

Unusual Significant Nighttime Tornadoes of 2008 Associated with Relatively Stable Low-level Conditions



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Motivation

- Nocturnal significant tornadoes in Plains fairly rare with enhanced risks
- Forecaster awareness increased following high-impact Spring 2007 events
- Spring 2008 produced comparatively unusual events containing considerable surface-based CINH and no 0-3 km CAPE

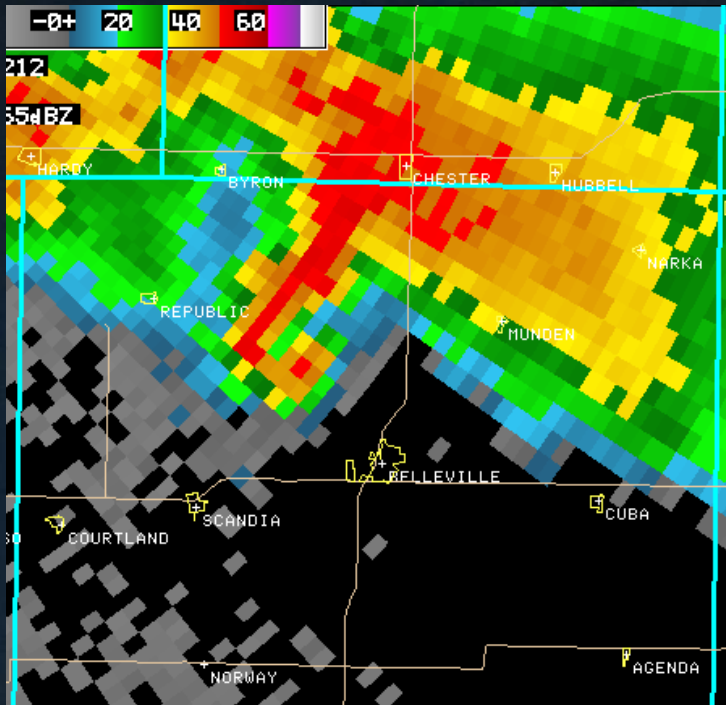
Overview of 5/29 and 6/11

- Each had long-lived supercell producing significant nocturnal tornadoes a number of hours into lifespan
- Sig tor environments contained nocturnally-lowered LCL/enhanced SRH, but considerable CINH due to proximal/upstream EML
- Each storm remained in warm sector throughout duration

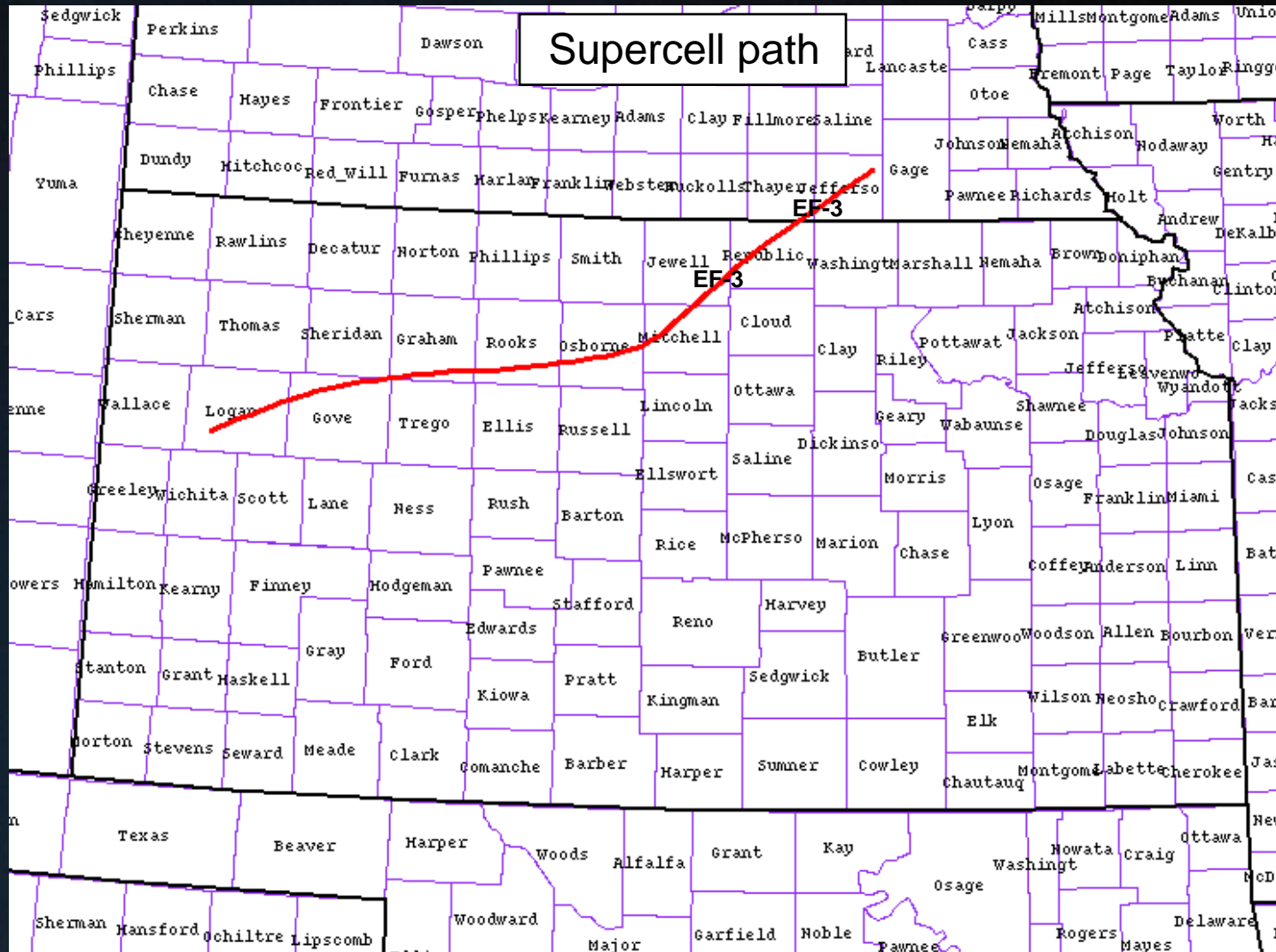
May 29, 2008

Jewell, KS EF-3

Belleville, KS EF-3



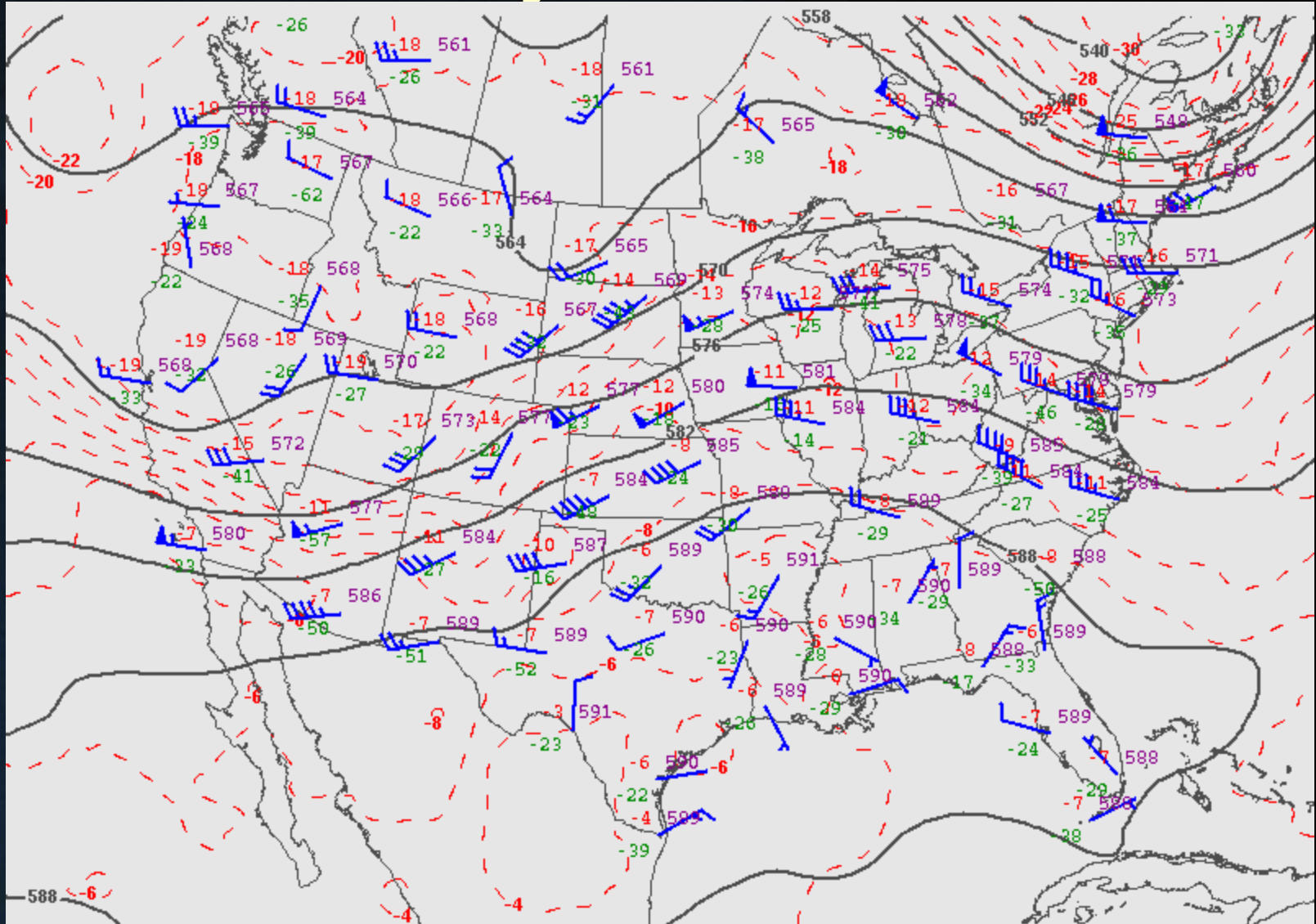
May 29, 2008



Supercell born
~2200Z

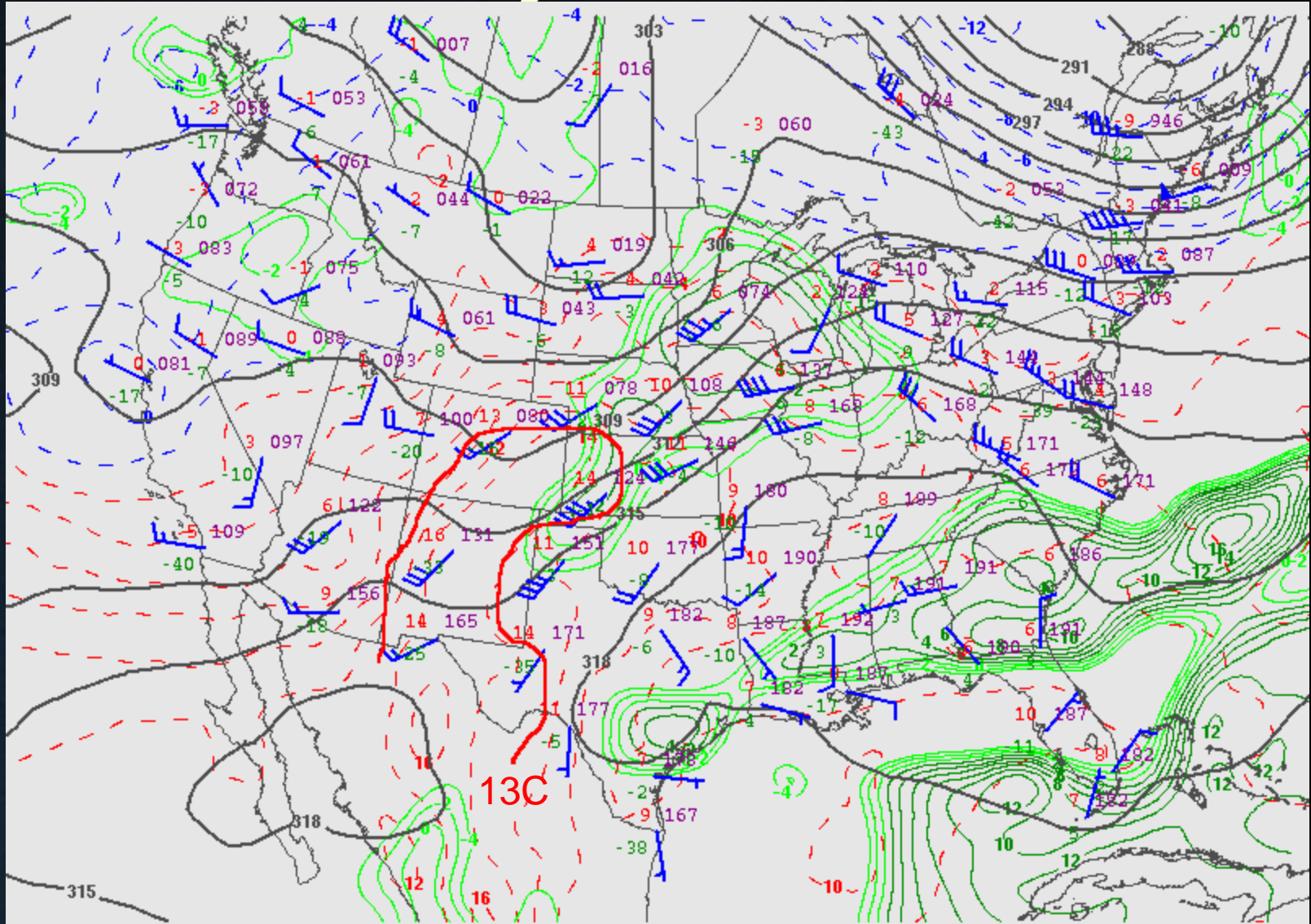
Sig for phase
~0145-0330Z

May 29, 2008



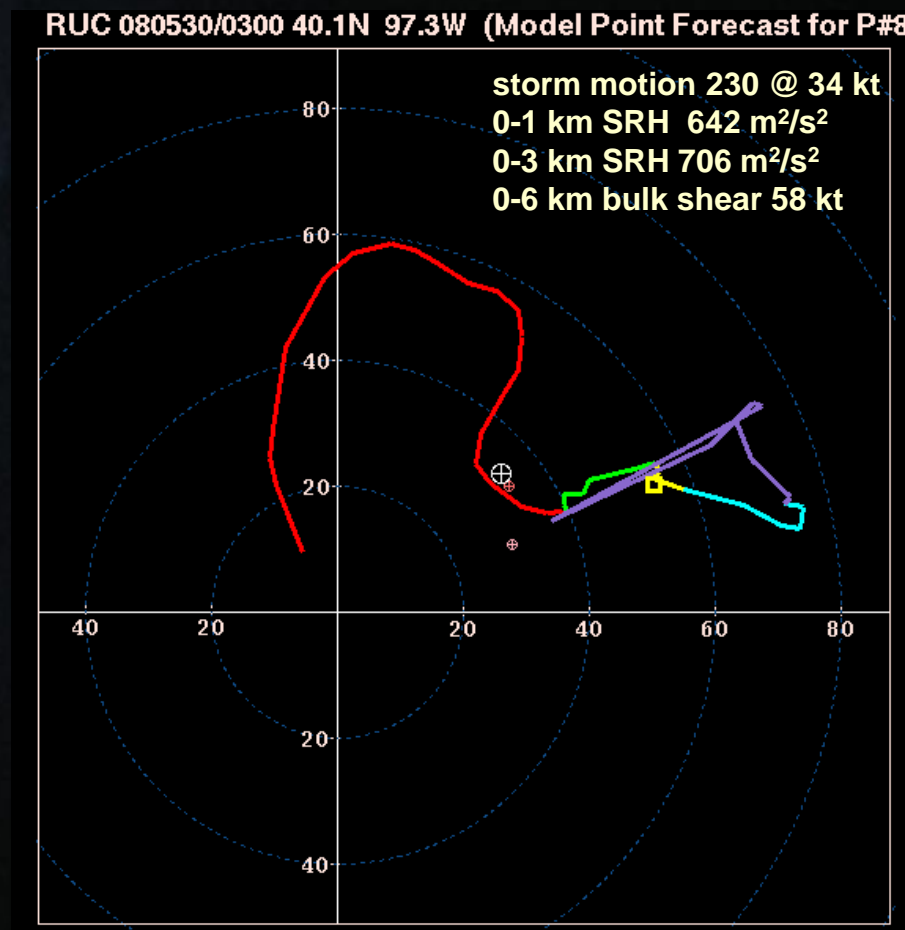
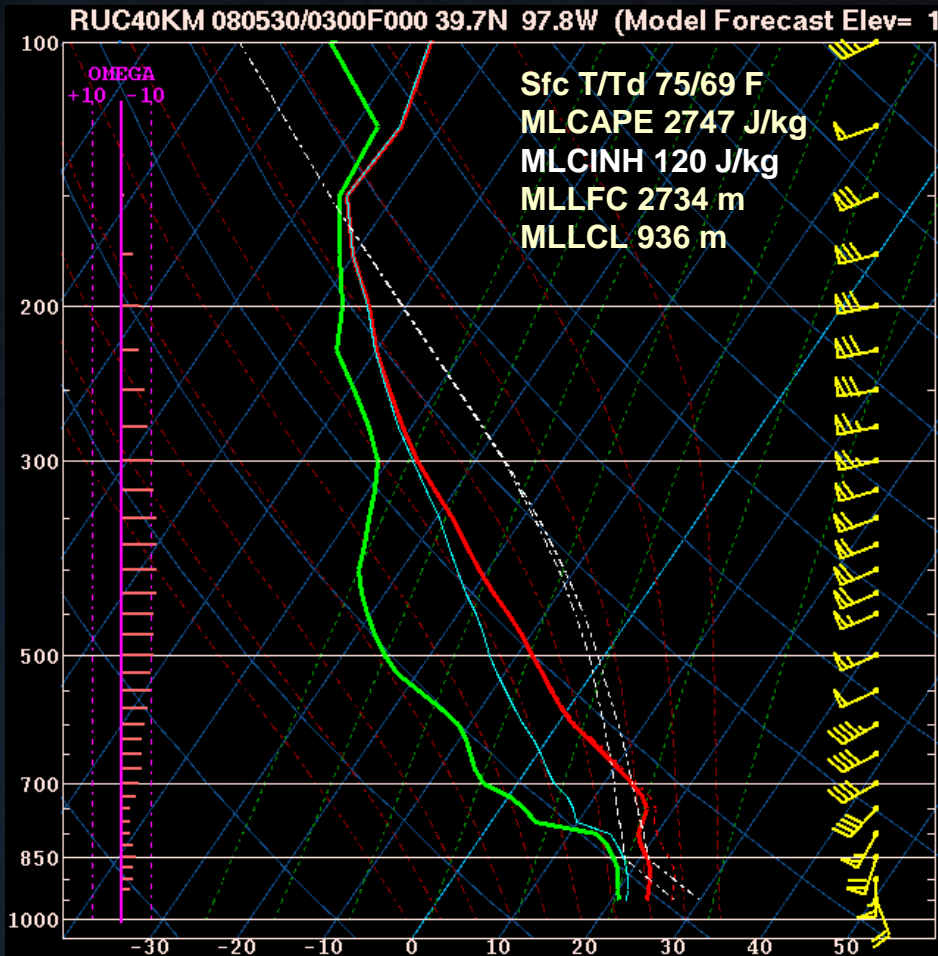
080530/0000 500 MB UA OBS, HGHTS, and TEMPS

May 29, 2008



080530/0000 700 MB UA OBS, HGHTS, TEMPS, Td>=-4

May 29, 2008 tornadic NSE



June 11, 2008

Salina, KS EF-3

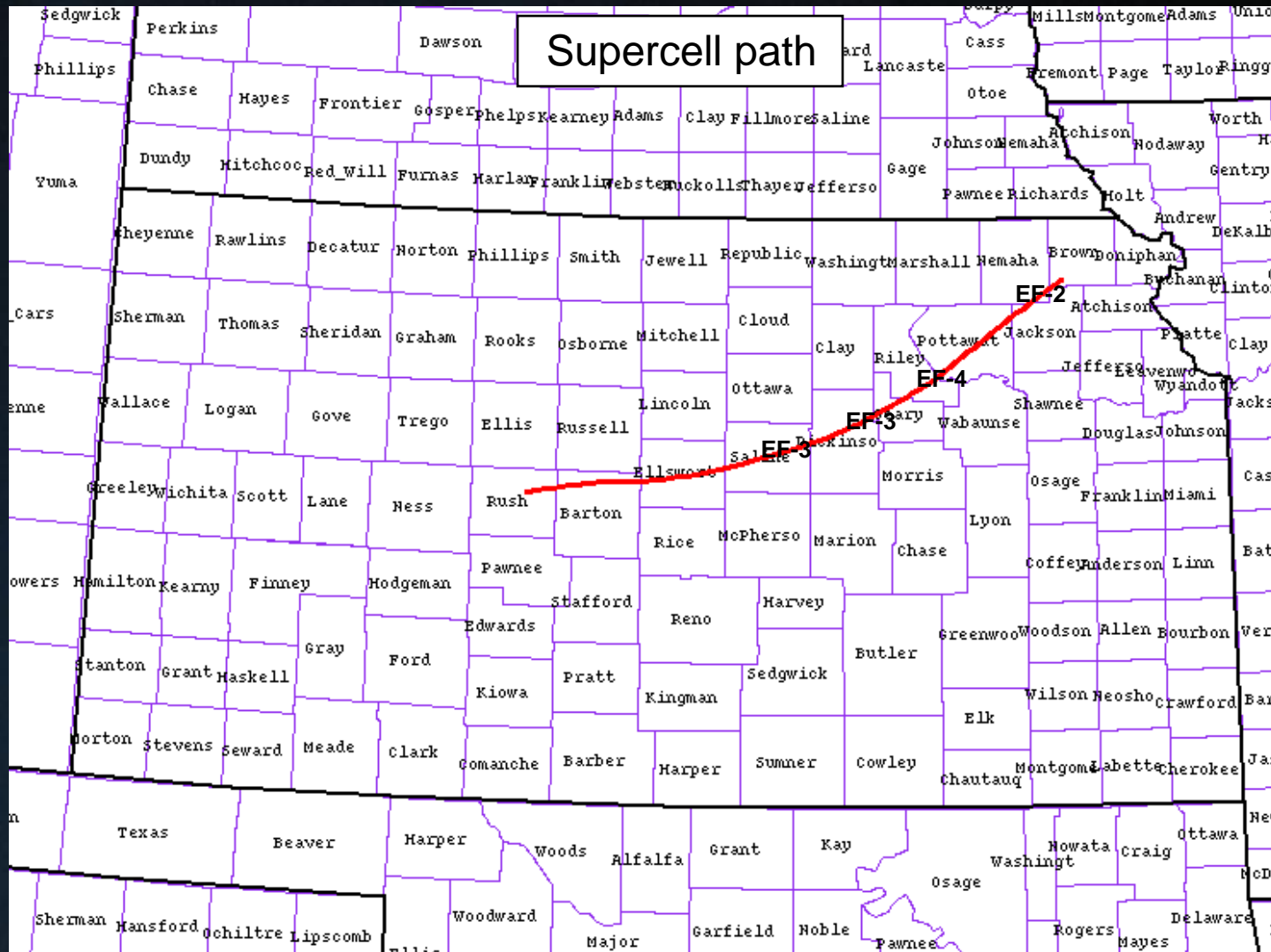
Chapman, KS EF-3*

Manhattan, KS EF-4

Soldier, KS EF-2*



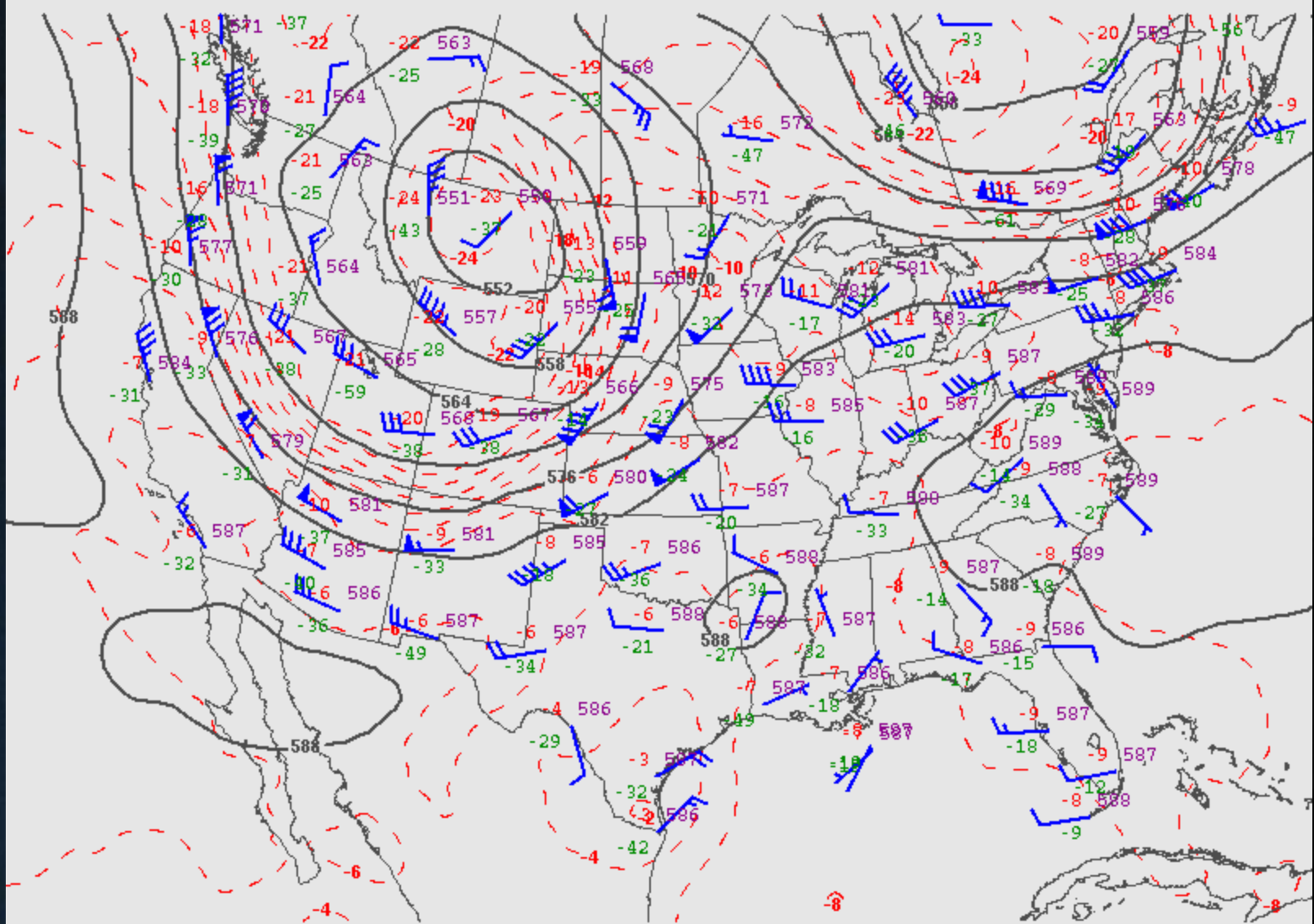
June 11, 2008



Supercell born
~0050Z

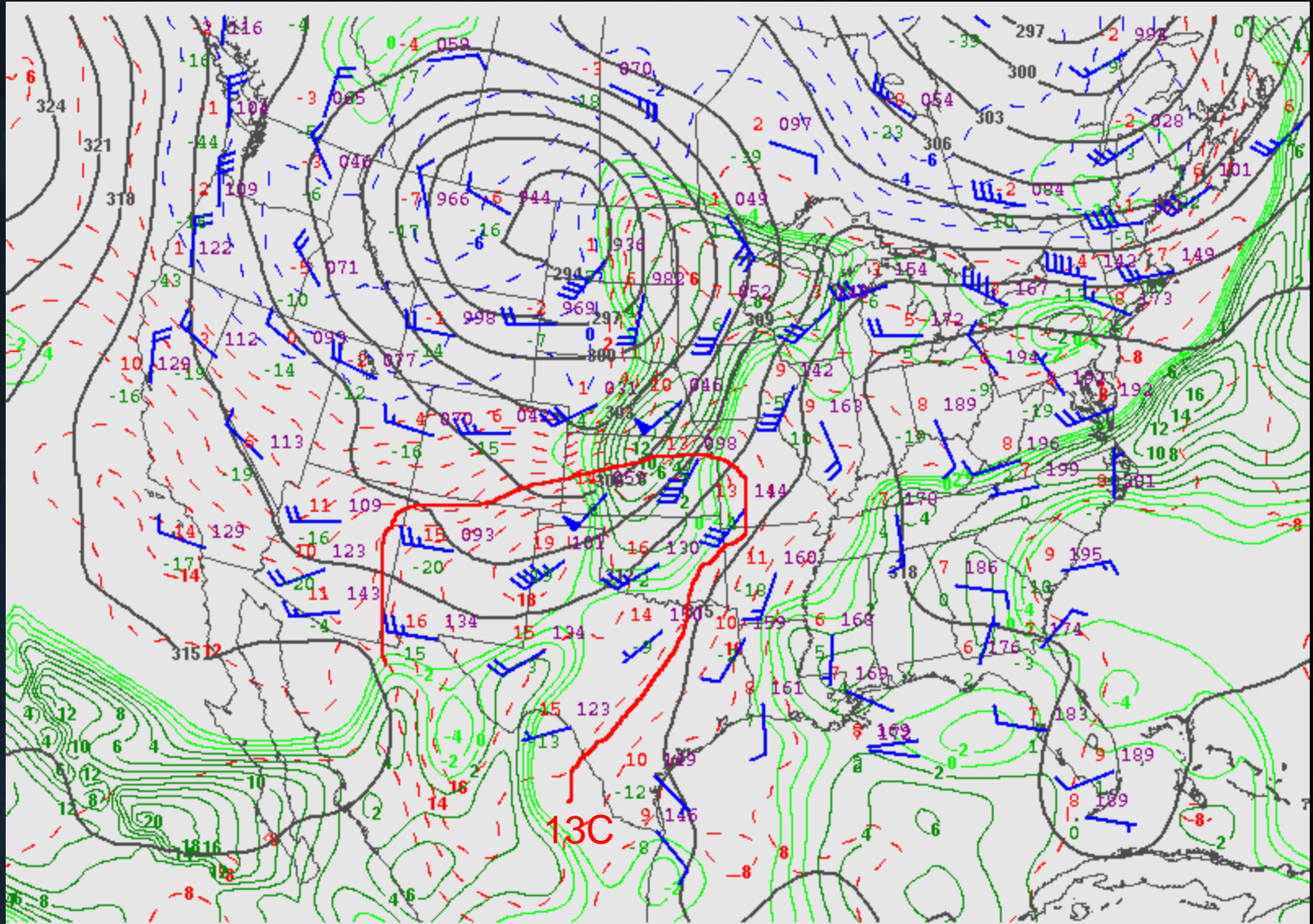
Sig for phase
(intermittent)
~0240-0500Z

June 11, 2008



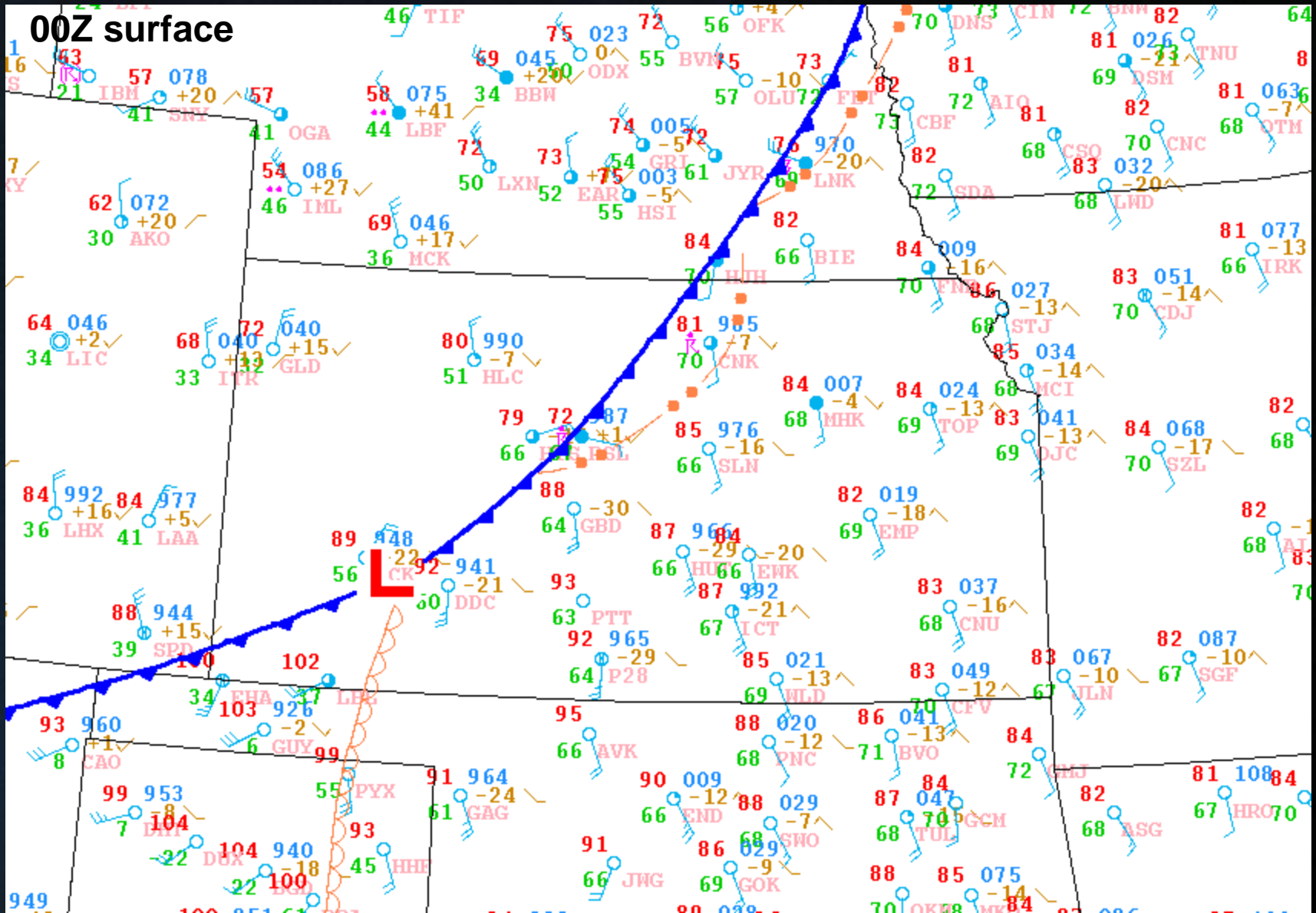
080612/0000 500 MB UA OBS, HGHTS, and TEMPS

June 11, 2008

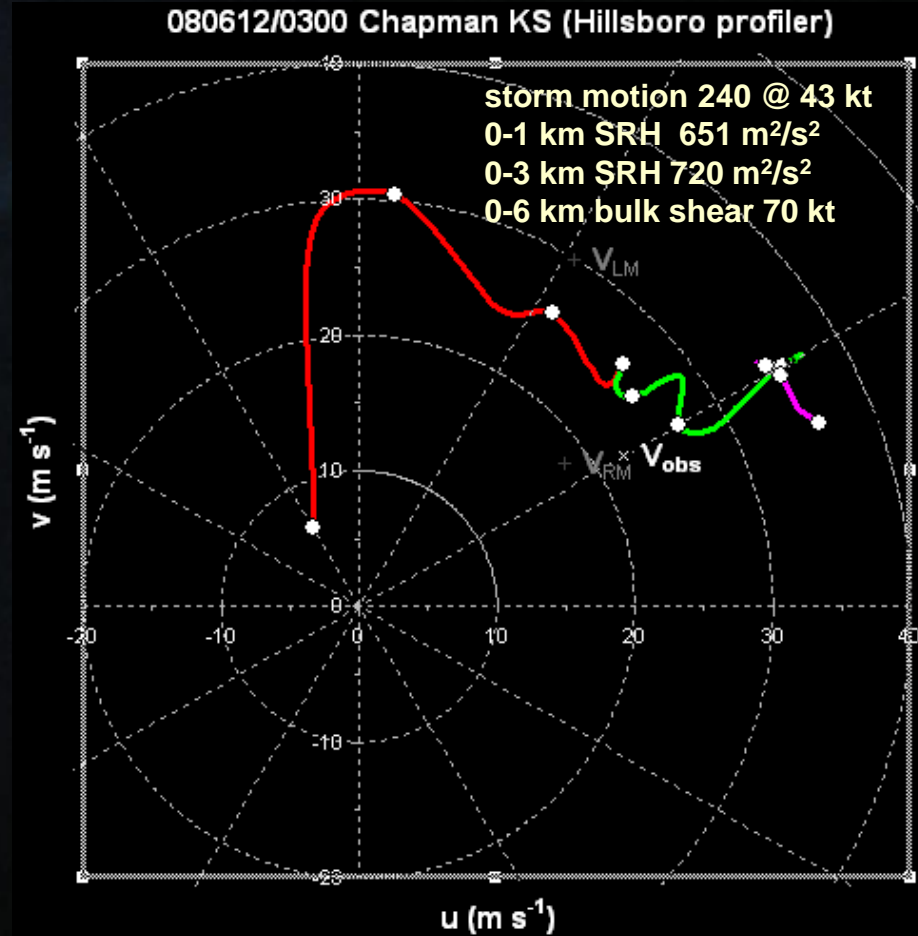
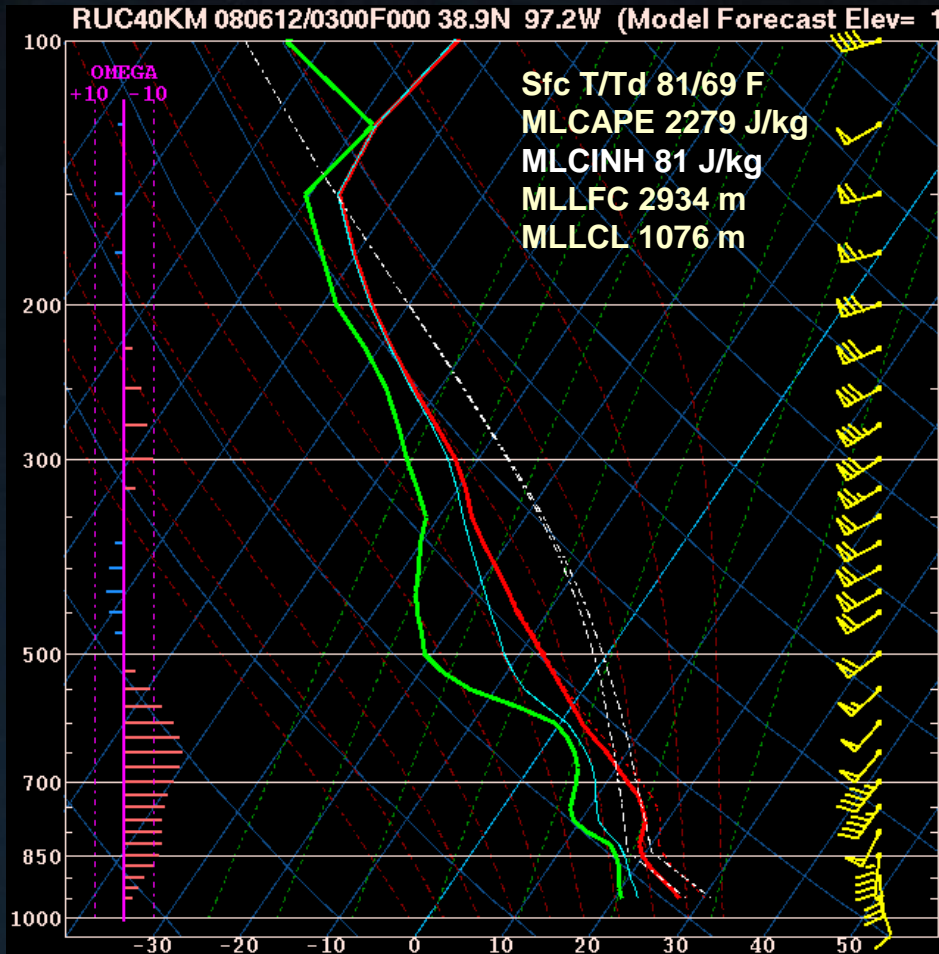


080612/0000 700 MB UA OBS, HGHTS, TEMPS, Td>=-4

June 11, 2008



June 11, 2008 tornadic NSE



Review of select NSE parameters (includes EHI)

	Sfc T/Td (F)	700mb T (C)	MLCAPE (J/kg)	MLCINH (J/kg)	0-3 km MLCAPE	0-6 km bulk shear (kt)	0-1 km SRH (m ² /s ²)	0-1 km MLEHI
05/29	75/69	13.1	2747	120	0	58	642	11.0
06/11	81/69	12.5	2279	81	0	70	651	9.3

Conclusions

- Each supercell produced nighttime sig tors despite capping EML & no 0-3 km CAPE
- Anomalously strong SRH along with strong deep layer shear helped counter CINH via intense/long-lived mesocyclones augmented by vertical pressure perturbations
- In strong CINH environments, be wary of potent SRH/bulk shear combinations via RAOB/ACARS/profiler/VWP data that may help compensate

References

- Craven, J. P., R. E. Jewell, and H. E. Brooks, 2002: Comparison between observed convective cloud-base heights and lifting condensation levels for two different lifting parcels. *Wea. Forecasting*, **17**, 885-890.
- Davies, J. M., 2004: Estimations of CIN and LFC associated with tornadic and nontornadic supercells. *Wea. Forecasting*, **19**, 714-726.
- Doswell, C.A. III, and E.N. Rasmussen, 1994: The effect of neglecting the virtual temperature correction on CAPE calculations. *Wea. Forecasting*, **9**, 625-629.
- Thompson, R. L., R. Edwards, J. A. Hart, K. L. Elmore, and P. M. Markowski, 2003: Close proximity soundings within supercell environments obtained from the Rapid Update Cycle. *Wea. Forecasting*, **18**, 1243-1261.