

Examination of northwest Alabama tornado event of May 17, 2003

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Overview

- Two F1 tornadoes developed at approximately 924 AM CDT over eastern Lauderdale and western Limestone counties
- Tornadoes formed near the apex of a well-developed bow echo racing eastward from the Shoals area

Overview

- Tornado #1 developed over extreme southeastern Lauderdale county and tracked 9 miles northeast across western Limestone county
- Tornado #2 developed over the Tennessee River and moved northeast across the Lucy's Branch area of southwest Limestone county

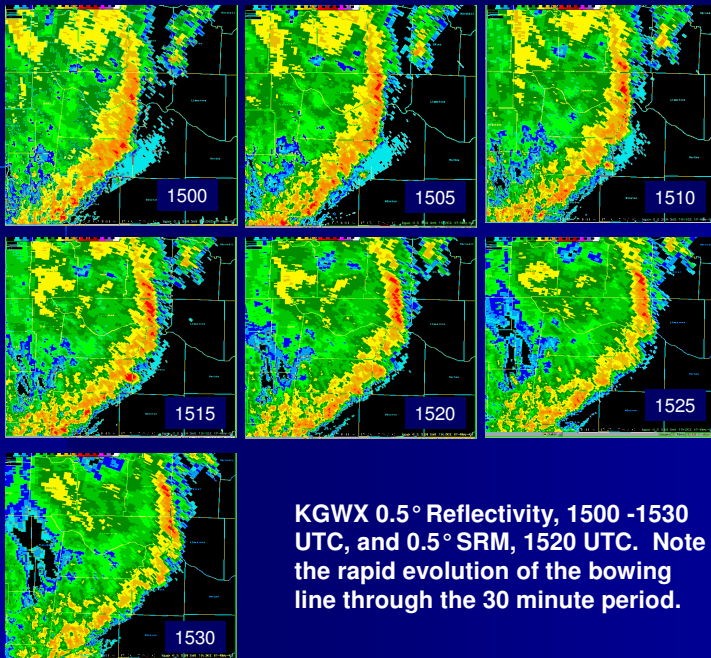
Overview

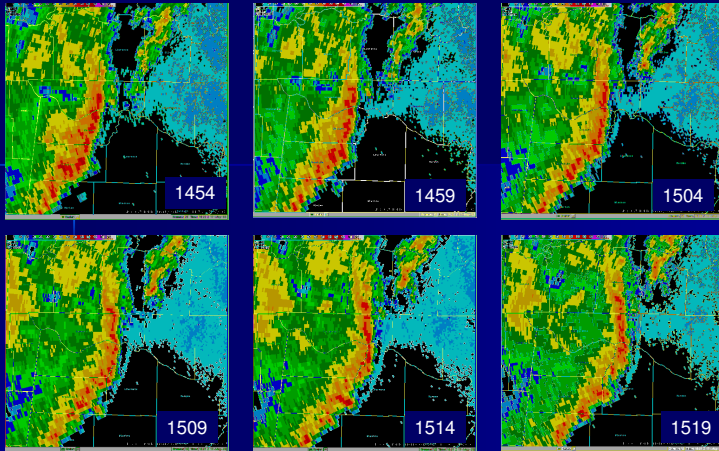
- A tornado watch was in effect
- An SVR was issued for Lauderdale 18 mins prior to touchdown
- An SVR was issued for Limestone 1 mins prior to touchdown
- A TOR was issued for Limestone several minutes following touchdown



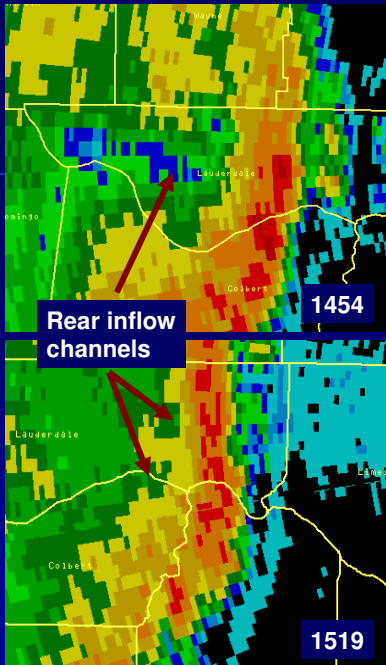


Additional damage photos from the Bay Hill Marina, associated with Tornado #2.





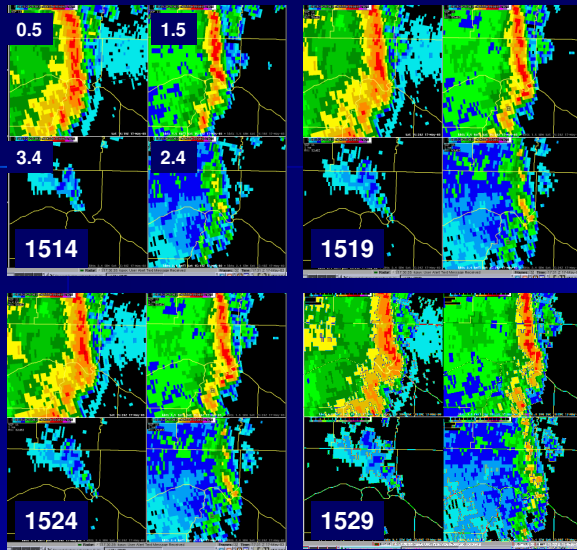
KHTX 0.5° Reflectivity, 1454 -1519 UTC. A similar perspective of the line, this time from KHTX. Note the subtle outflow boundary which first appears ahead of the line at 1454 UTC. This boundary maintains a stable position ahead of the primary convection, suggesting an ideal dynamic balance between shear and buoyancy. This is a clue to the strength of the evolving mesoscale convective system.



Let's take a closer look at the KHTX reflectivity products during the evolution of the bowing line.

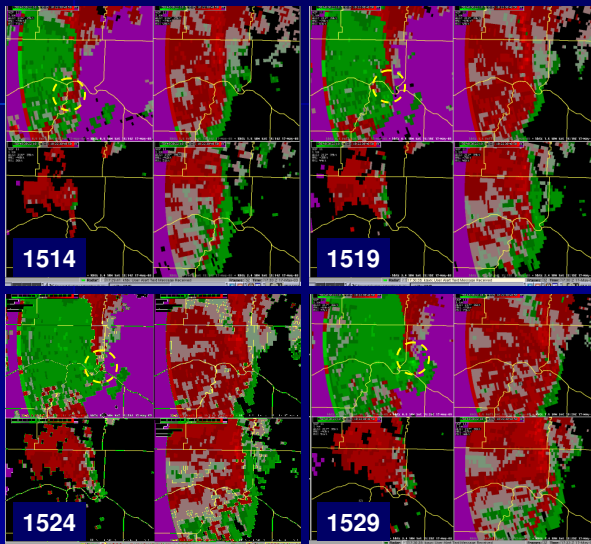
At both 1454 and 1519 UTC, and throughout the formative stages of the bow, we see weak reflectivity channels behind the line, which are indicative of rear inflow jets.

As we know, these signatures are often associated with intensifying bow echoes and resultant damaging winds.



Sequence of 4-panel KHTX reflectivity images from 1514 to 1529 UTC.

Note the evolution of the “knot” at the head of bow as seen in the 0.5° and 1.5° products. This feature is coincident with the development of the tornado.



Here is a sequence of 4-panel SRM products from KHTX for the period 1514 to 1529 UTC. Estimated tornado initiation occurs at 1524 UTC.

Note the broad, weak region of shear which gradually intensifies through time. This feature is located within the knot discussed in the previous slide.

An important point about this bow echo...

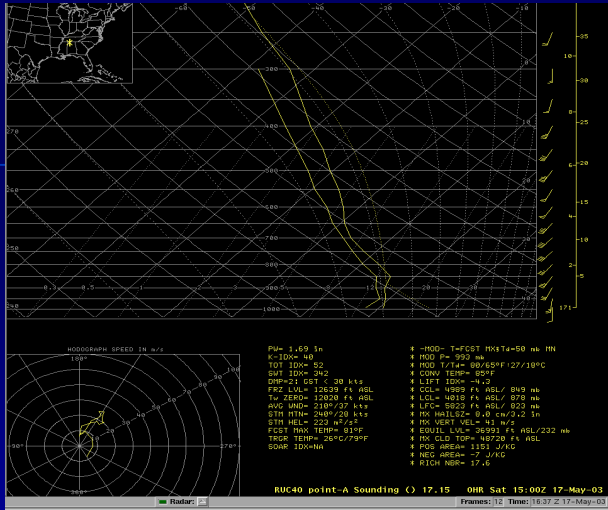
- Initially, this line didn't appear very impressive on either GWX or HTX reflectivity products. In reality, the storms were probably stronger than they appeared on radar.
- Remember...most of Lauderdale county is at least 75 nm away from both GWX and HTX.

Words to the wise...

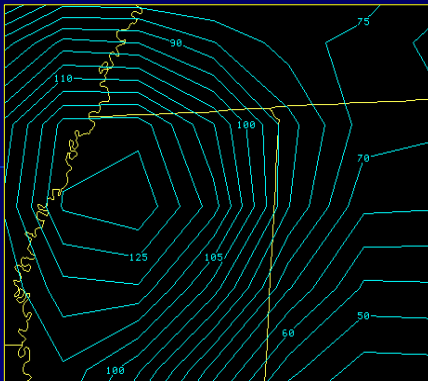
If a storm looks *even close* to being marginally severe over Lauderdale or Colbert counties, it probably *is* severe!

If the environment is favorable, don't simply wait for the report to come in – be proactive and warn!!

Furthermore, be extremely vigilant about developing rotational signatures along bow echoes – they may indicate rapid tornadogenesis

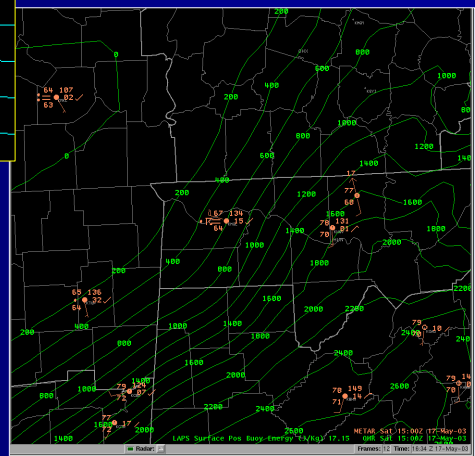


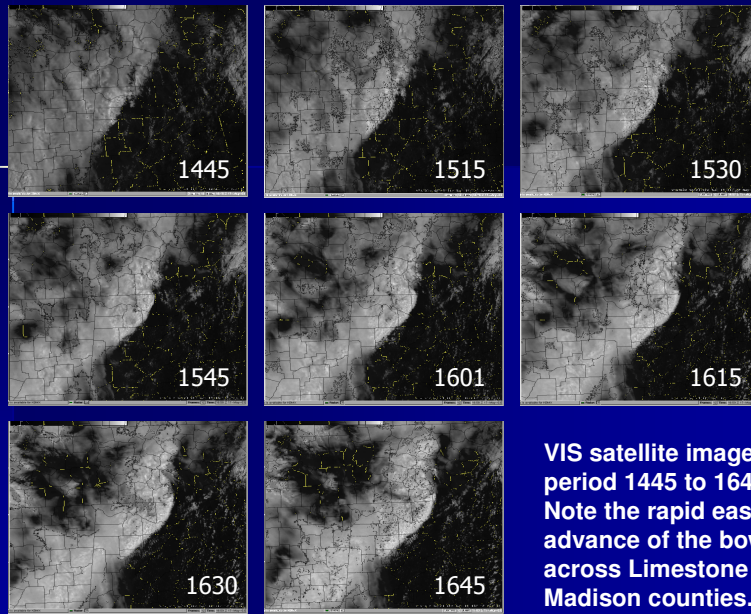
1500 UTC 00-hour RUC sounding, centered over eastern Lauderdale County. Note the 0-3 km SRH value of 229 m²/s², and the CAPE of 1151 J/kg.



ETA 00 hr forecast Bulk Richardson Shear, valid 1200 UTC. Note the values of ~ 75 – 90 units over northwest Alabama. Values in excess of 35-40 m²/s² are often associated with supercells.

METAR observations and LAPS Surface-based CAPE analysis, valid at 1500 UTC. Note the strong gradient in temperature and CAPE depicted across northwest Alabama.





VIS satellite imagery for period 1445 to 1645 UTC. Note the rapid eastward advance of the bowing line across Limestone and Madison counties.

Things to take from this event...

- Storms in NW Alabama are **not well presented** by HTX or GWX!!!!
- Be proactive about issuing warnings for this part of the CWA, if conditions warrant
- Be extra vigilant for strengthening rotation which may signal a brief period of tornadogenesis
- Always mention the possibility of tornadoes in SVR's if a TOR Watch is in effect

