

Severe Weather Event of 20 May 2005

FIC Report by Bill Schaub, 22 May 2005

Event Summary

This report addresses the severe weather event that occurred from early morning through mid-afternoon on May 20th.

On the evening of May 19th, the Day 1 outlook from the SPC put all of Tennessee and most of northern Alabama under a slight risk of severe thunderstorms through 12Z on May 20th, with damaging winds the main threat. Toward the latter part of the midnight shift on May 20th, a severe thunderstorm watch was issued for our whole CWA and was valid until 4 pm.

The first wave of thunderstorms arrived along an outflow boundary from Tennessee. The storms affected the southern middle Tennessee counties and Limestone, Madison, and Jackson counties in northern Alabama during the morning rush hour. This was described very well in our 4 am HWO which highlighted the period from 6 am to 9 am. Between 630 am and 830 am, eight warnings were issued. Thus far, storm reports have been of only marginally severe weather.

The initial thunderstorms weakened by mid-morning, then redevelopment started late in the morning in a prefrontal trough across the Alabama counties north of the Tennessee River. As this activity strengthened in response to daytime heating, strong to severe thunderstorms affected a few of the counties east of I-65 for the first part of the afternoon. Between noon and 230 pm, five warnings were issued, three of which have verified so far. The watch was canceled at 250 pm when it was obvious that any further activity would be isolated.

The LMA seemed to be a good indicator of updraft pulses and increases in lightning. It was a useful tool for confirming that cells were strong. It would be interesting to examine the LMA between 1230 pm and 130 pm when a cell over western Marshall county developed a deep mesocyclone. An elevated TVS was indicated on one radar volume scan with this cell.

No serious operational issues occurred during this event, but the Hytop radar was a concern for a while as lightning near the radar in the morning made it skip a few volume scans. Staffing was very good. There were four people on hand by 630 am. Then by 8 am we had a full time coordinator, a warning meteorologist with others watching radar as well, the short- and long-term forecasters, a public service forecaster, and two people at times on communications.

Synoptic Discussion

At 12Z on the 22nd, a 500-mb short wave trough was moving east-northeast over Missouri toward the Ohio valley. Ahead of this feature, the upper flow was highly diffluent over the lower Tennessee valley, with a 65-knot jet streak over Oklahoma and Arkansas. At 850mb, an axis of moisture covered all of our area and extended southwest into central Mississippi. A surface cold front was from a low over northeast Missouri down to southeast Oklahoma, with a trough ahead of it from southern Illinois to west-central Mississippi.

At the shift change briefing for the evening shift, it was pointed out that a severe thunderstorm watch was in effect until 9 pm for all but the three northwest Alabama counties, and that most of the activity would probably be to our east in the more moisture-rich air. At this time, there was no significant activity in the area. There was actually some skepticism that much of anything would happen.

A surface chart analysis for 4 pm showed a dry line extending from just east of Nashville, southwestward to just west of Huntsville, to south of Tupelo. To the west of this feature was a prefrontal trough into north-central Mississippi, and the cold front was just entering western Tennessee. The dew point temperatures behind the dry line were in the mid 50s over northwest Alabama, and dropped into the mid 40s ahead of the cold front. However, the dew point temperatures ahead of the dry line were in the lower 60s, and strong advection of higher temperatures and dew point temperatures into eastern sections was occurring due to southwest flow.

The first signs of convection came after 5 pm when a few echoes appeared over our Tennessee counties, and an isolated cell developed over north-central Lauderdale county near the Tennessee line. The Lauderdale cell matured quickly and developed an inflow notch and weak echo region. This prompted the first SVR for Lauderdale at 5:25 pm and the next one for Limestone at 5:40 pm. What followed was a flurry of SVRs from the three meteorologists on duty as the activity peaked between 5:55 pm and 6:10 pm: one for Moore; then a minute later one for Franklin (Tennessee) and Lincoln; then 4 minutes later one for Madison and Jackson, and 10 minutes later one for Dekalb. The remaining SVRs were for the counties of Marshall and Franklin (Tennessee), with extensions for Jackson and Dekalb. The TOR for Dekalb was an upgrade to a SVR in effect. The last warning was a SVR for Jackson at 7:15 pm.

Operations

This was the type of event that starts to look like a dud then develops rapidly as ingredients come together late in the afternoon. In this case it happened in the unstable air in the eastern mountains, where lift from a dry line and the topography, combined with low-level convergence and upper-level divergence allowed explosive convection. The isolated cell that developed over Lauderdale county was probably associated with a prefrontal trough behind the dry line.