

WFO Huntsville Quick Event Review

Date/Time of Event: 7/12/05
Forecaster(s) performing review: Andy Kula
Type (and significance) of event: Localized strong winds and Flash Flooding

Brief overview of event:

A band of strong to potentially severe thunderstorms developed in northwest Alabama and spread east across far north Alabama during the evening hours. This band of convection was not directly associated with the remnants of Hurricane Dennis, but was ahead of a surface trough that had developed across middle Tennessee to near Memphis. In fact, this wind shift line was noted on the Memphis 88D as a fine line. Temperatures ahead of the line were in the mid to upper 80s with dew points in the lower 70s. Behind the trough, temperatures exceeded 90F in a few areas where a bit of subsidence and mixing occurred. Dew points in this narrow zone dipped into the lower 60s. This set up a strong moisture and instability gradient on which the storms developed. Surface Theta-E analysis and Lifted Index are excellent contours to use in D2D to depict this boundary. The 4 pm briefing and initial inspection of NSE data and soundings indicated that a constant radar watch was needed, but severe weather remained unlikely.

An axis of MU Capes exceeding 1500 J/kg via SPC's page and 2000 J/kg (via Ruc40 on D2D) were in advance of these storms in northeast Alabama. Although deep layer (6km) shear was only near 30kt (low end threshold for supercells), low level (1km) shear was rather good for mid July with 20-25kt along the TN border. Also note that a belt of moderate 700 mb and 500 mb westerly winds of 35-40kt (not too shabby for mid July) were also present. One negative to these wind profiles are that 850-500 mb winds backed slightly (cold advection).

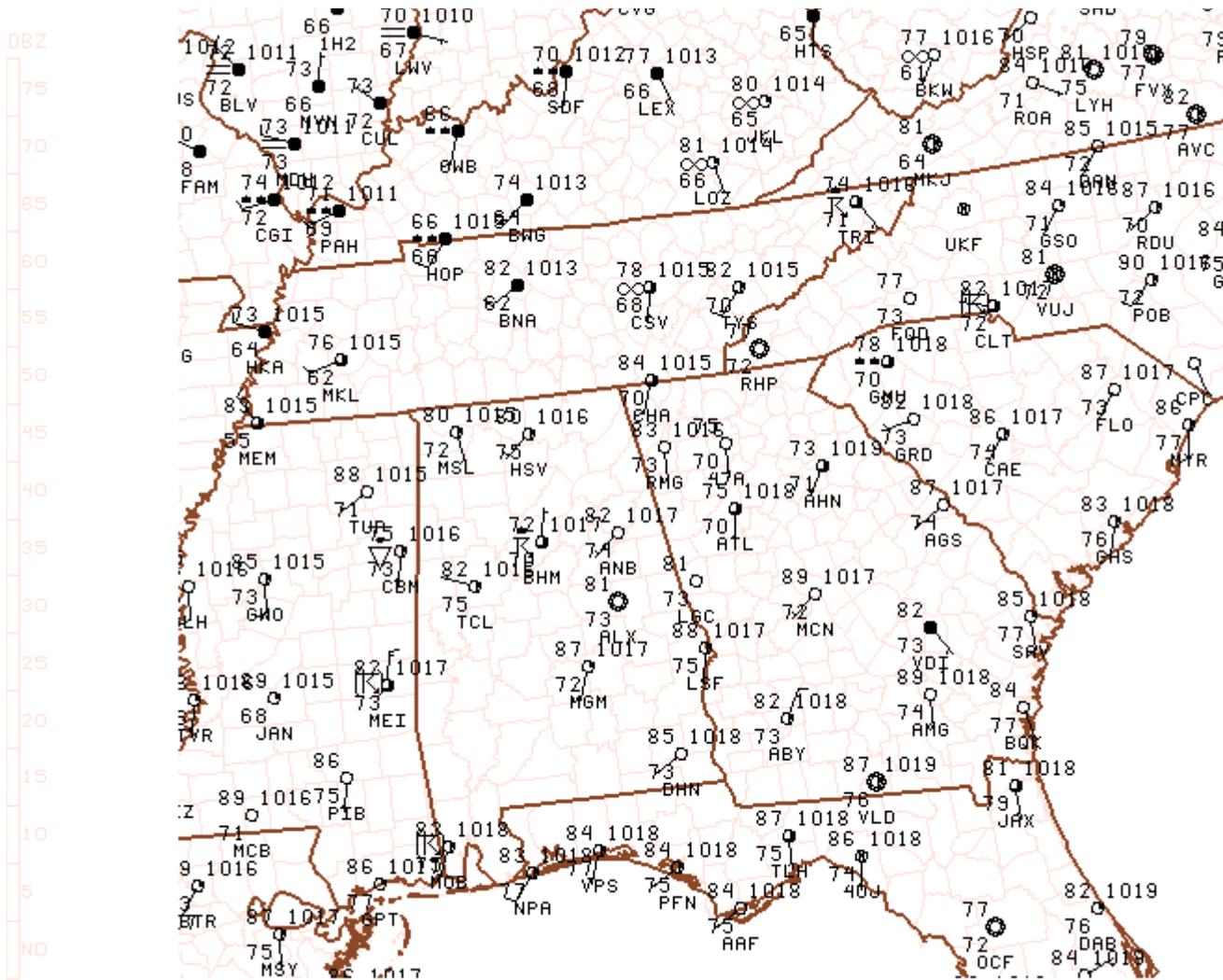
The first cell of interest which intensified to strong levels was in Limestone County moving into Madison County. This rather low topped cell had little or no lightning, and reflectivity remained below 60 dbZ. Robert Boyd called in a report of estimated 40 mph winds in Madison, while another "spotter" called in near Hughes Drive and Highway 72 with gusty winds. This prompted the issuance of a Significant Weather Alert for Madison County. It eventually had a decent velocity surge on the 88D east-northeast through north Huntsville (including the WFO) where winds gusted over 20 mph and moved toward Hytop. Initially, an SWA was issued which was upgraded to a SVR when a 60-65 dbZ core developed in mid levels along with some decent deep layer convergence in low to mid levels. A velocity "surge" developed over the Hytop vicinity which accelerated to the east. Calls to Jackson County dispatch (who radioed Hytop fire)

indicated that strong winds had moved through, but no speed estimate was decided upon. Another cell developed in Madison County which eventually merged with another in Jackson County. This cell to my recollection evolved into one with supercell characteristics (deep layer weak-moderate cyclonic rotation), and most evident, a front flank inflow notch and hook appendage. I would not call this a classic hook, but it did have our attention. We issued another SVR for Jackson County based on this structure. Calls were made to Jackson County dispatch to activate spotters to observe this storm along highway 72. There were observations of “rotation” but no official wall cloud reports. Again, strong winds were reported by dispatch southwest of Stevenson along Highway 72, likely within the Rear Flank Downdraft (RFD) noted on the 0.5 SRM product. LCLs were rather low, 0-1km shear was considerable, but low level (0-3 km) CAPE was likely to low to consider a TOR.

Attention then turned to the west as new storms developed across Madison into Limestone and northern Morgan Counties. These were more linear in nature, and began to train. Fortunately, storm movement of 250/20-25kt would preclude serious rainfall and flash flooding. However, rainfall rates became very intense (exceeding 5 inch/hr) in a few KGWX FFMP basins in southwest Madison County. These intense rates, despite rapid movement, led me to issue an FFW for Limestone and Madison Counties. There was a report relayed by local media of a wall cloud near Madison. Also, a few minutes later, a local TV station relayed that velocities on their Doppler radar were 70-90 mph along I-565. KHTX did not show anything near that magnitude of wind nor a reflectivity signature (such as a bow or divergent base velocity) to suggest a severe downburst. Later, the same station noted they thought their radar was running too hot. The Limestone portion of the FFW was cancelled early as storms exited quickly with no reports. However, two reports of Flash Flooding were received for the Madison warning including a report from Jimmy Archer of water up to car doors near Gurley. Inspection of radar indicated that this had to be north of Gurley along or near highway 72 if it indeed occurred. Calls to Madison and Jackson County dispatch did not reveal any flooding reports, but these areas were remote.

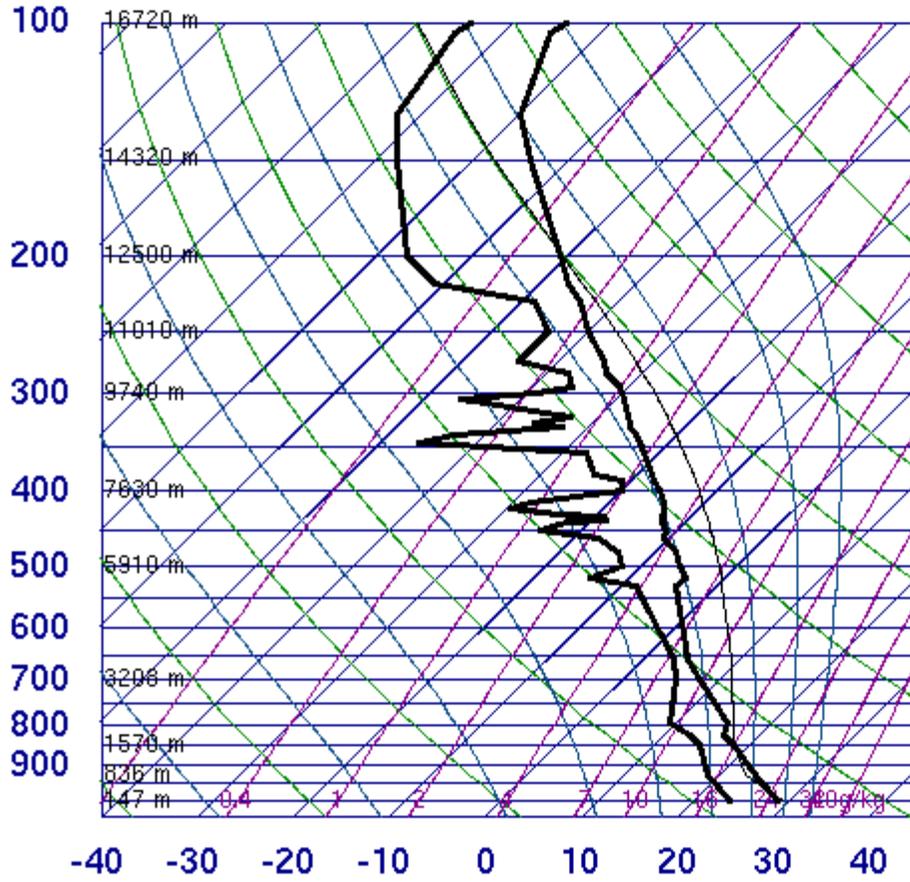
To conclude this section, although far from a classic severe weather or flooding situation, conditions were set up for potential local problems associated with wet microbursts and supercells producing strong rear-flank downdrafts. 00Z soundings eventually revealed an airmass conducive to intense rainfall rates with PWATs just above 2 inches at KBMX. Also noted was a considerable amount of 0-3km SRH (~150-200) combined with a decent sized SBCAPE (≥ 1400 J/kg) Note that MUCAPEs were considerably higher for persistent updrafts. Thus, a brief supercell threat could have been anticipated. In fact, the KGWX radar showed another small supercell just east of the radar site that evening. If time allows, we’ll pull up a couple of these images in the WES archive to add to this review. One definite negative to damaging downburst winds was a rather low DCAPE which was less than 1000 J/kg.

Attachments



050713/0000 SURFACE WEATHER PLOT

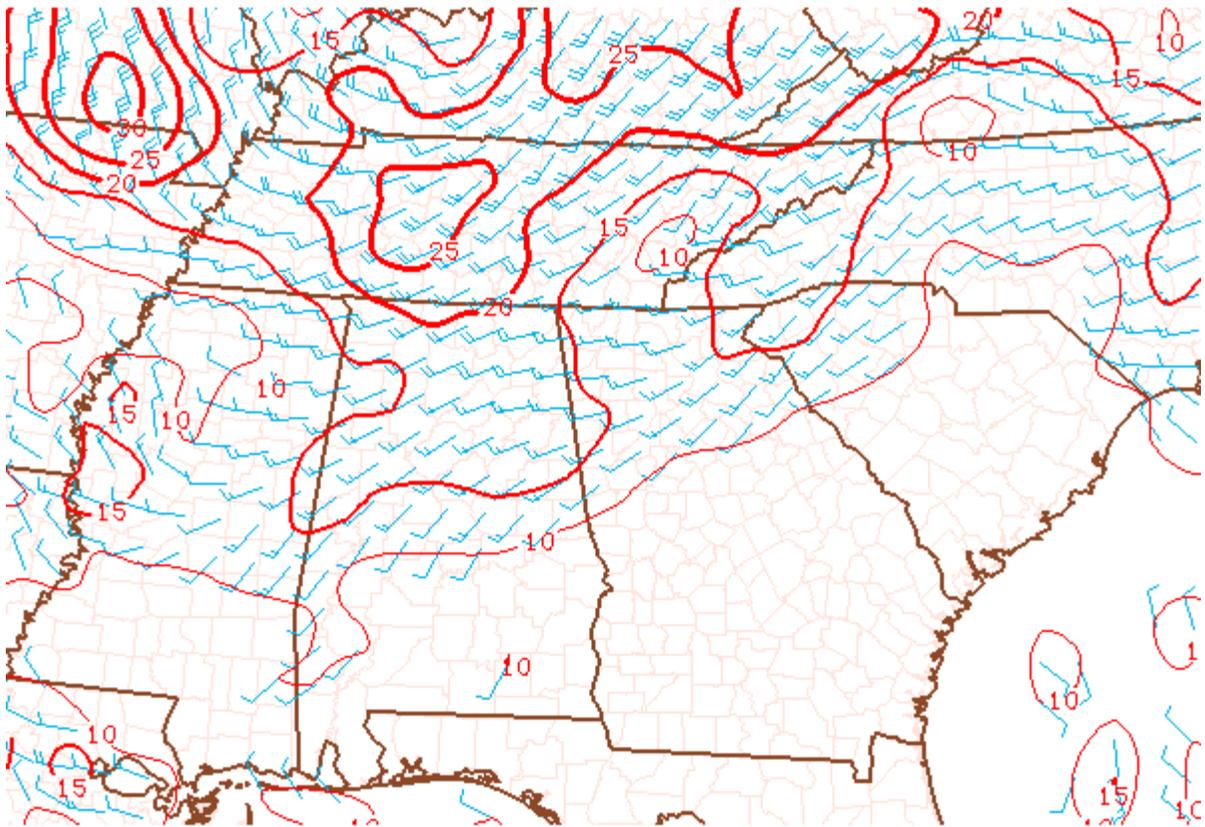
72230 BMX Shelby County Airport



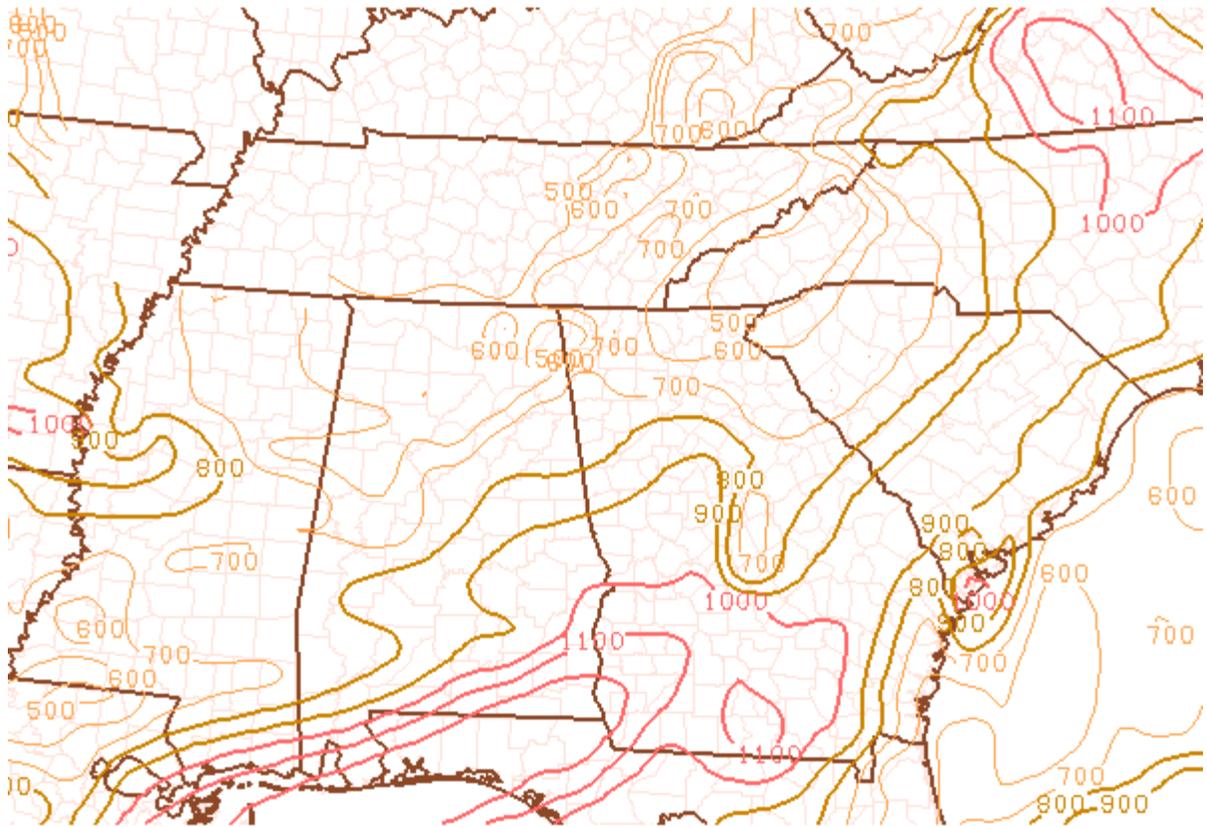
SLAT	33.16
SLON	-86.7
SELV	178.0
SHOW	-0.37
LIFT	-4.10
LFTV	-4.71
SWET	253.5
KINX	36.60
CTOT	20.70
VTOT	24.30
TOTL	45.00
CAPE	1424.
CAPV	1596.
CINS	-24.3
CINV	-11.8
EQLV	196.3
EQTV	195.9
LFCT	852.1
LFCV	871.0
BRCH	35.63
BRCV	39.94
LCLT	293.6
LCLP	901.1
MLTH	302.5
MLMR	17.23
THCK	5763.
PWAT	52.28

00Z 13 Jul 2005

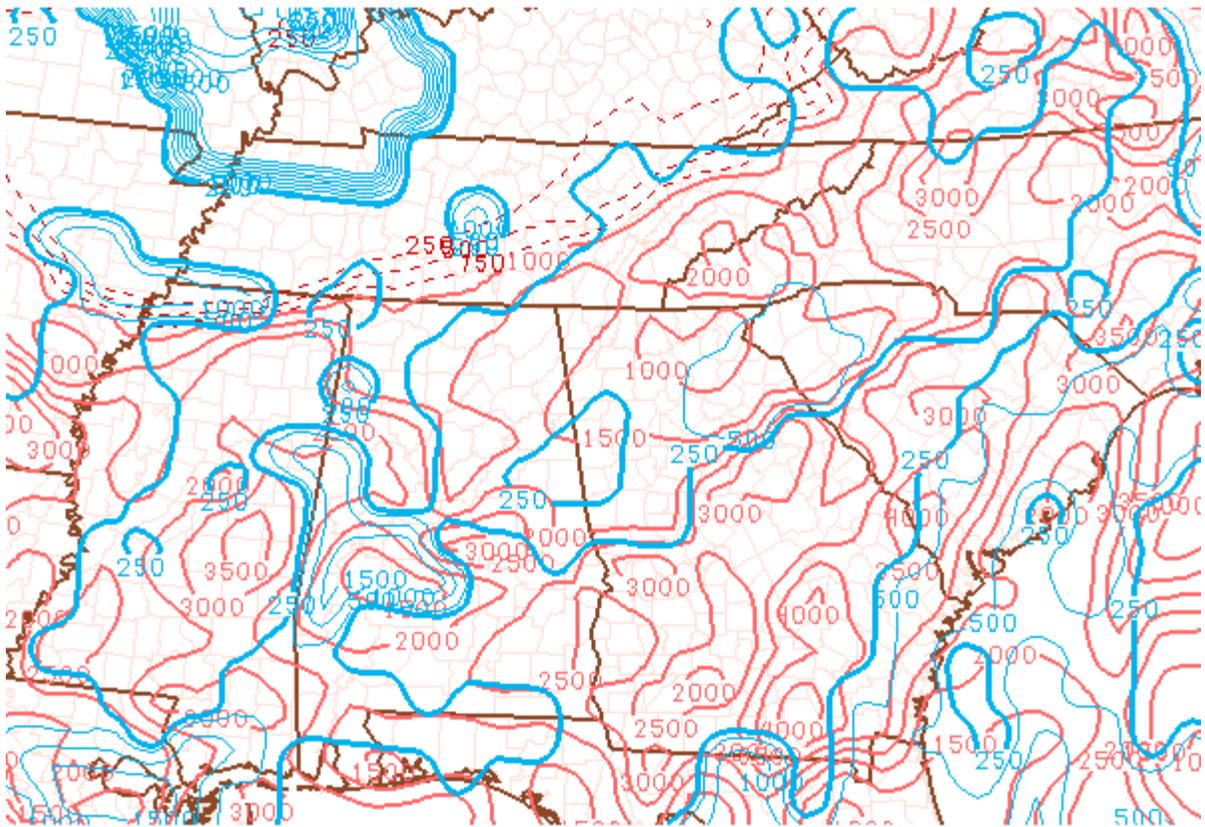
University of Wyoming



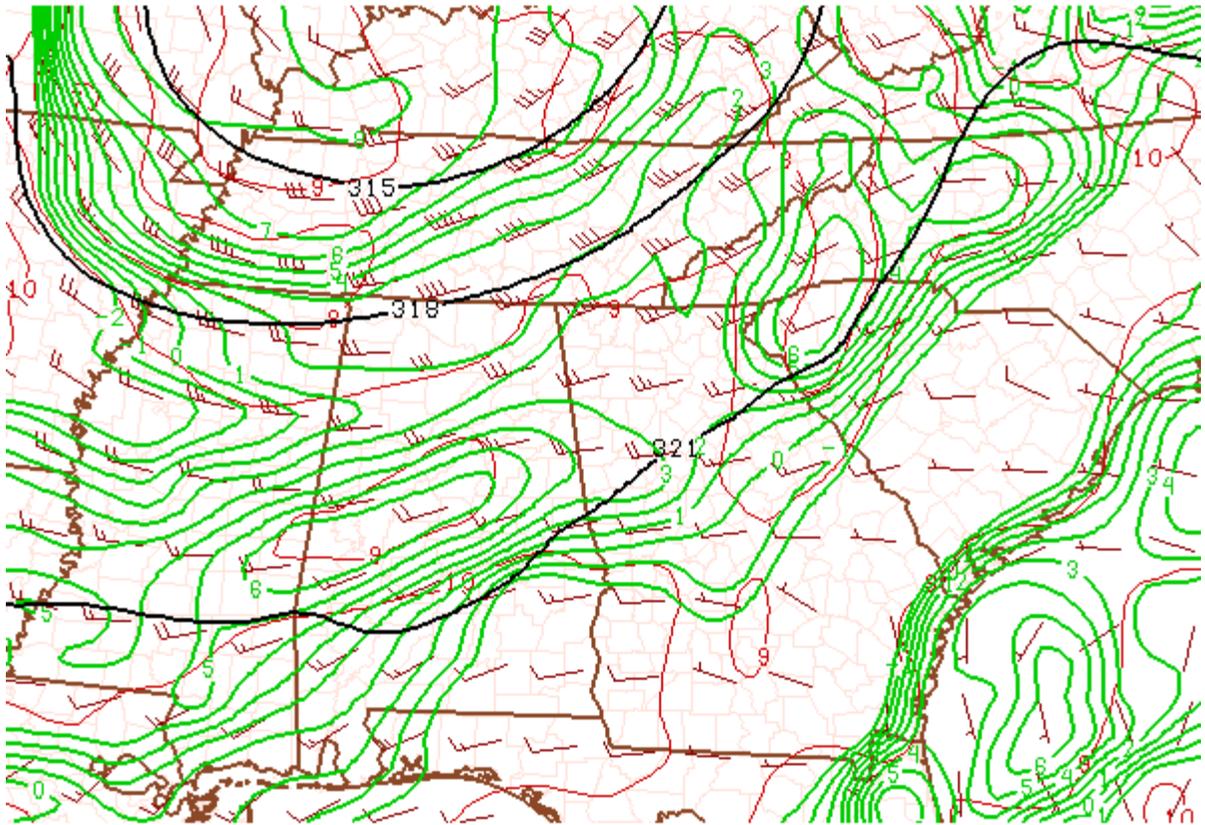
050713/0000 Surface - 1km shear vector



050713/0000 DCAPE



050713/0000 MUCAPE and LPL (m agl)



050713/0000V001 700mb HGHT, T, Td, WInd