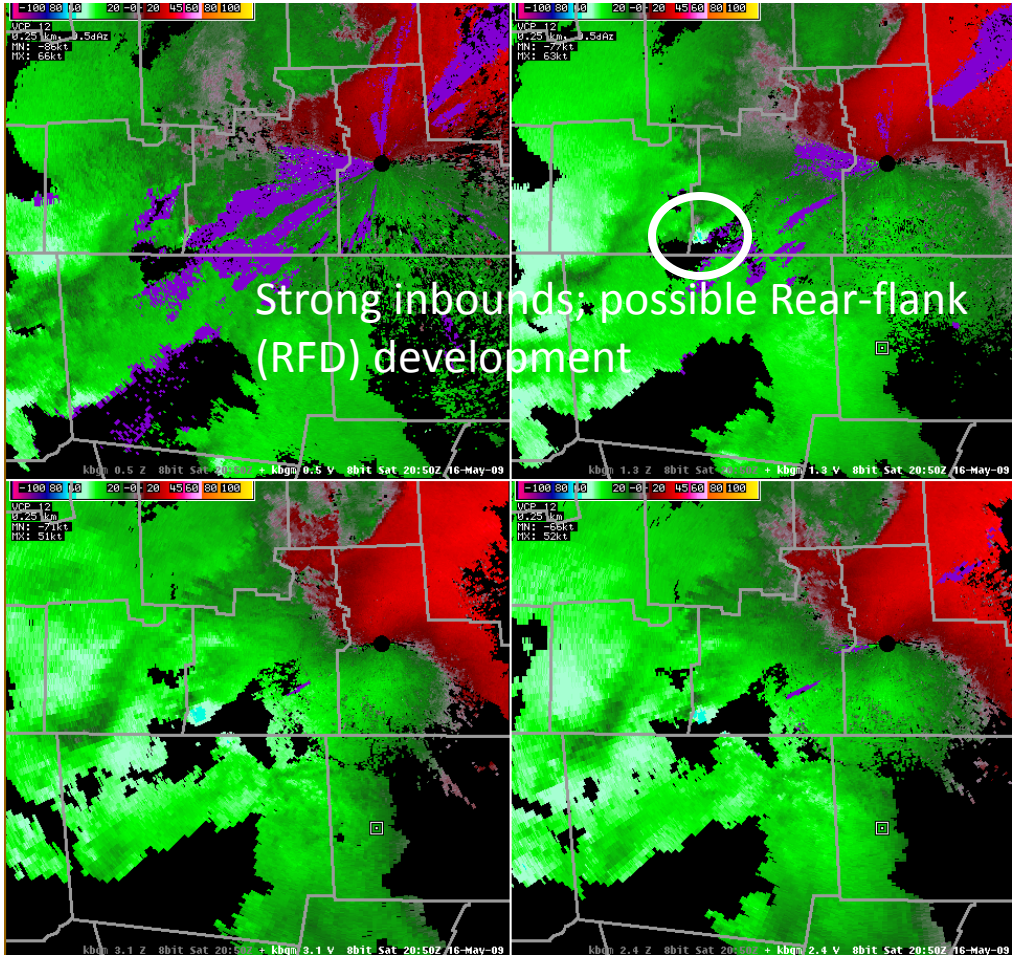
* On the border of a Minimal and Moderate Mesocyclone; VR shear of 31 kt, at a range of 26 nm
* Stronger rotation at 3.4 degrees, but at an altitude of almost 10,000 feet AGL



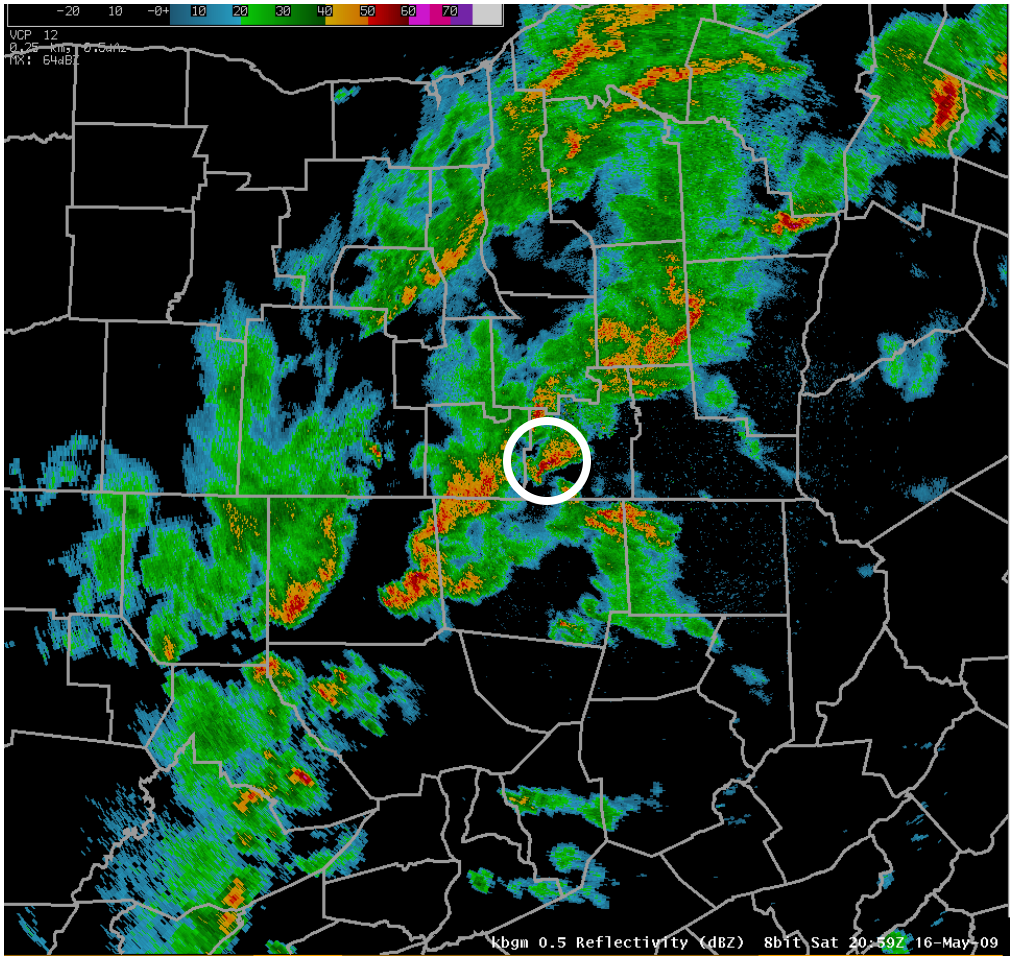
4-Panel Reflectivity at 2050 UTC



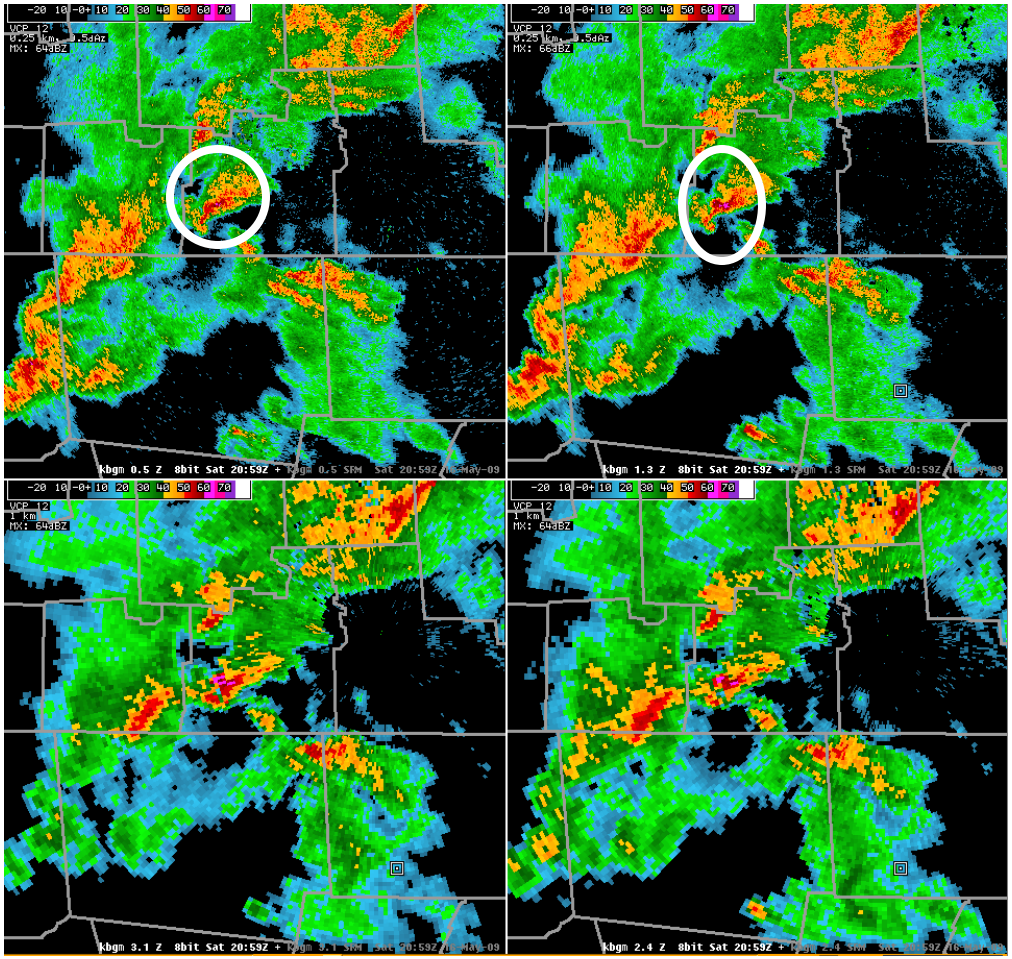
4-Panel Velocity at 2050 UTC



KBGM 0.5 Reflectivity, Near time of Tornado touchdown (2059 UTC)

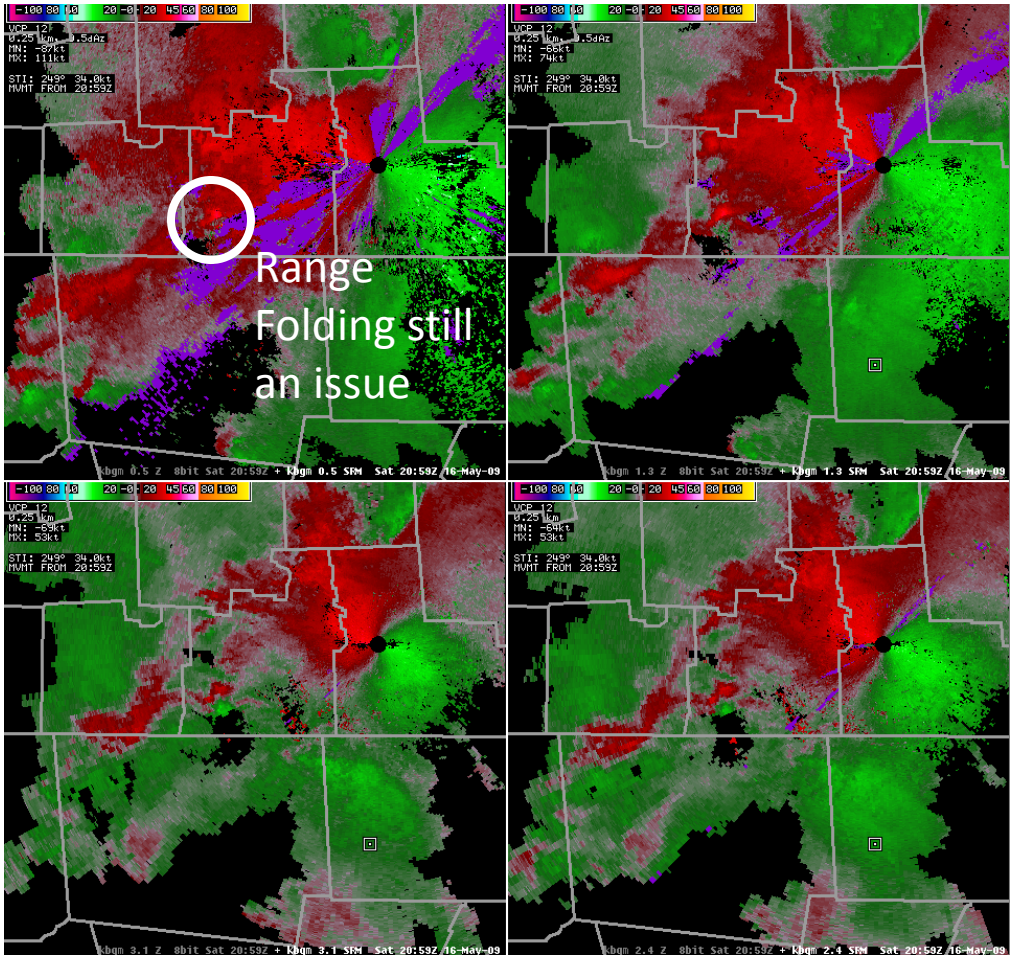


4-Panel Reflectivity at 2059 UTC



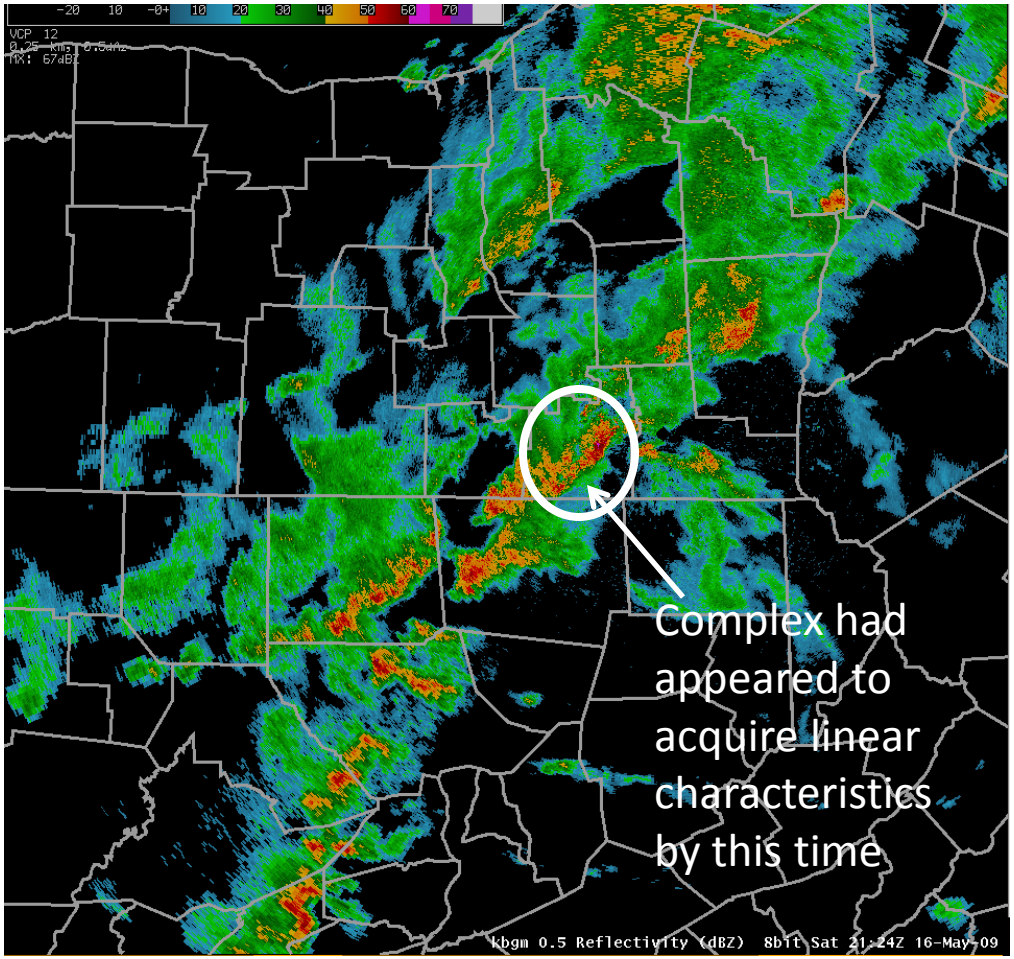
4-Panel SRM at 2059 UTC

* Still on the border of a Minimal and Moderate Mesocyclone; VR shear of 33 kt, at a range of 22 nm

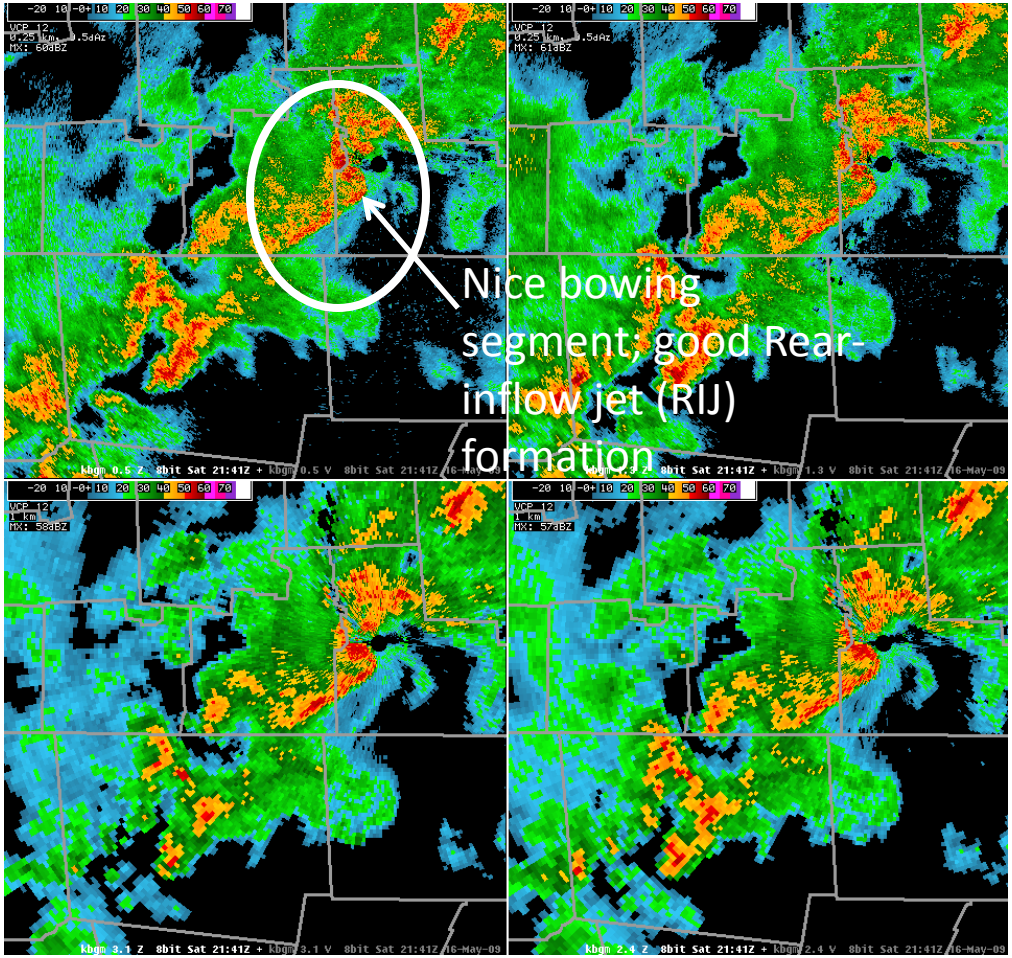


Chemung/Tioga Damage Photos

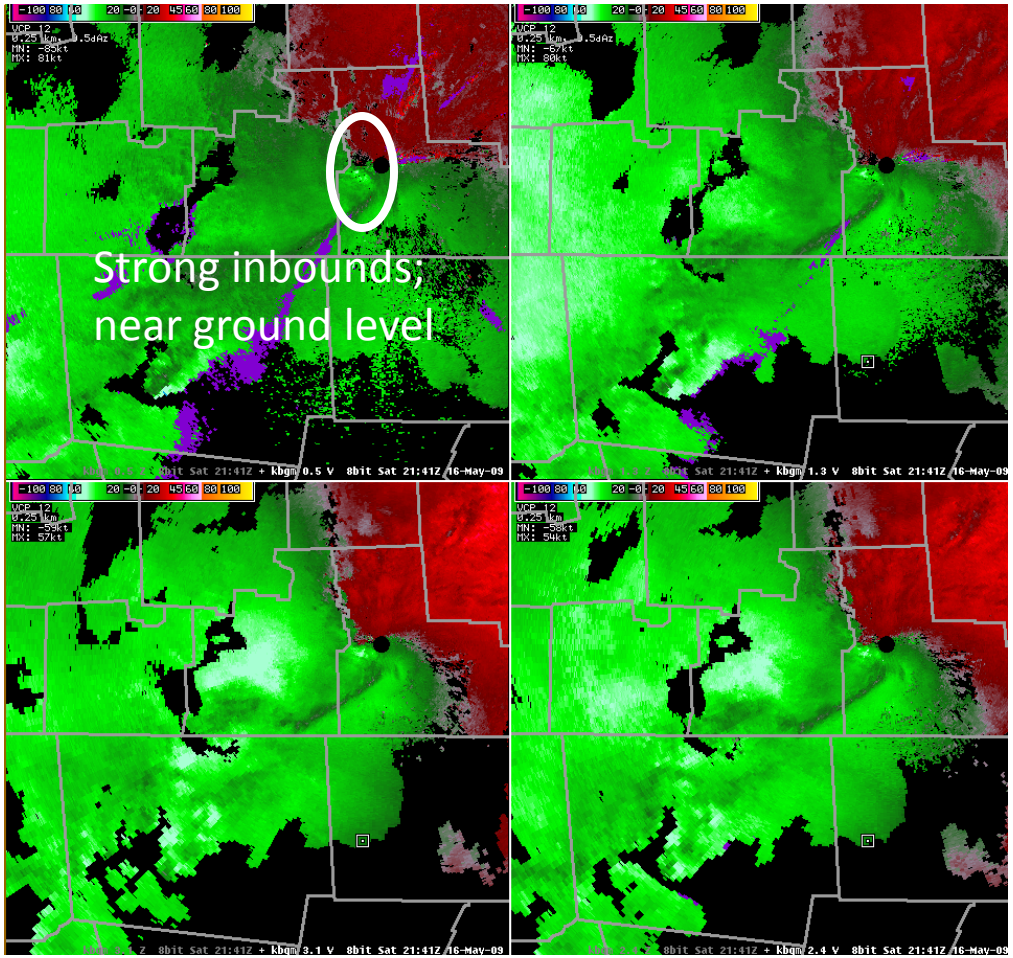
KBGM 0.5 Reflectivity, Just before next SVR was issued (2124 UTC)



KBGM 0.5 Reflectivity, Near time of reported wind damage (2141 UTC)

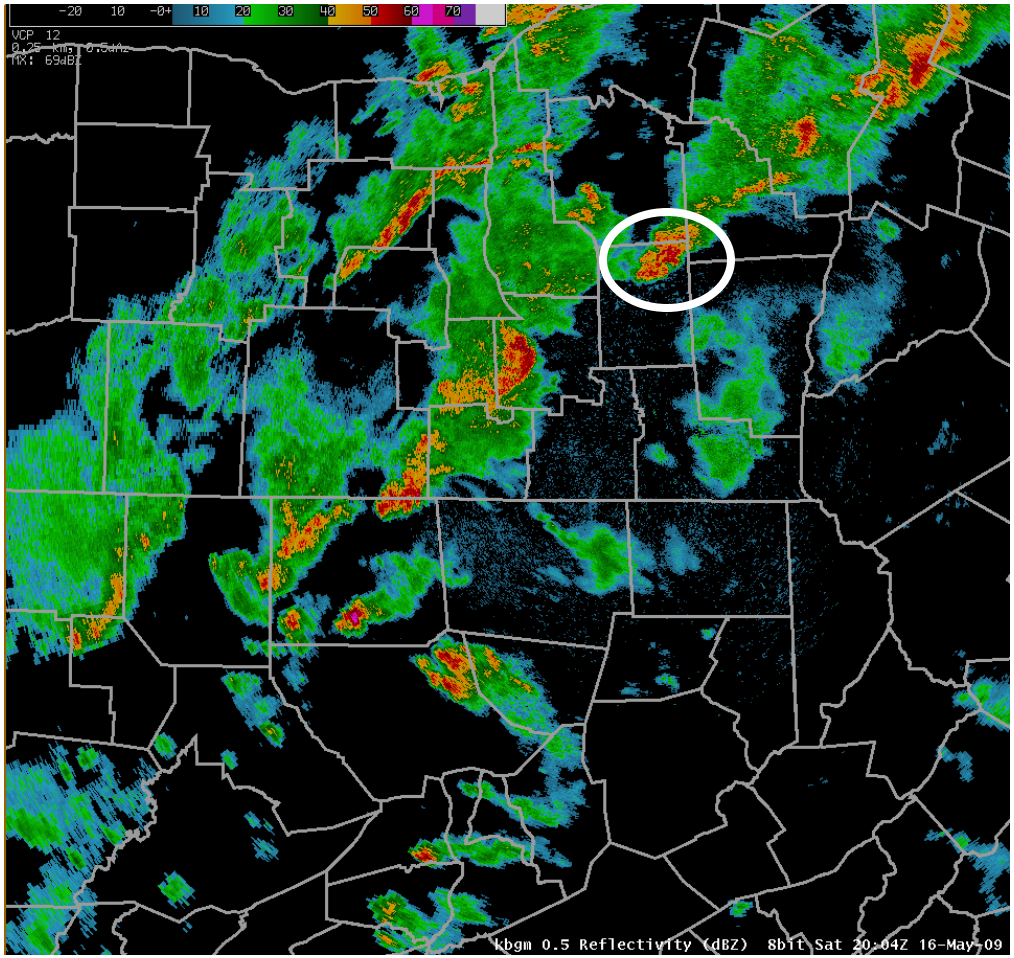


4-Panel Velocity at 2141 UTC

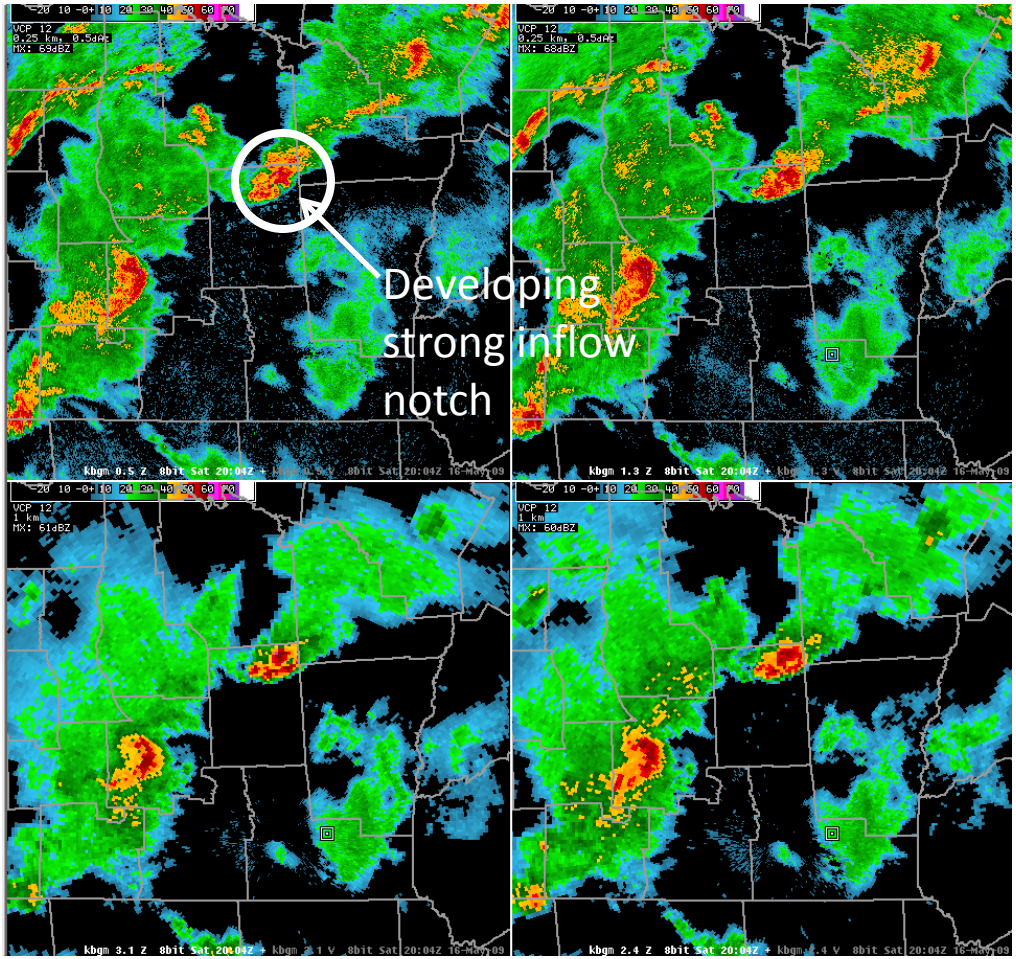


Cortland / Madison County Supercell

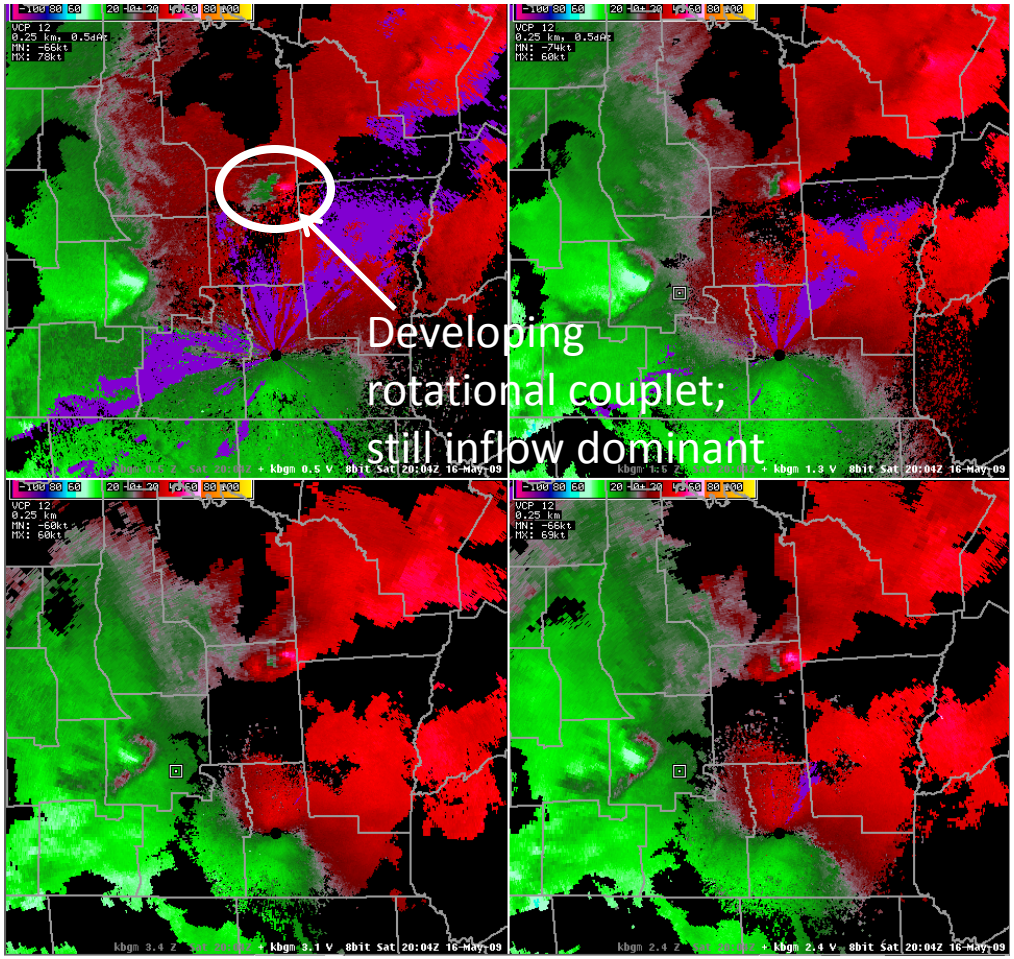
KBGM 0.5 Reflectivity, Just before a SVR was Issued (2004 UTC)



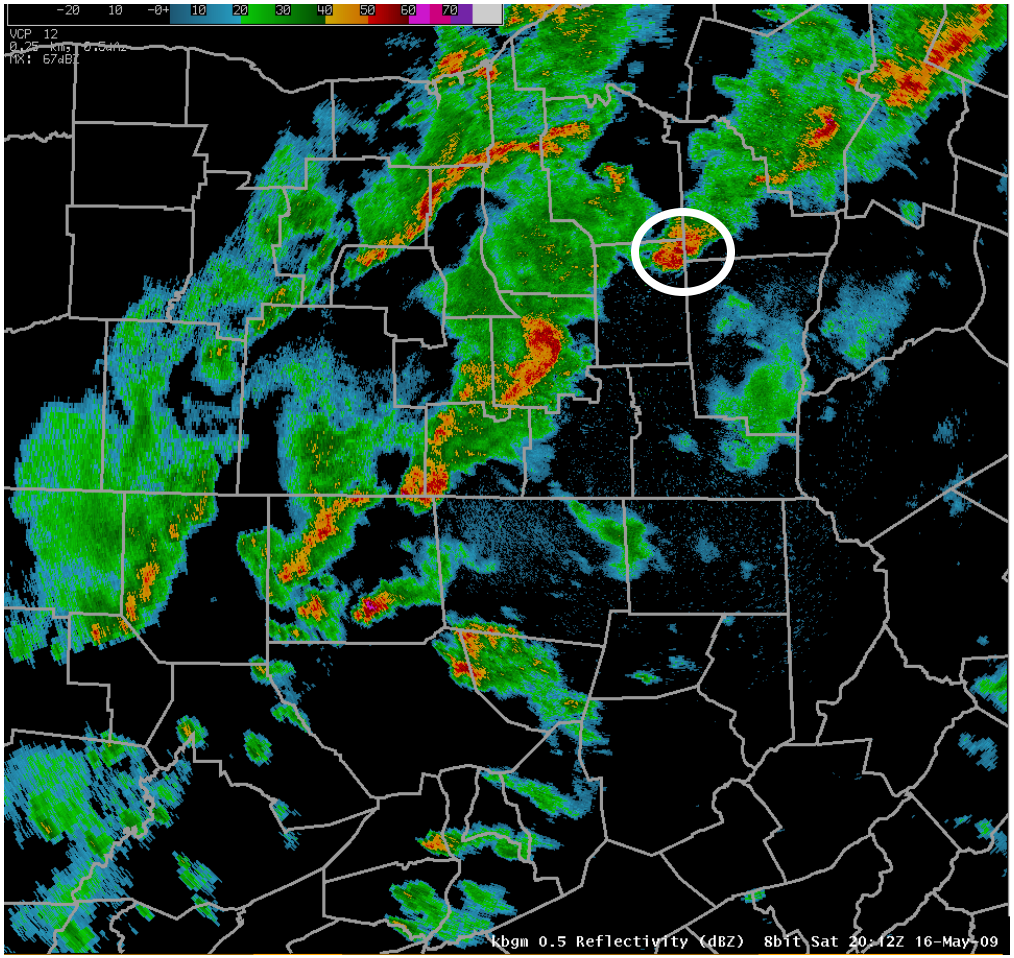
4-Panel Reflectivity at 2004 UTC



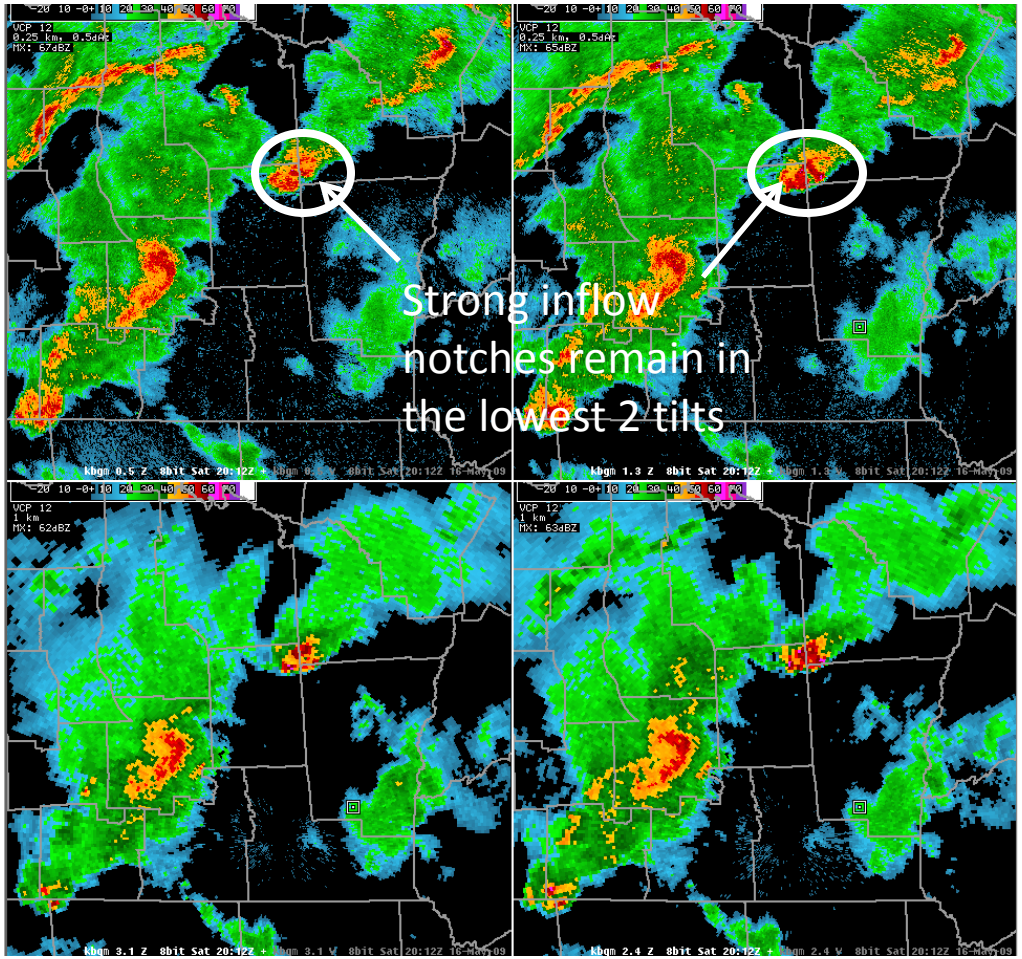
4-Panel Velocity at 2004 UTC



KBGM 0.5 Reflectivity, Just before TOR was Issued (2012 UTC)

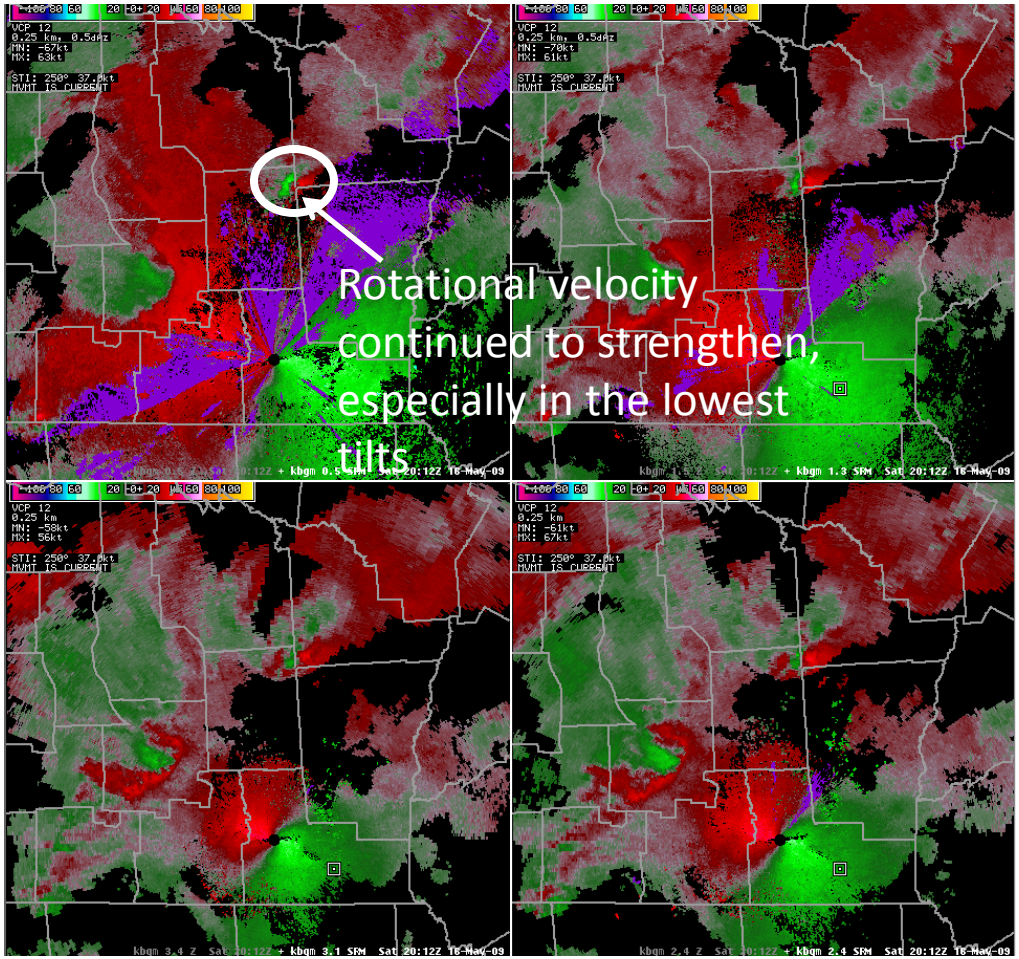


4-Panel Reflectivity at 2012 UTC



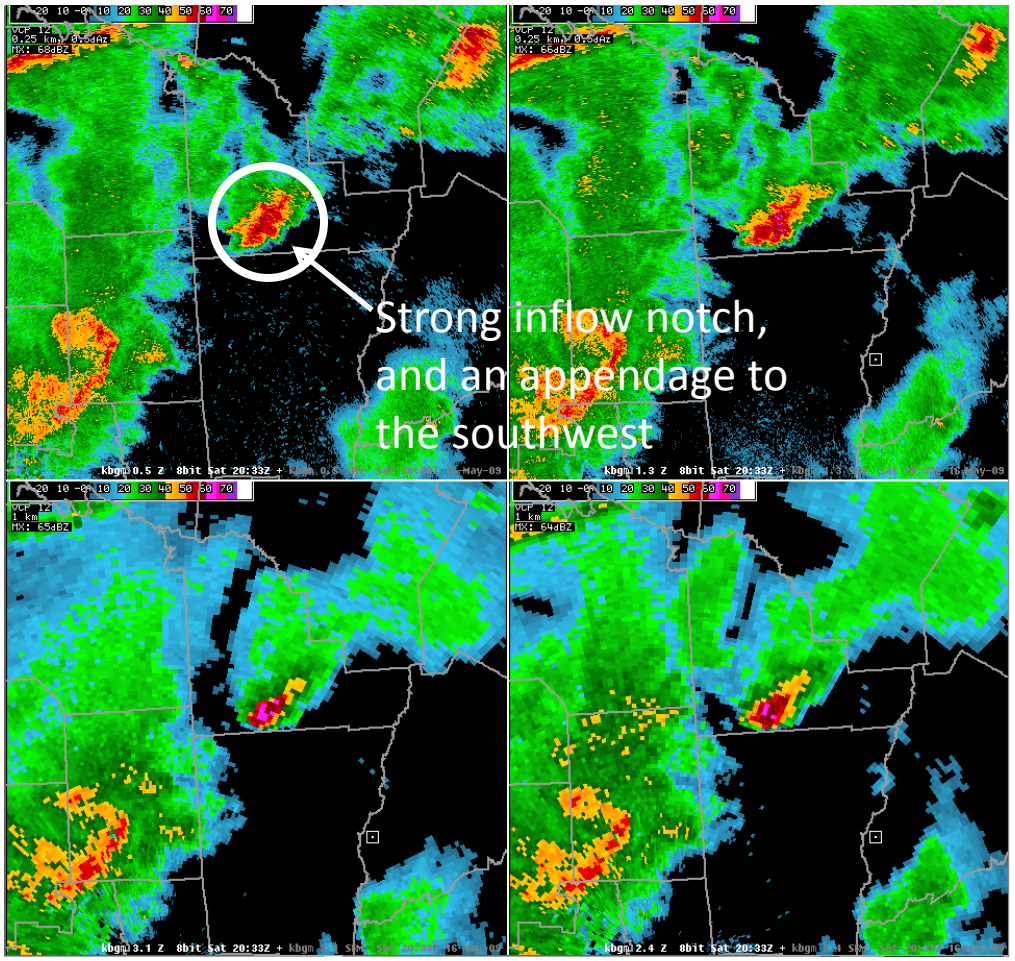
4-Panel SRM at 2012 UTC

* Rotational velocity value of 34 kt observed at 0.5 degrees, with a diameter of 1.7 nm, and a range of 31 nm
* This value is on the border of a Minimal and Moderate Mesocyclone



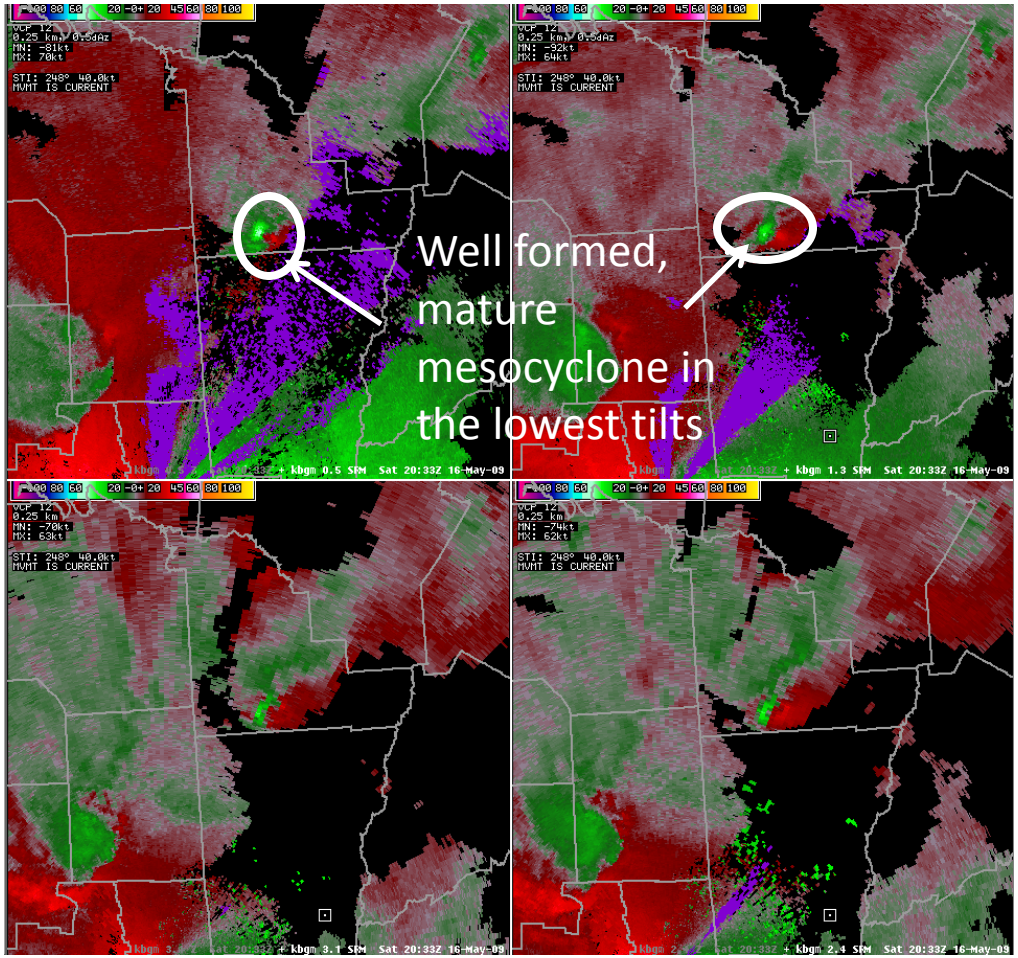
* This was before a brief EF0 touchdown, near the border of Cortland and Madison counties

KBGM Reflectivity, Near the time of an EF2 touchdown in Georgetown, NY (2033 UTC)



4-Panel SRM at 2033 UTC

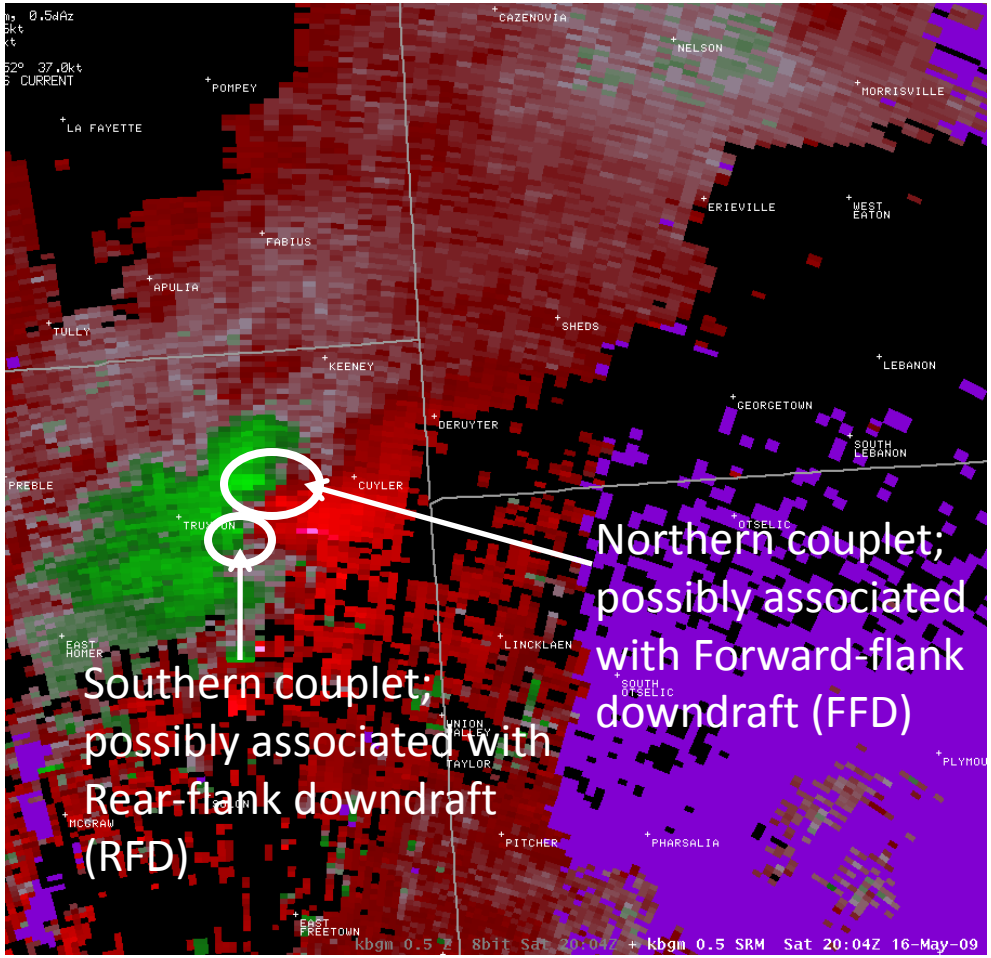
* Rotational velocity of 43 kt observed at 0.5 degrees, at a diameter of 2.5 nm, with a range of 37 nm
* This was on the border of a Moderate and Strong Mesocyclone



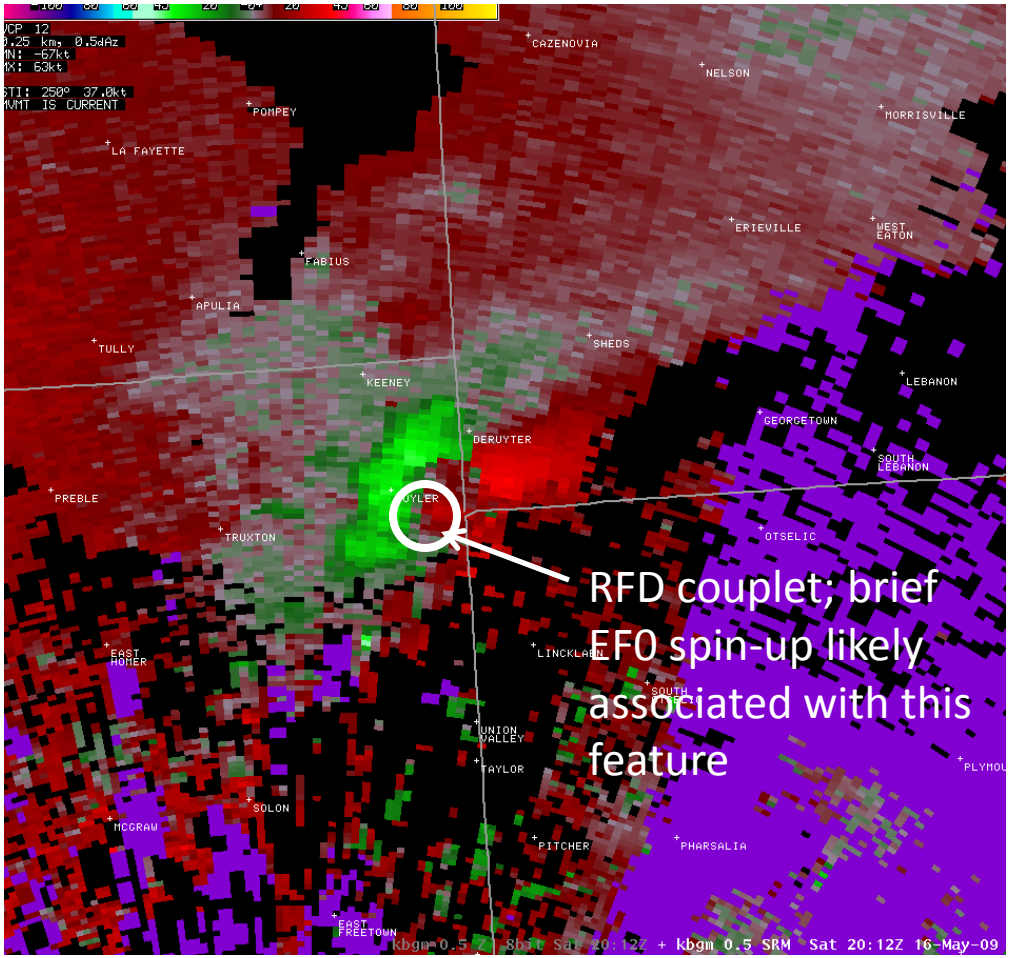
EF2 Damage Photos

A Closer Inspection of the Storm-Relative Motion Data

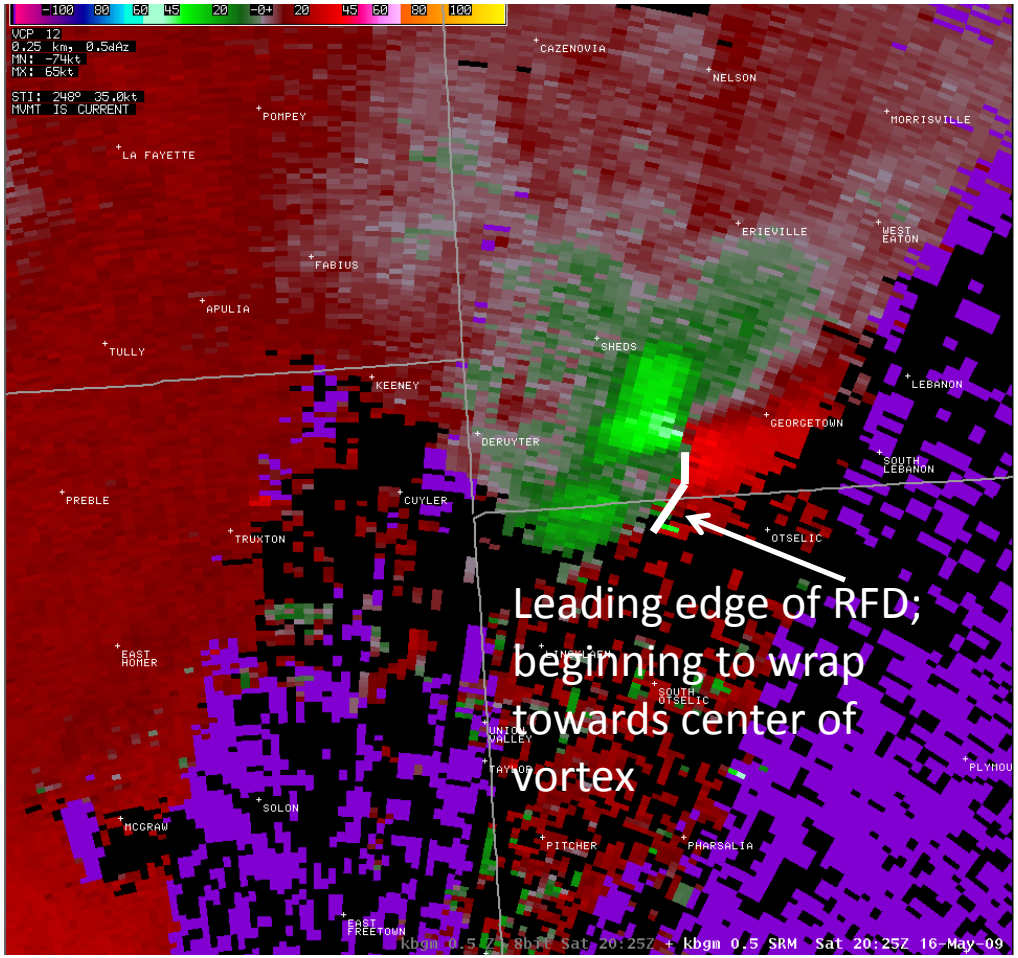
KBGM 0.5 SRM at 2004 UTC



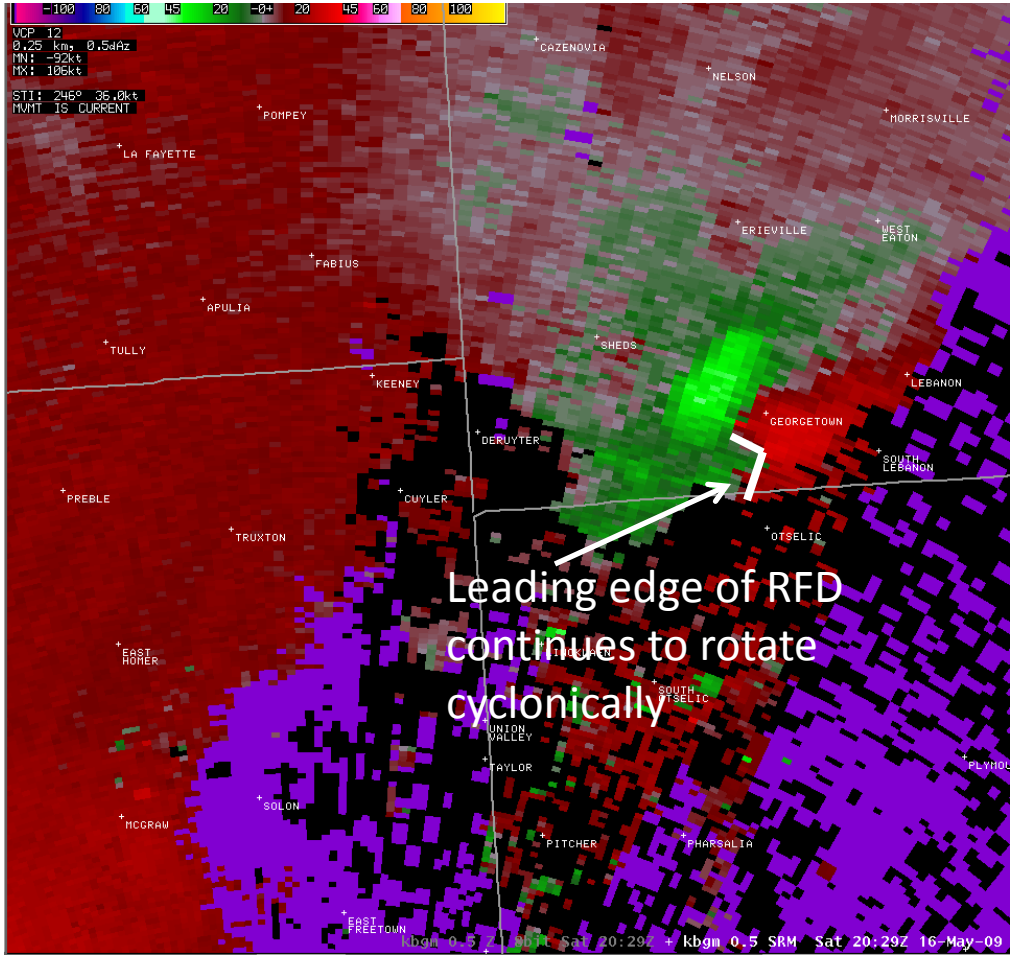
KBGM 0.5 SRM at 2016 UTC



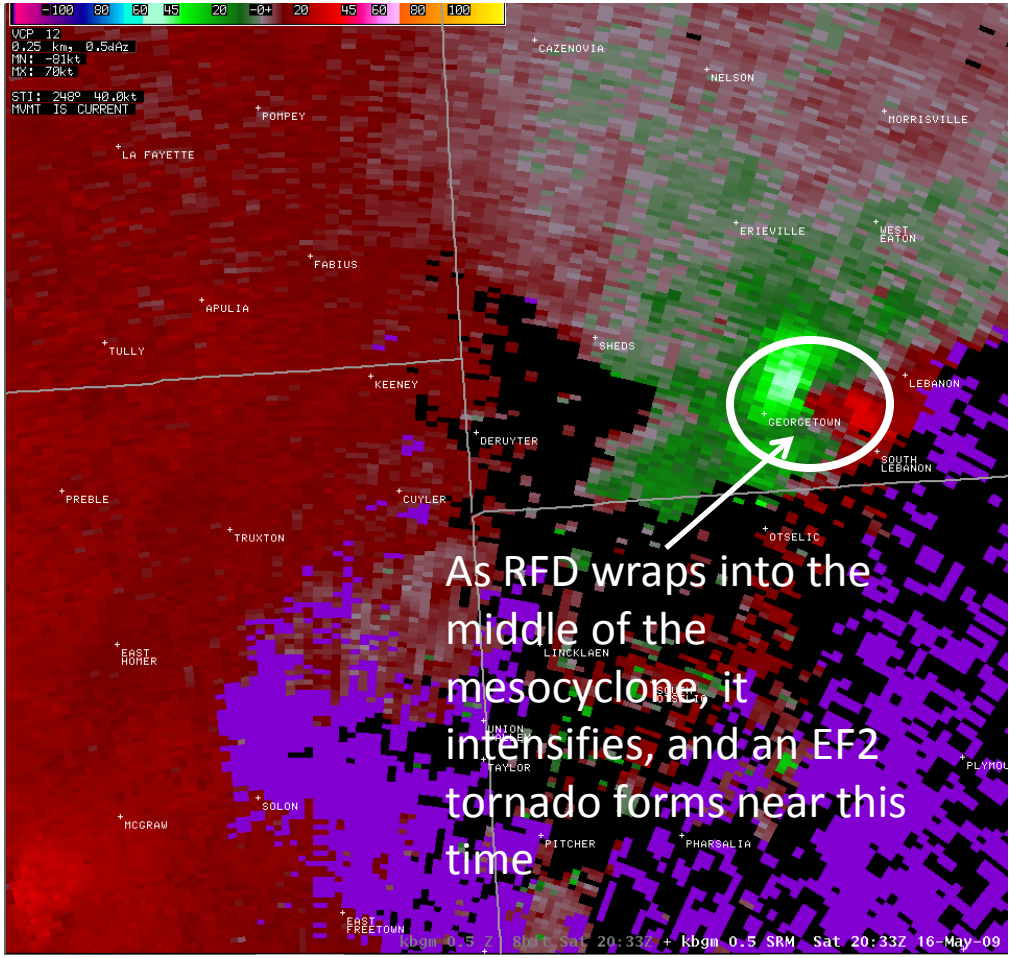
KBGM 0.5 SRM at 2025 UTC



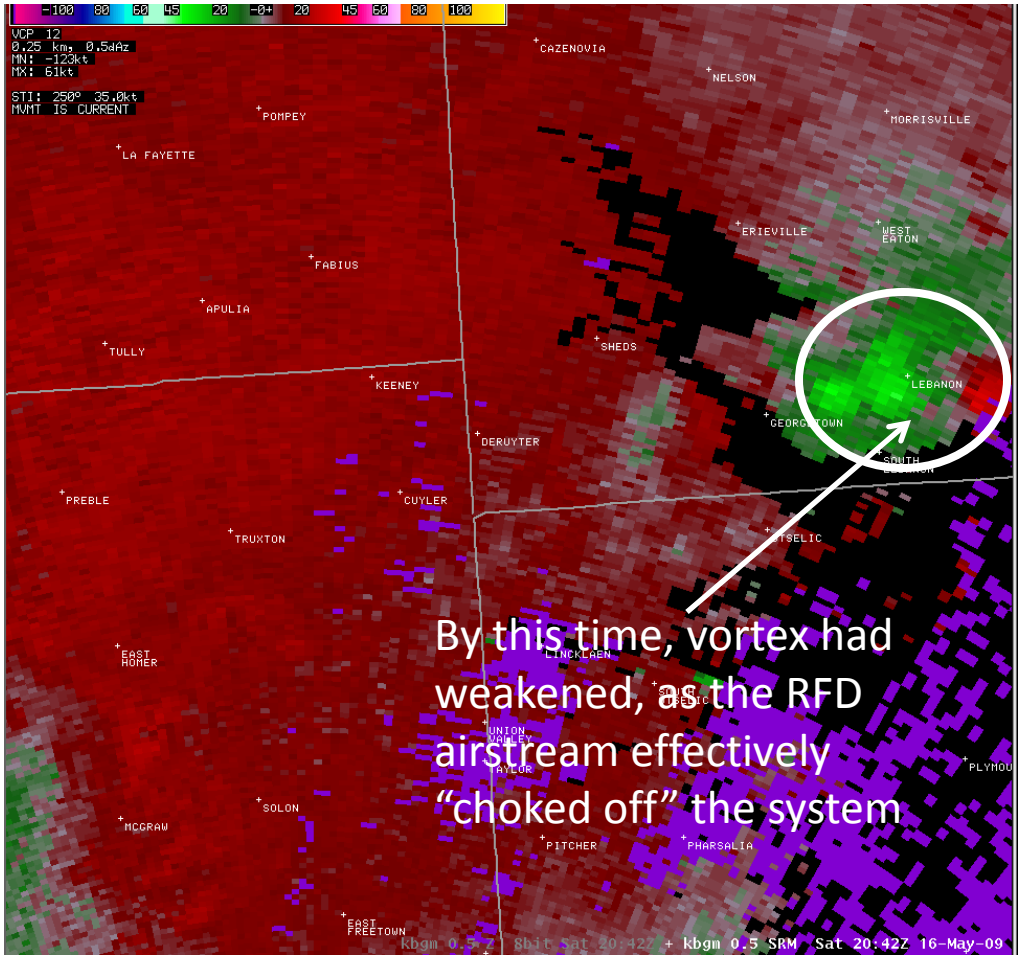
KBGM 0.5 SRM at 2029 UTC



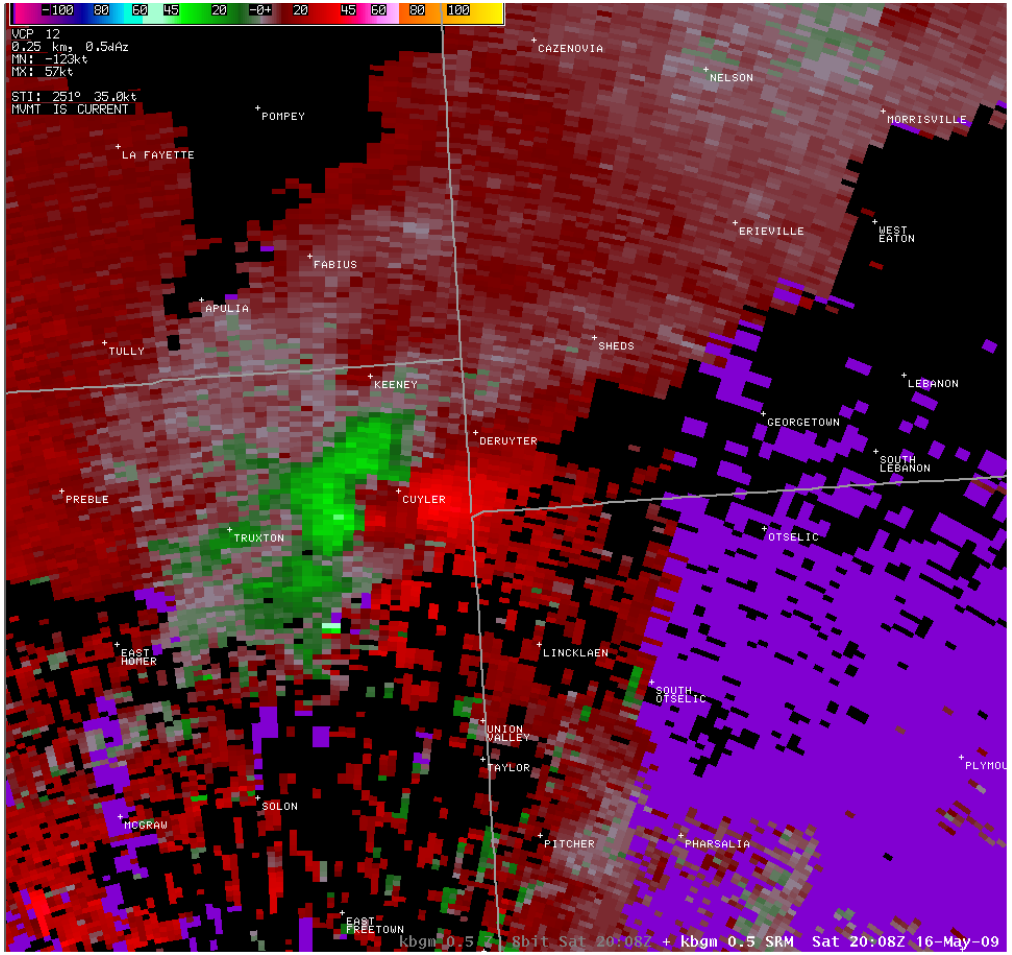
KBGM 0.5 SRM at 2033 UTC



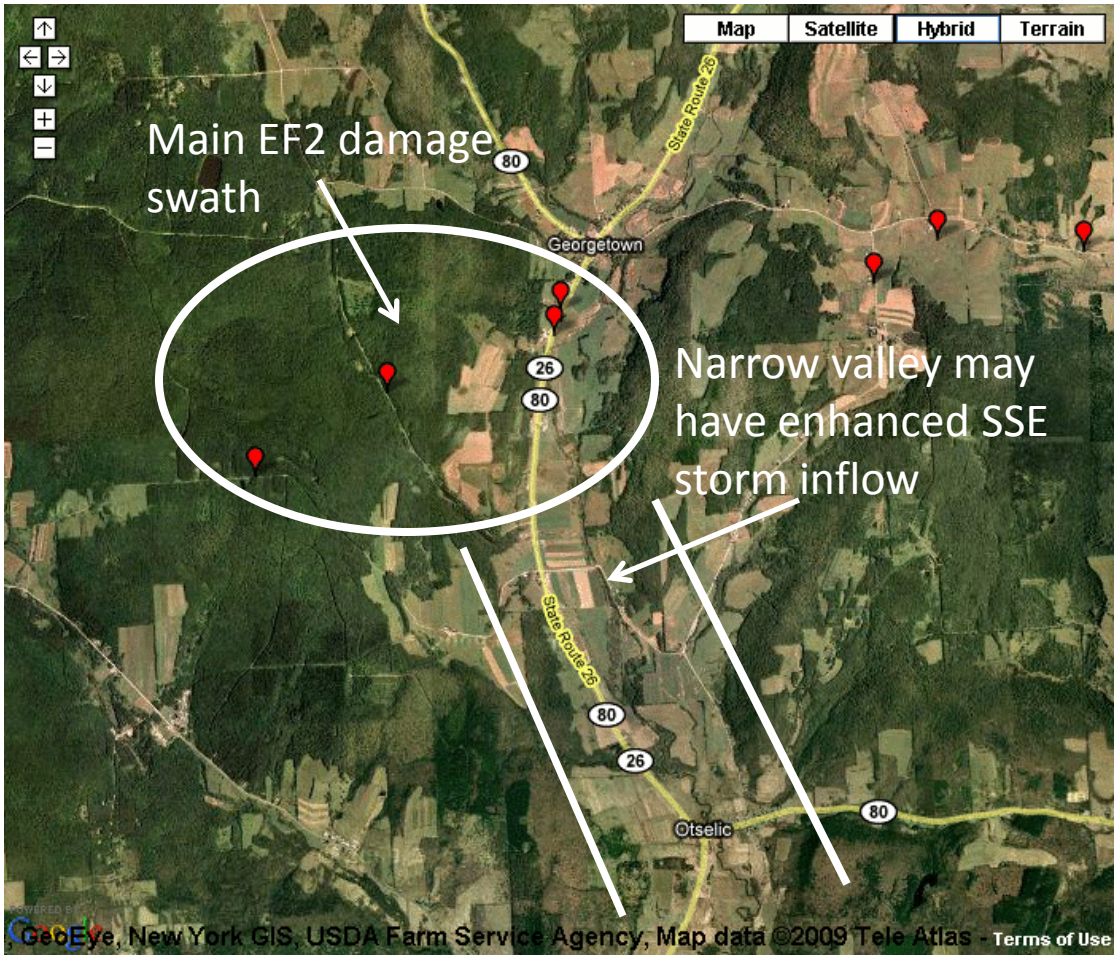
KBGM SRM at 2042 UTC



Zoomed-In KBGM SRM Loop



EF2 Damage Path



Summary

- Two long-lived, tornadic supercells developed on this day
  - One near the NY/PA border, and one across northern Cortland/southern Madison counties
- Chemung/Tioga
  - Proximity of pre-frontal trough likely helped focus convergence and also increased low-level shear
- Cortland/Madison cell
  - Storm scale occlusion processes (RFD wrapping into the main vortex) may have helped spawn EF2 tornado

Summary (continued)

- Lesson learned: switching to VCP212 sooner probably would have mitigated range folding issues with the Chemung/Tioga storm