An Analysis of Two Tornadic Events Associated With Closed Cold Core 500mb Lows.

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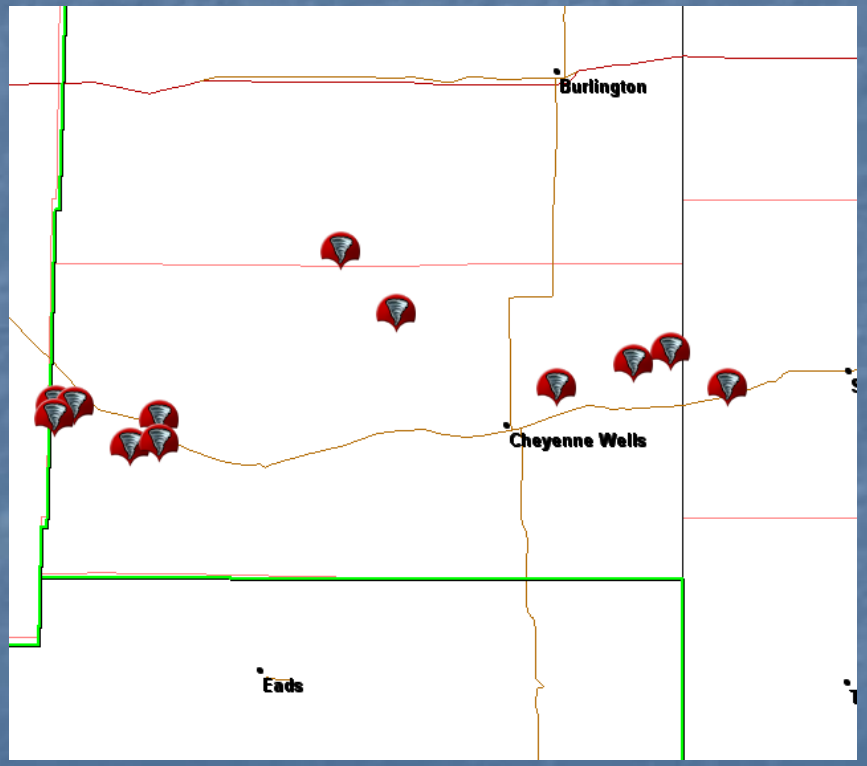
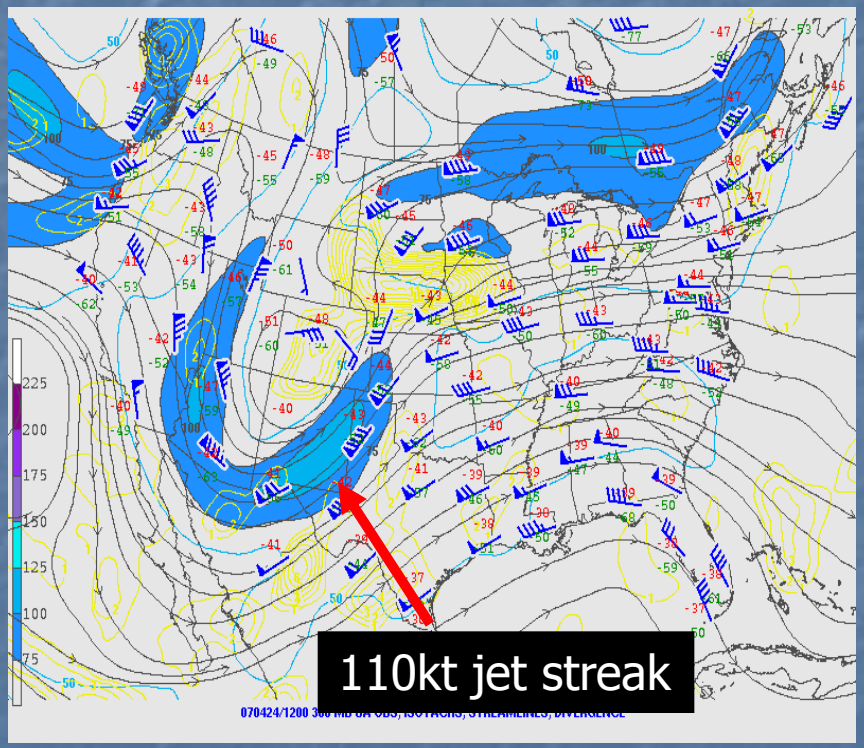
WFO GLD

April 24th 2007

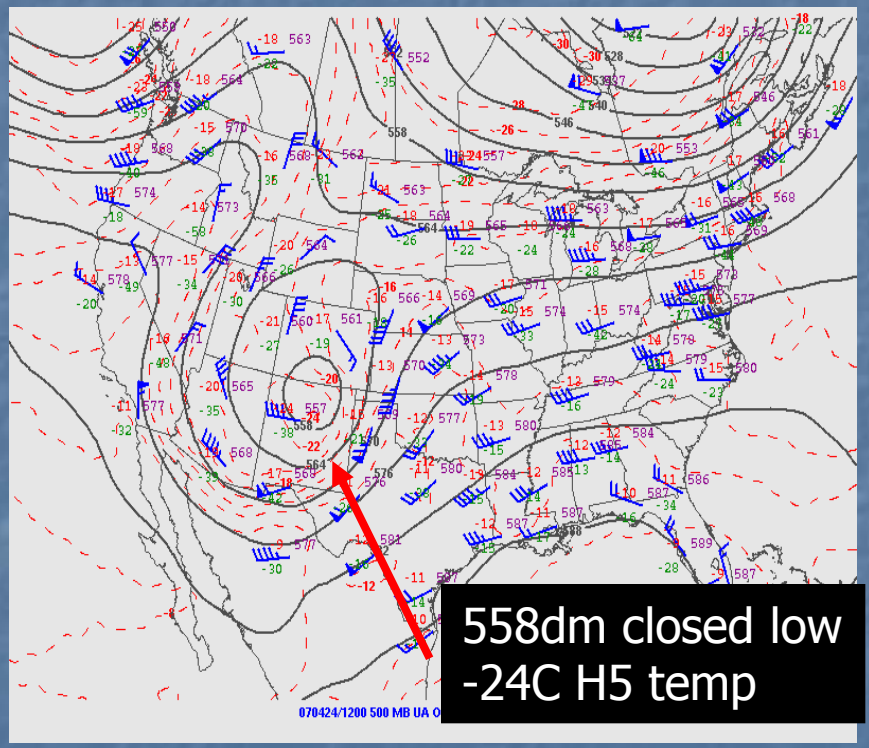
- 11 Tornadoes over 2 hours
- 9 Tornadoes in Goodland CWA
- 7th Most tornadoes in a 24 hour period for Goodland CWA



04/24/07

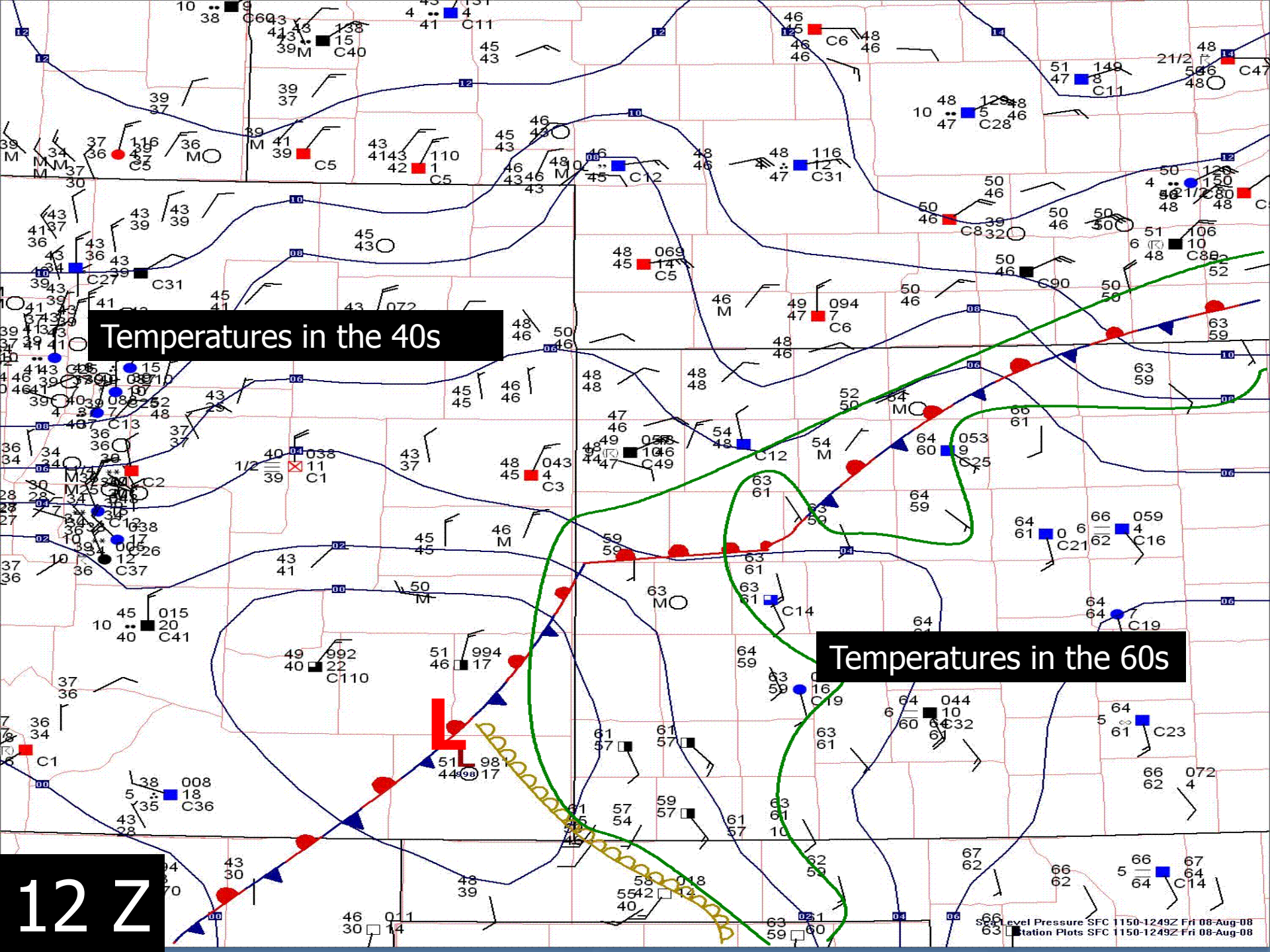


300 mb

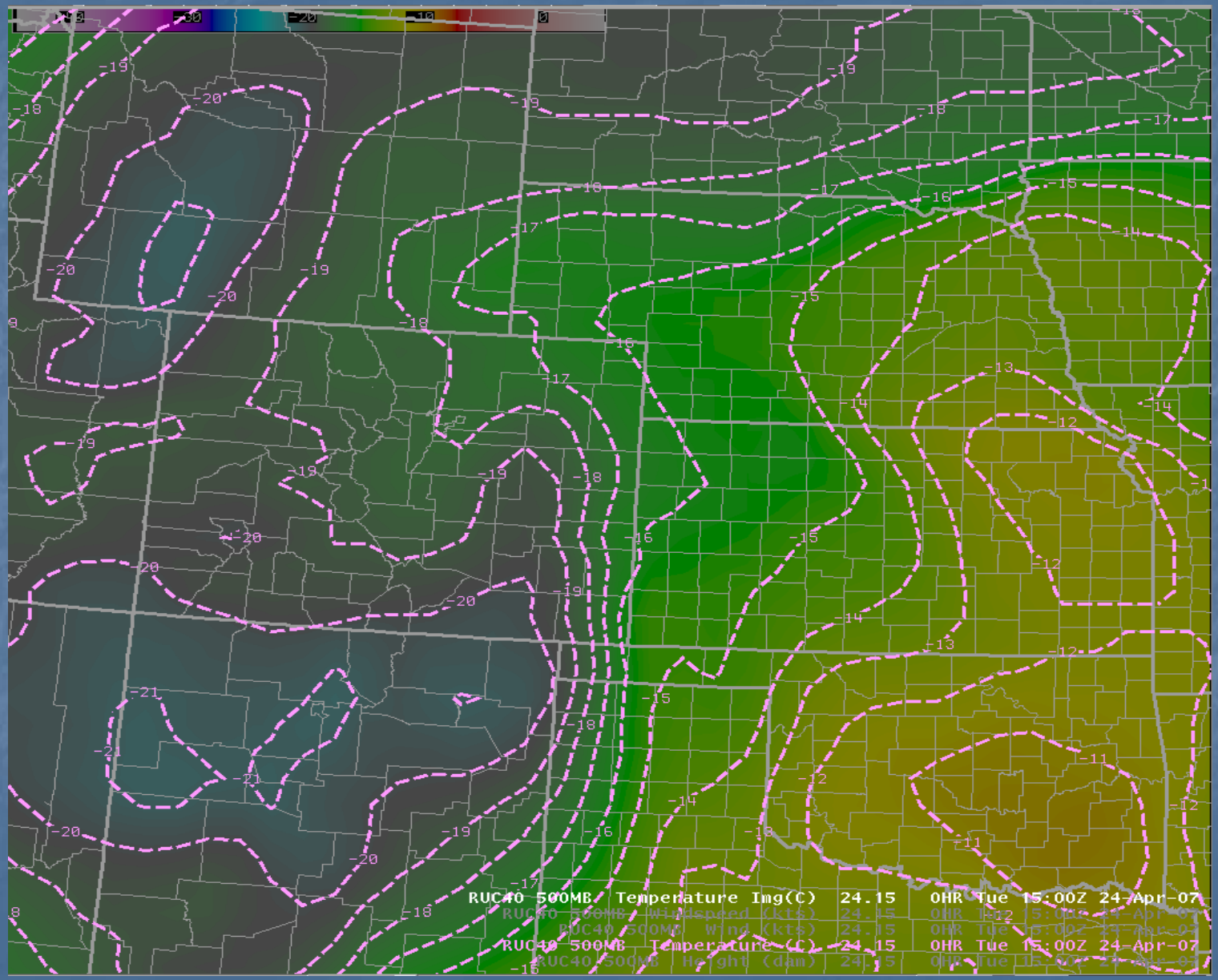


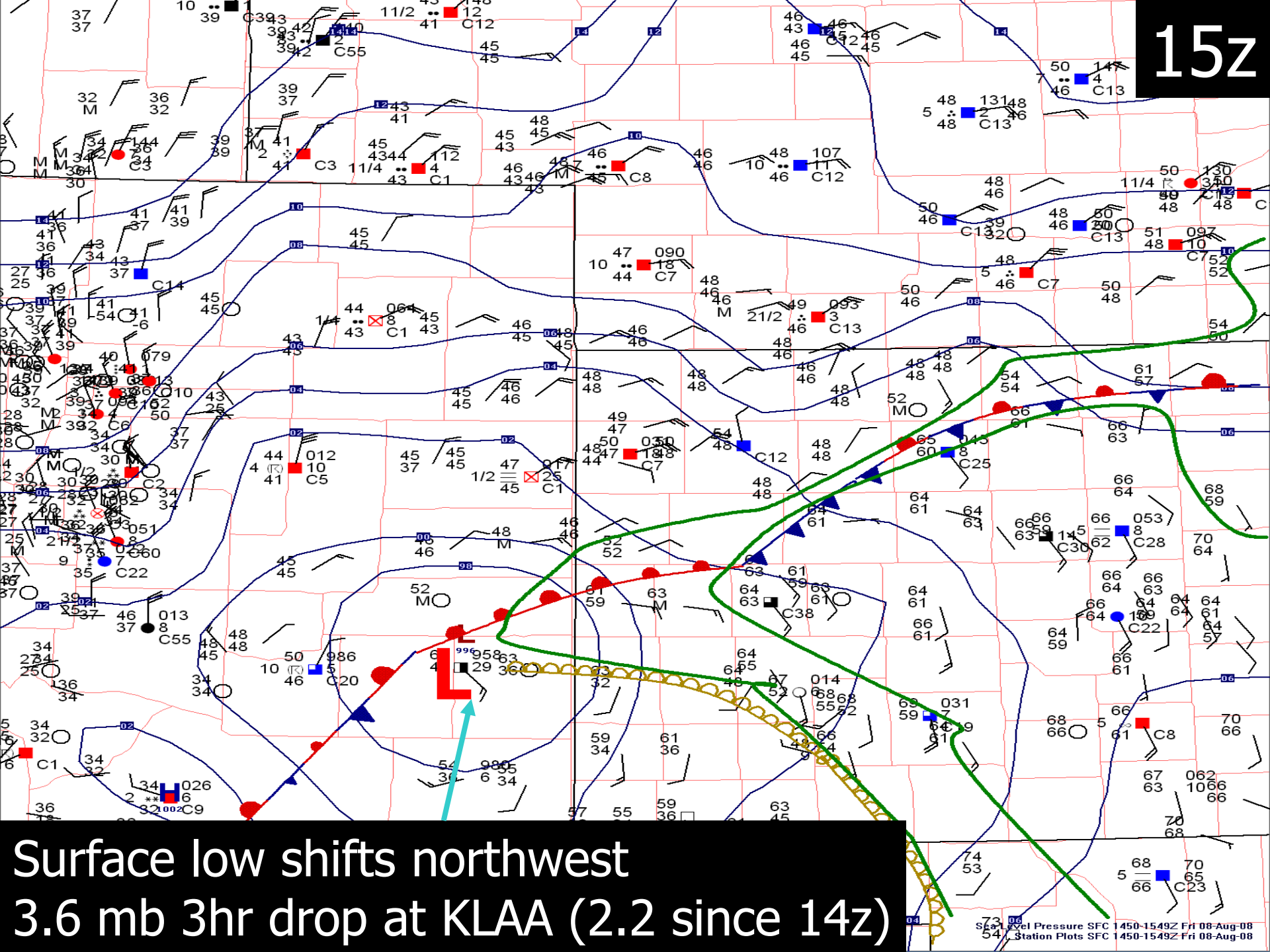
500 mb

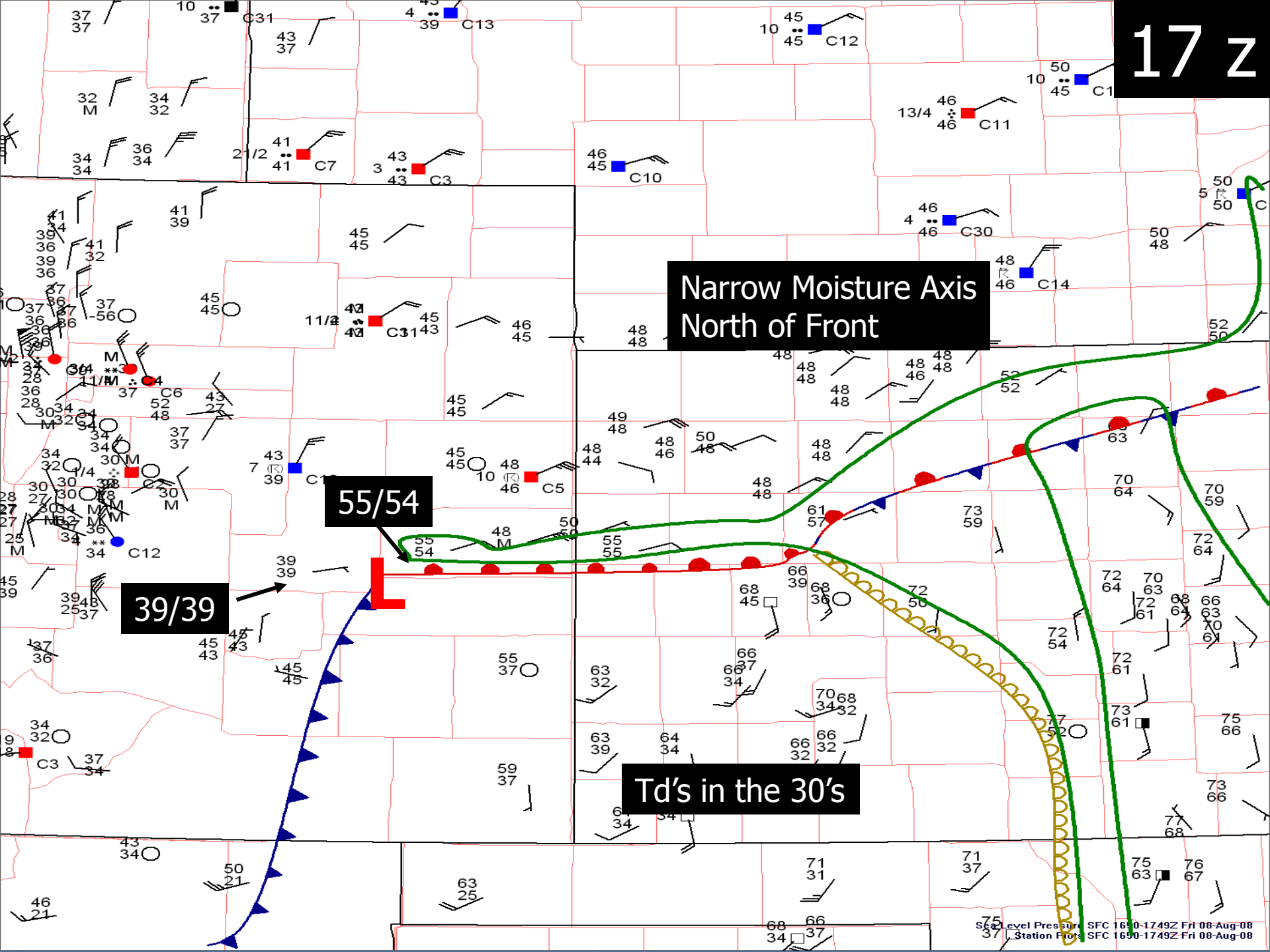
Images from SPC

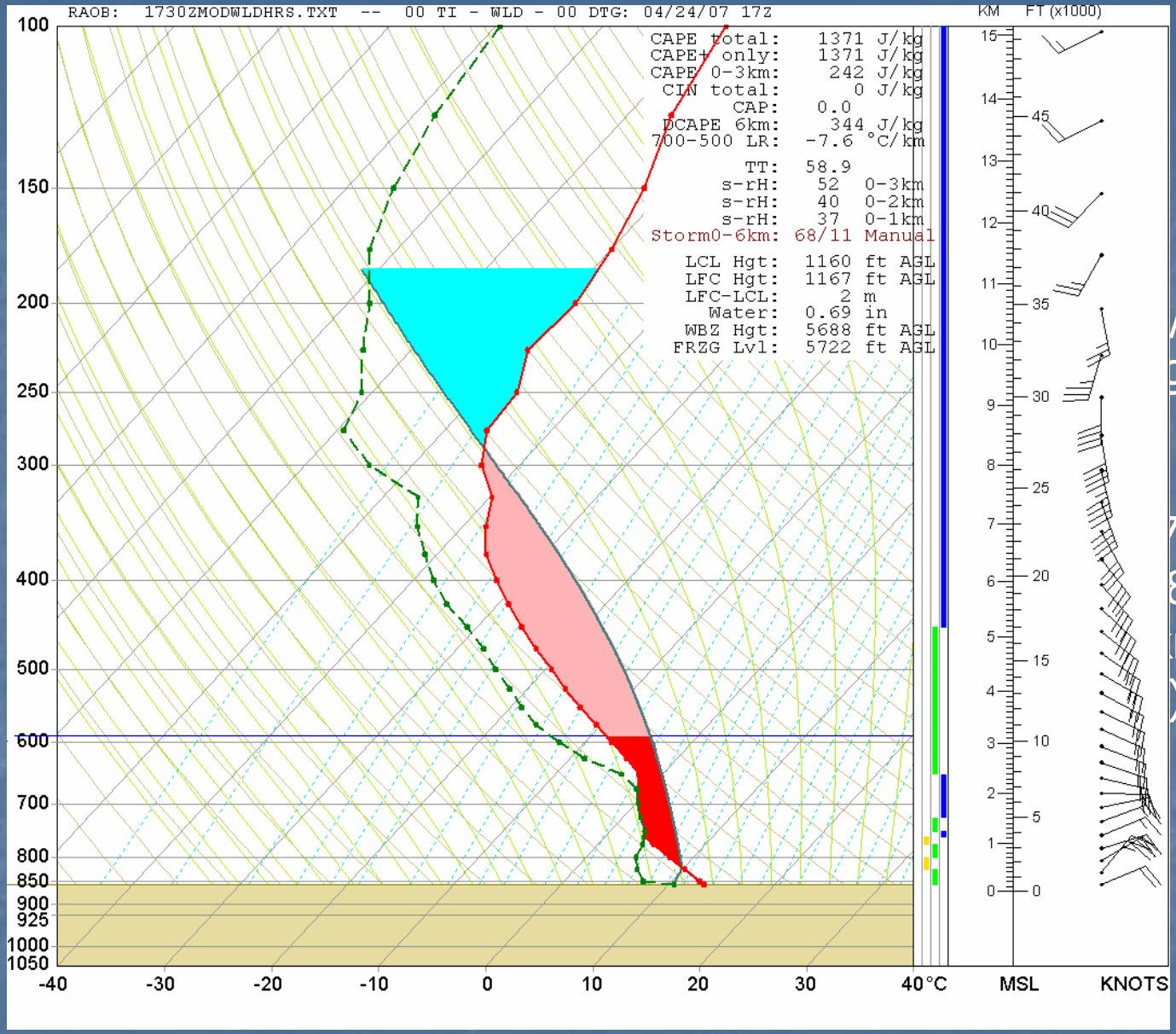

Temperatures in the 40s
Temperatures in the 60s
12 Z
Sea Level Pressure SFC 1150-1249Z Fri 08-Aug-08
Station Plots SFC 1150-1249Z Fri 08-Aug-08

15z 500mb Height/Temp



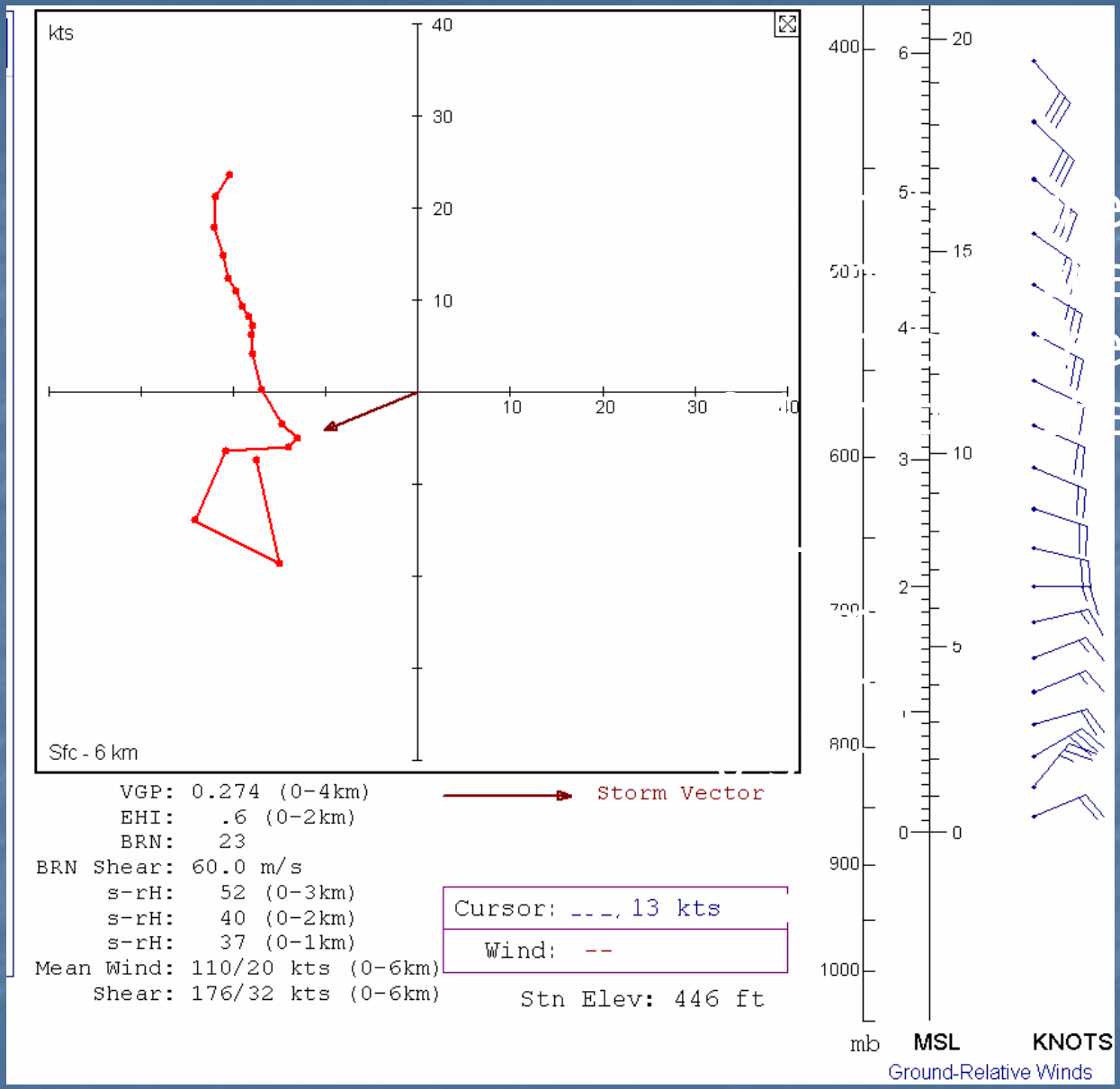

15z
Surface low shifts northwest
3.6 mb 3hr drop at KLAA (2.2 since 14z)
Sea Level Pressure SFC 1450-1549Z Fri 08-Aug-08
Station Plots SFC 1450-1549Z Fri 08-Aug-08


17 z
Narrow Moisture Axis
North of Front
55/54
39/39
Td's in the 30's
Sea Level Pressure SFC 1650-1749Z Fri 08-Aug-08
Station Plots SFC 1650-1749Z Fri 08-Aug-08



/kg
g
751ft
8.5
m)
)
mb

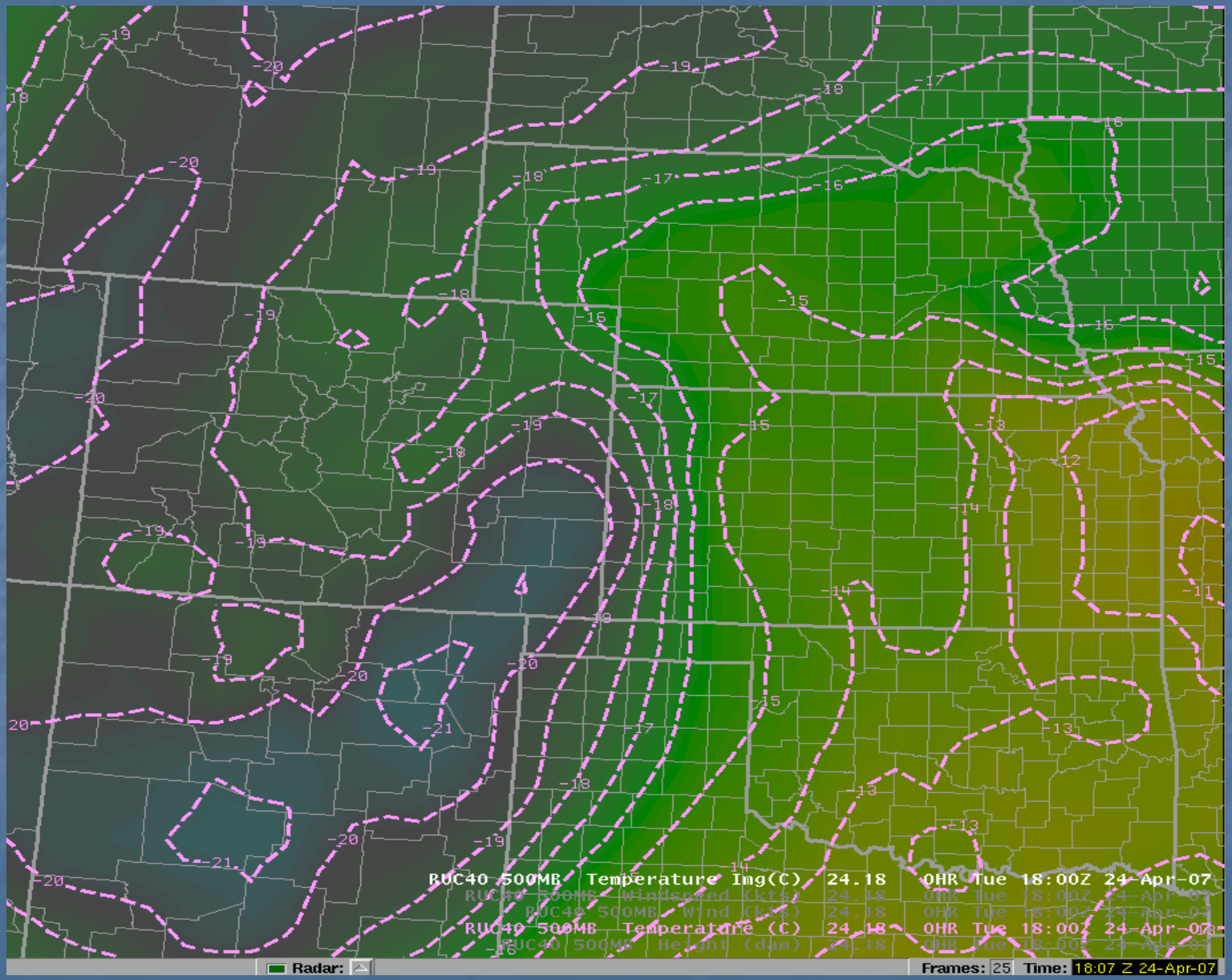
Modified RUC40 17z sounding at Wild Horse, Colorado
SFC 56/51 (28 minutes prior to first tornado report)

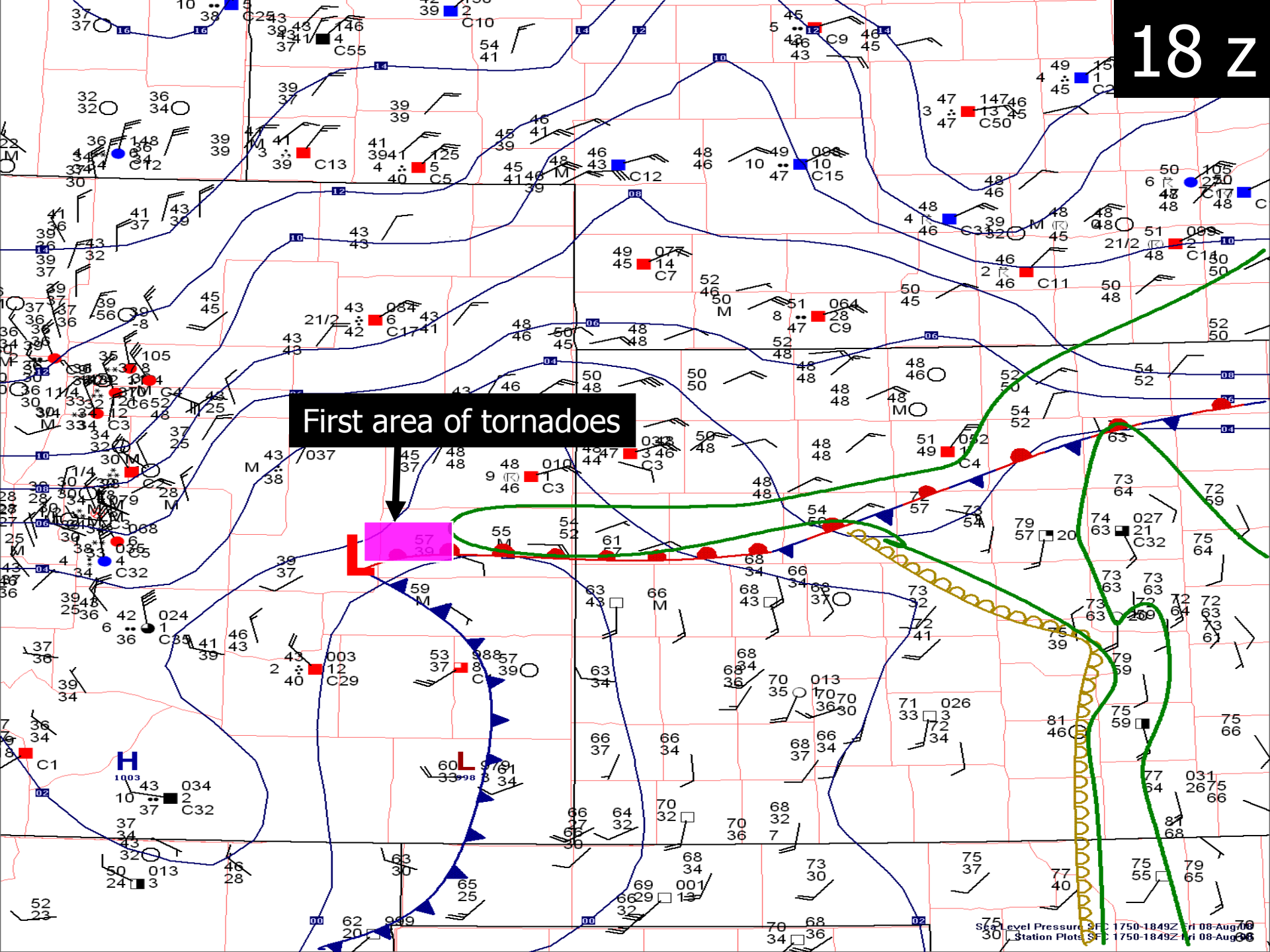


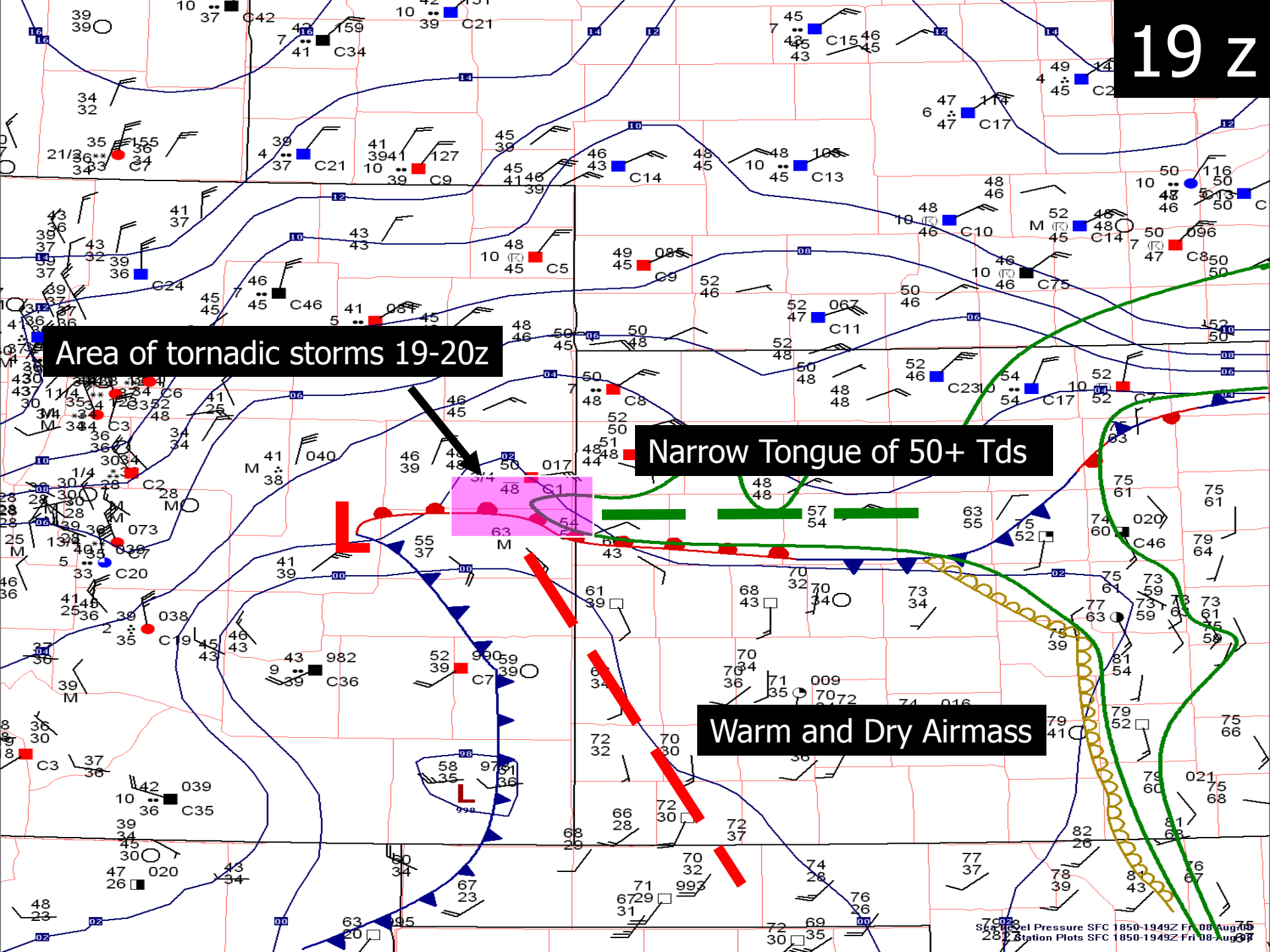
ear: 32 kts
ear: 70 kts
ear: 3 kts
ear: 36 kts

17z RUC40 0-6 km Hodograph at Wild Horse, Colorado

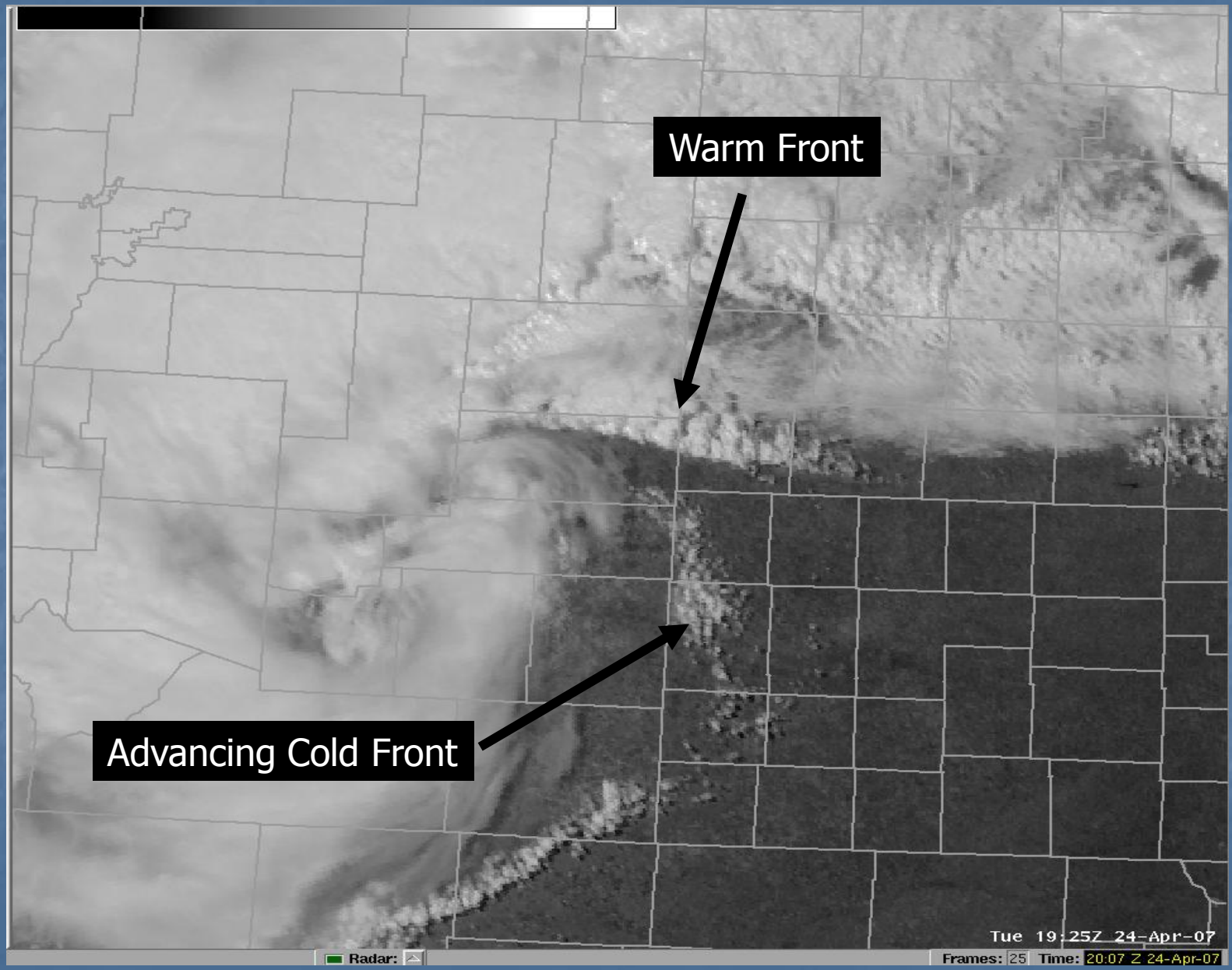
18z 500mb Height/Temp

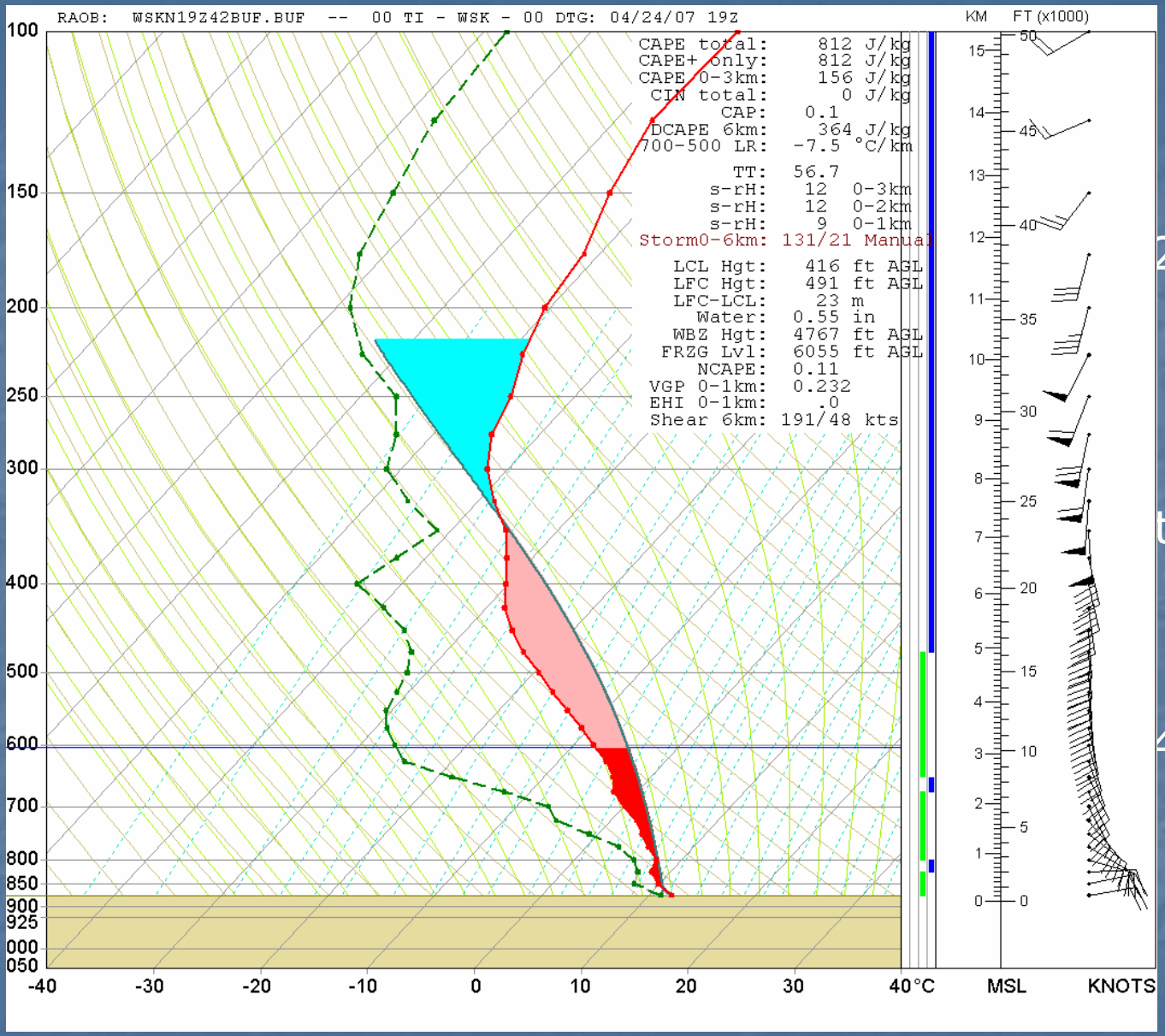



18 z
First area of tornadoes


19 z
Area of tornadic storms 19-20z
Narrow Tongue of 50+ Tds
Warm and Dry Airmass

19z Visible Satellite



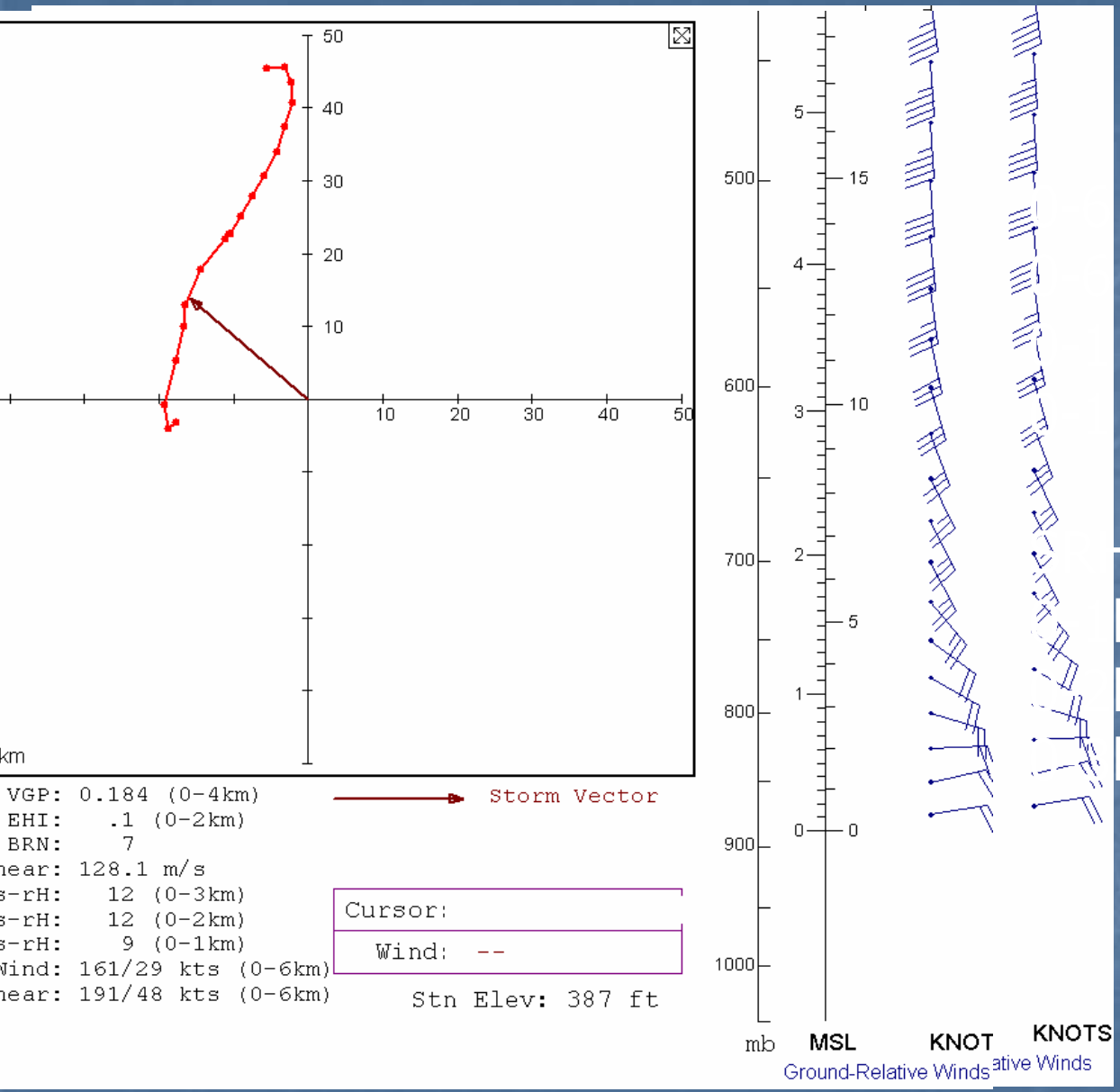


2 j/kg
j/kg

24681ft
te: 7.9

.11
450 mb

Modified RUC40 19z sounding at Weskan, Kansas
Surface data 54/52

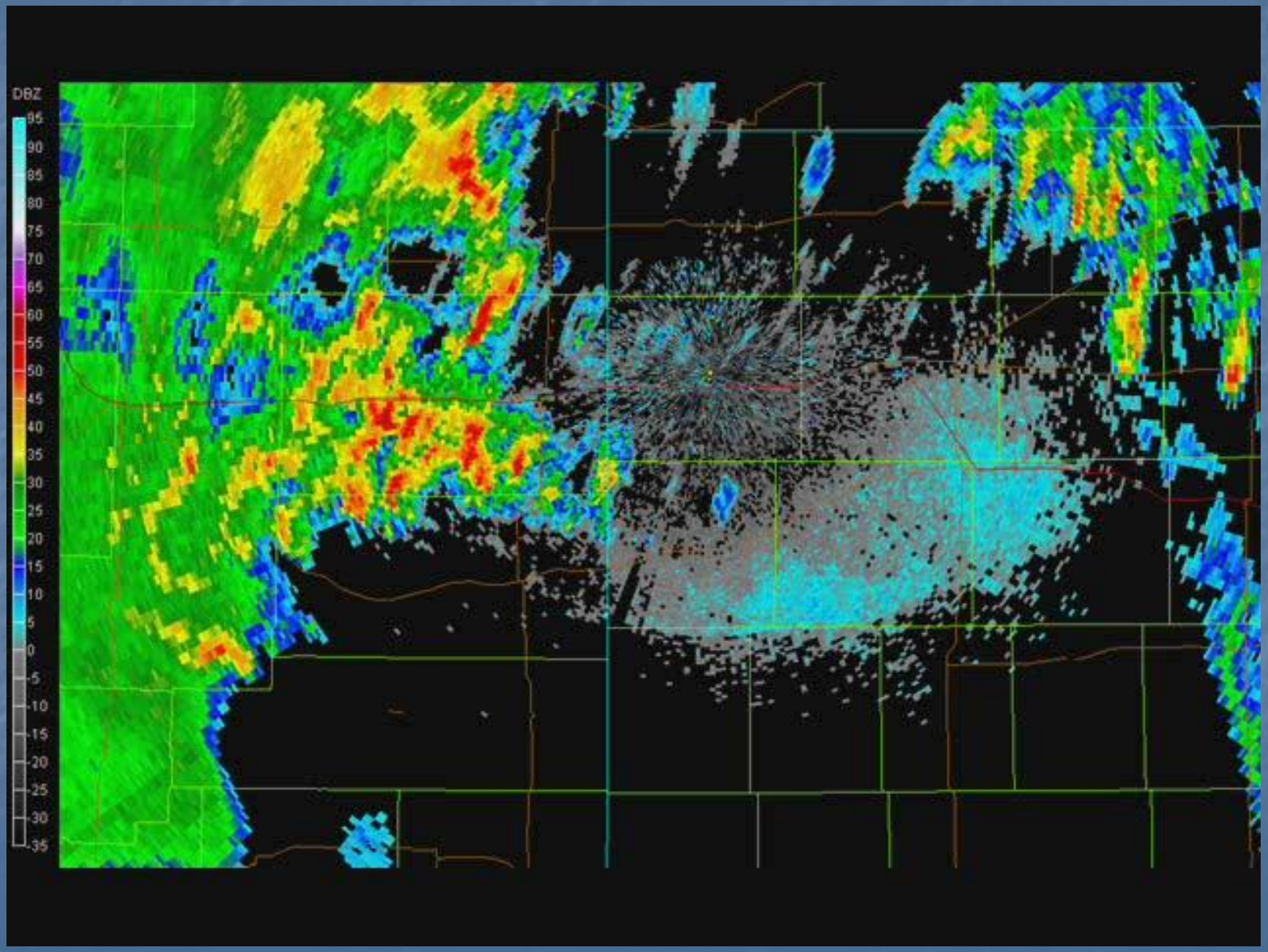


km bulk shear: 48 kts
km total shear: 62kts
km bulk shear: 13 kts
km total shear: 16kts

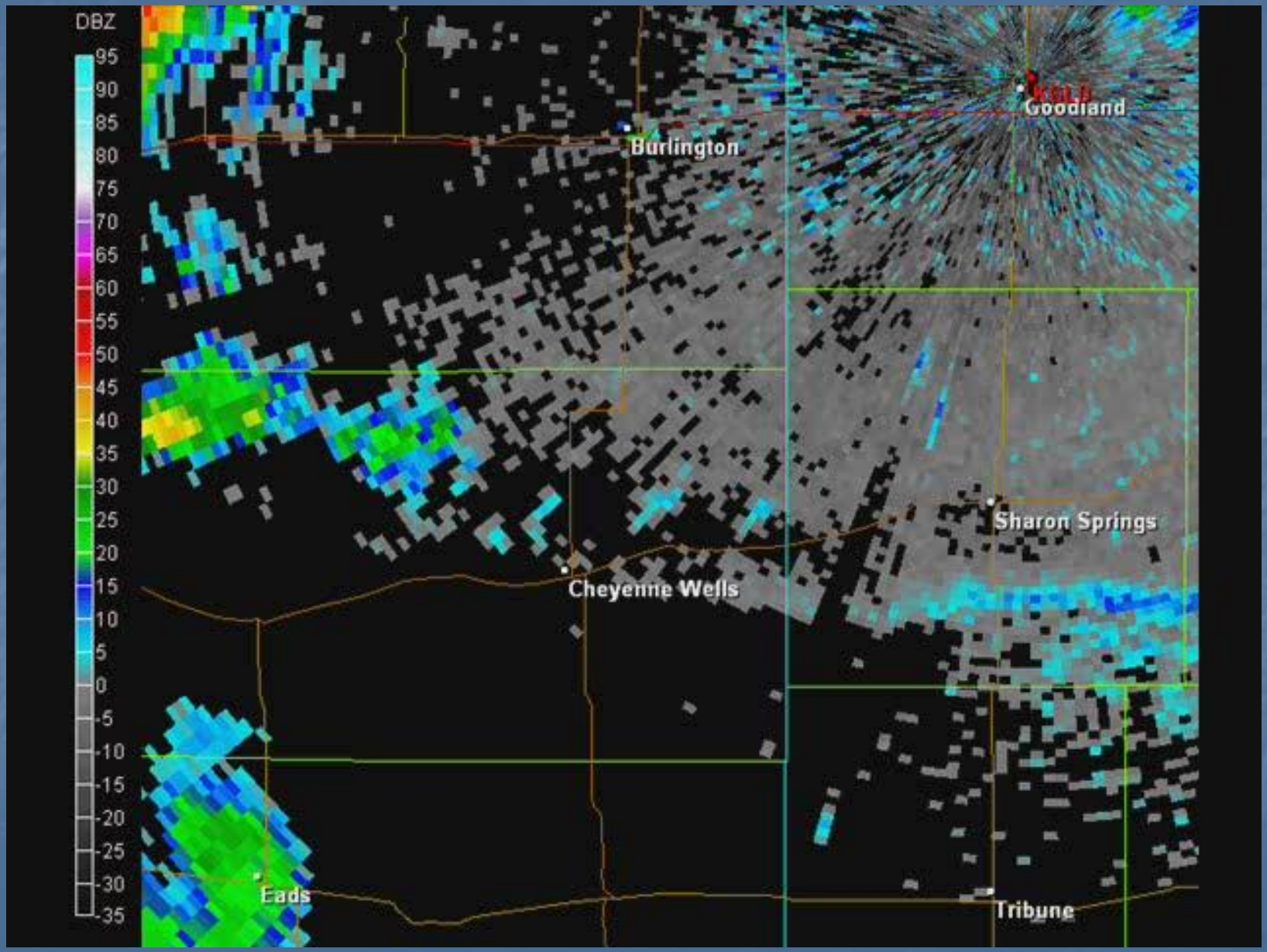
0-1 km SRH : 57
0-2 km SRH : 137
0-3 km SRH : 149
km : 12

19z Hodograph With Unmodified Storm Motion

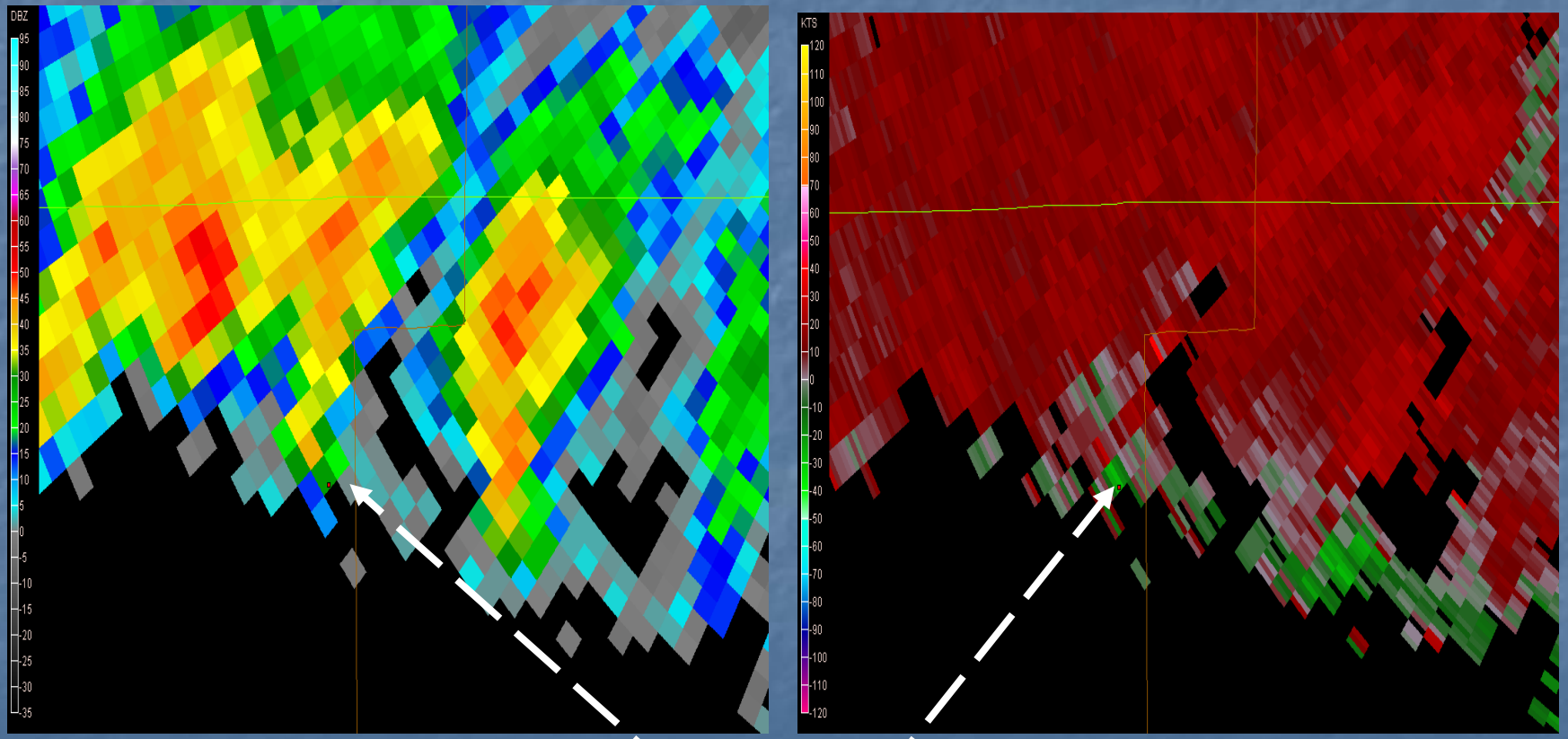
1705-2058z KGLD Reflectivity



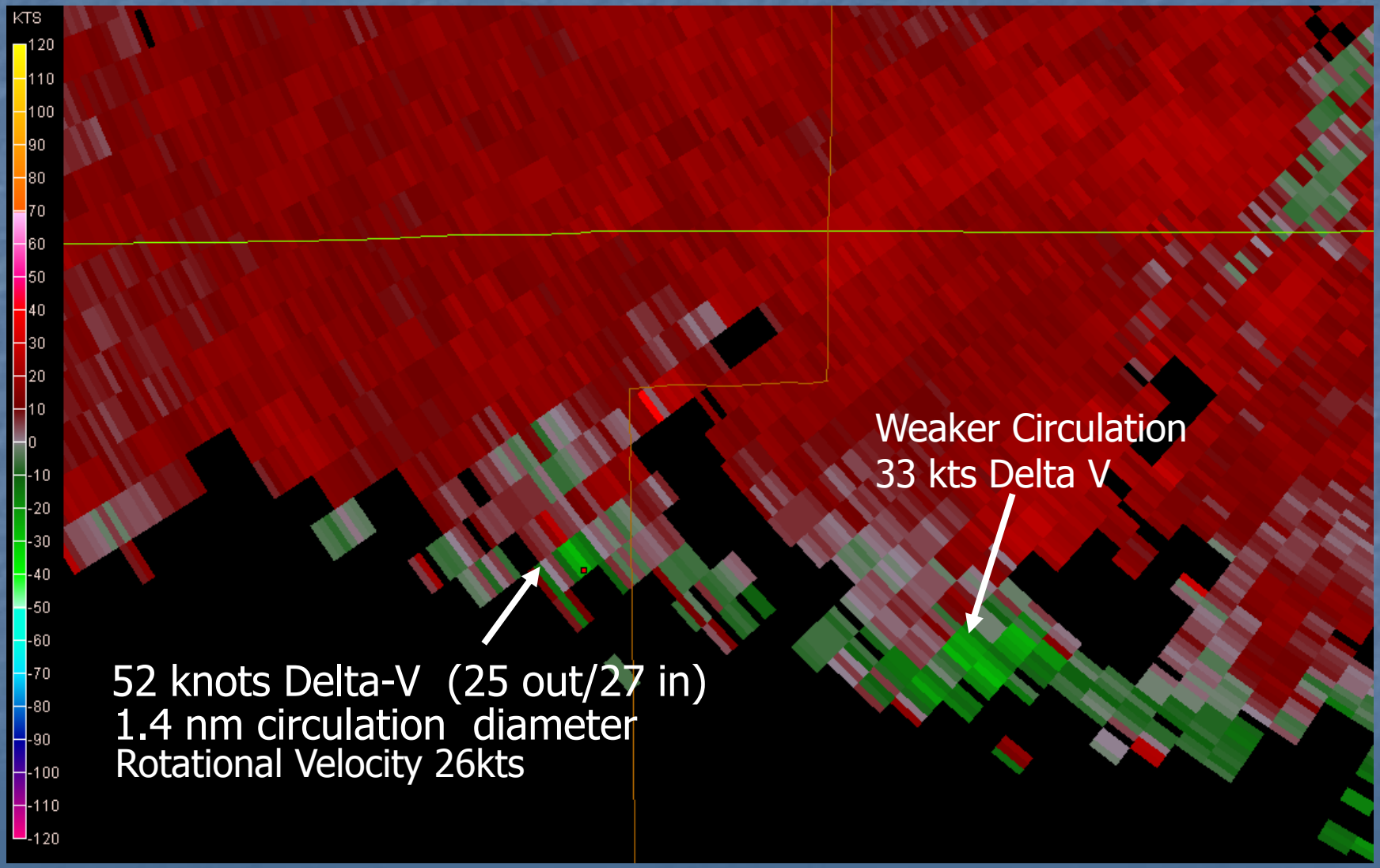
1851-2010z Zoomed In



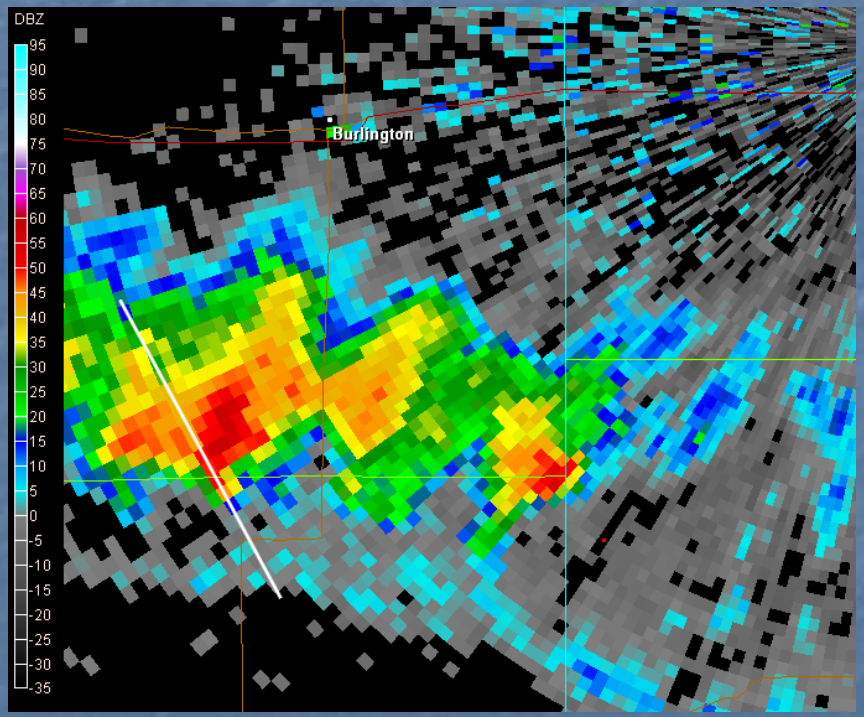
1933Z Reflectivity/SRM



1933Z 0.5 KGLD SRM

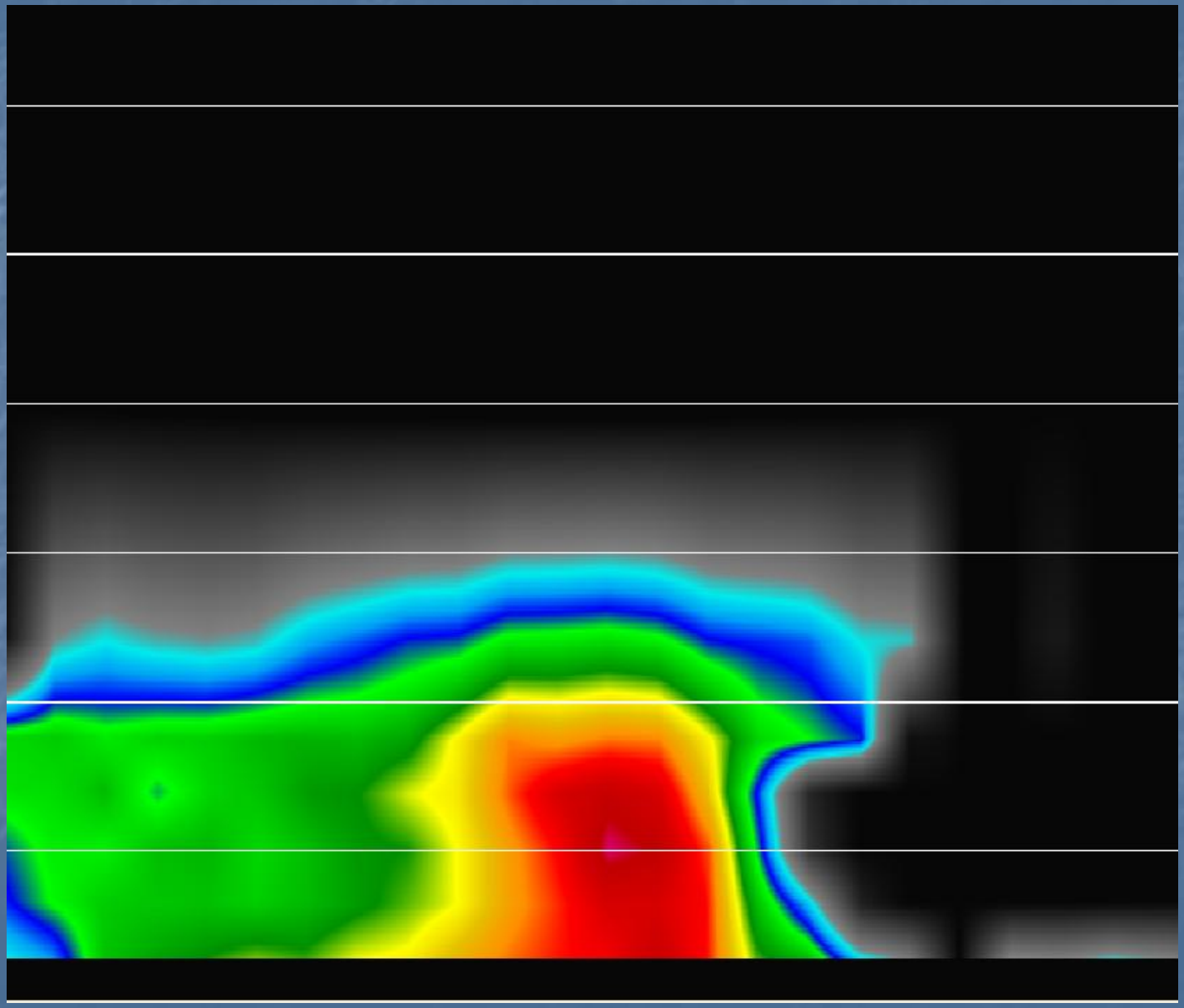


Storm Picture at 2005 Z, From 20 miles away!

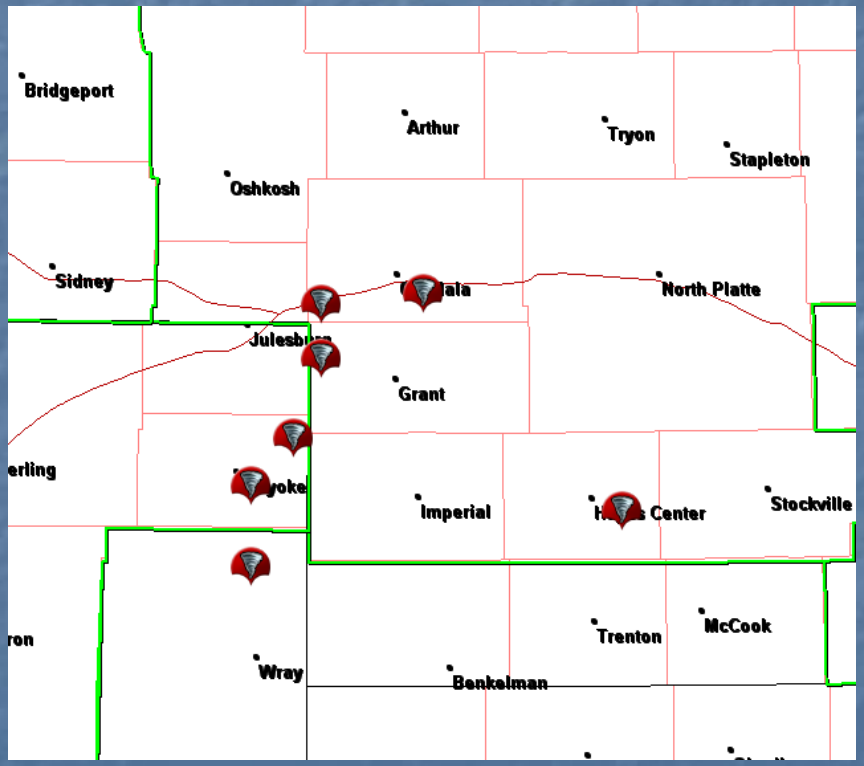


Pictures courtesy of Al Pietrycha

Cross Section

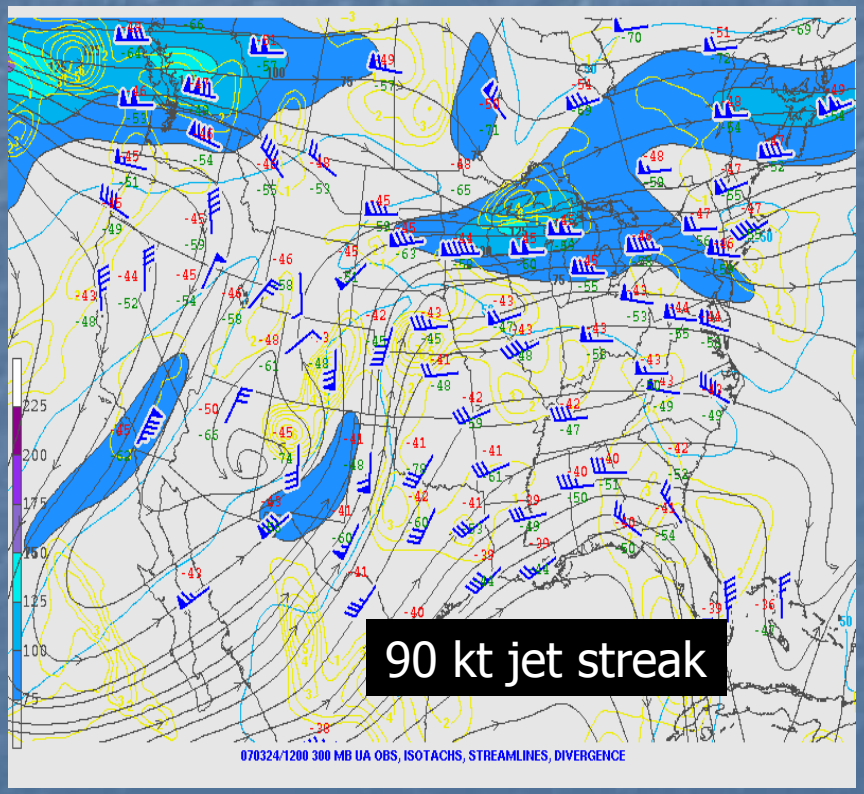


March 24th 2007

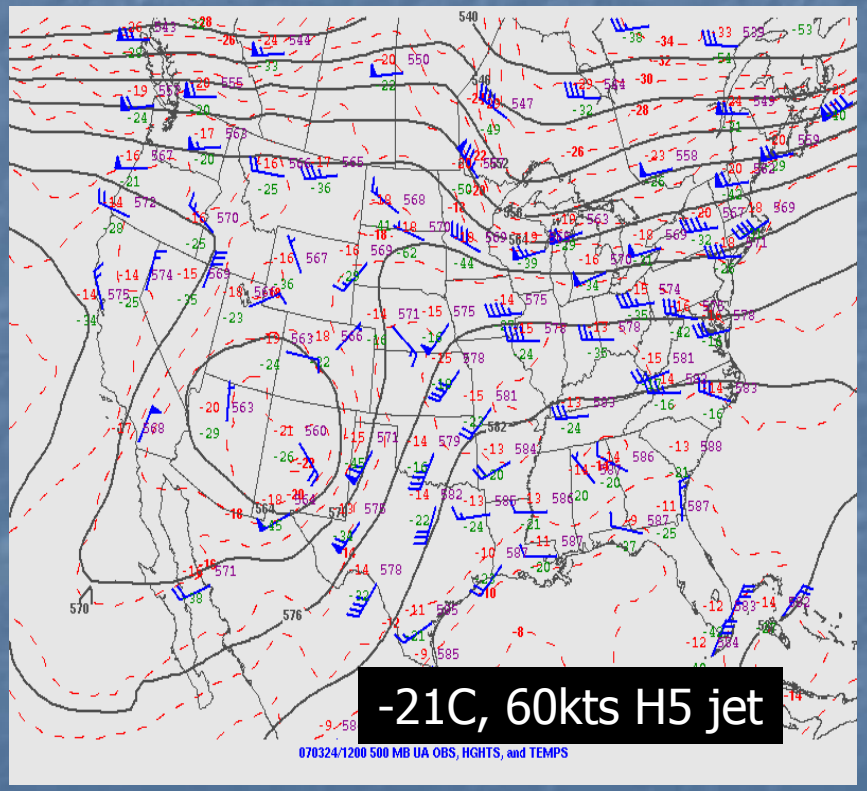


- Seven tornadoes occurred across NE Colorado and SW Nebraska.
- Tornadoes all occurred in a 2 hour 15 min period.

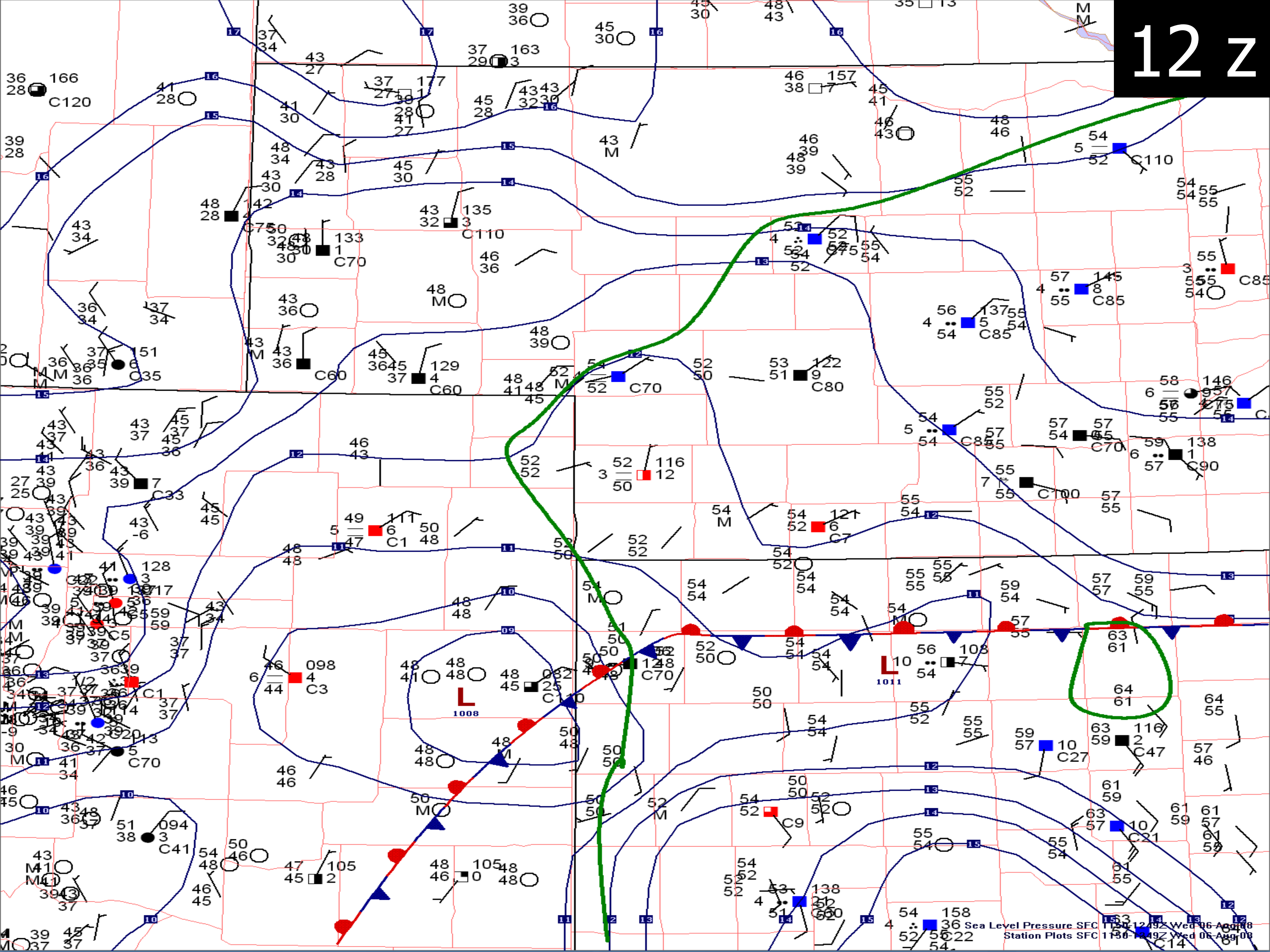
03/24/07

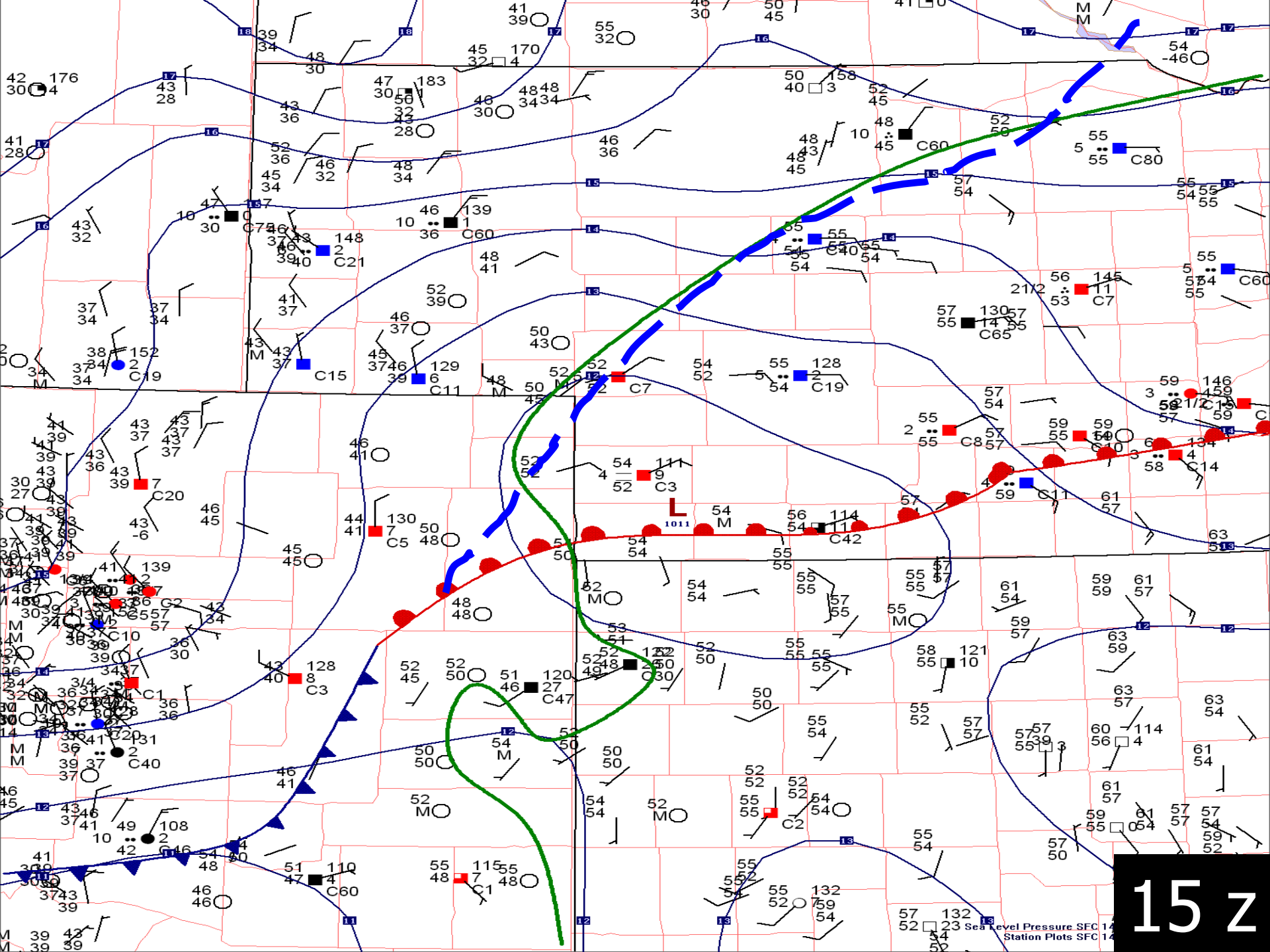


300 mb

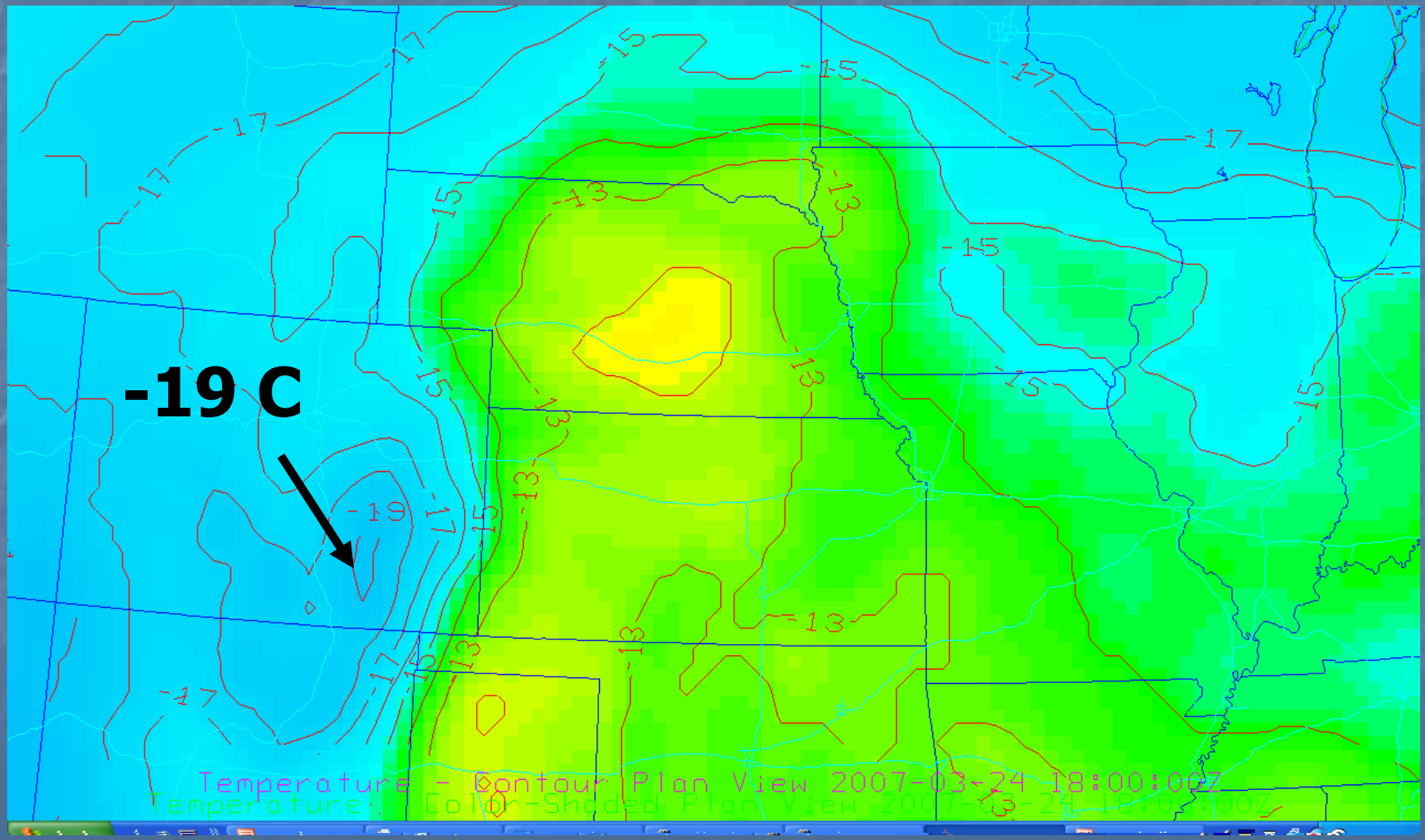


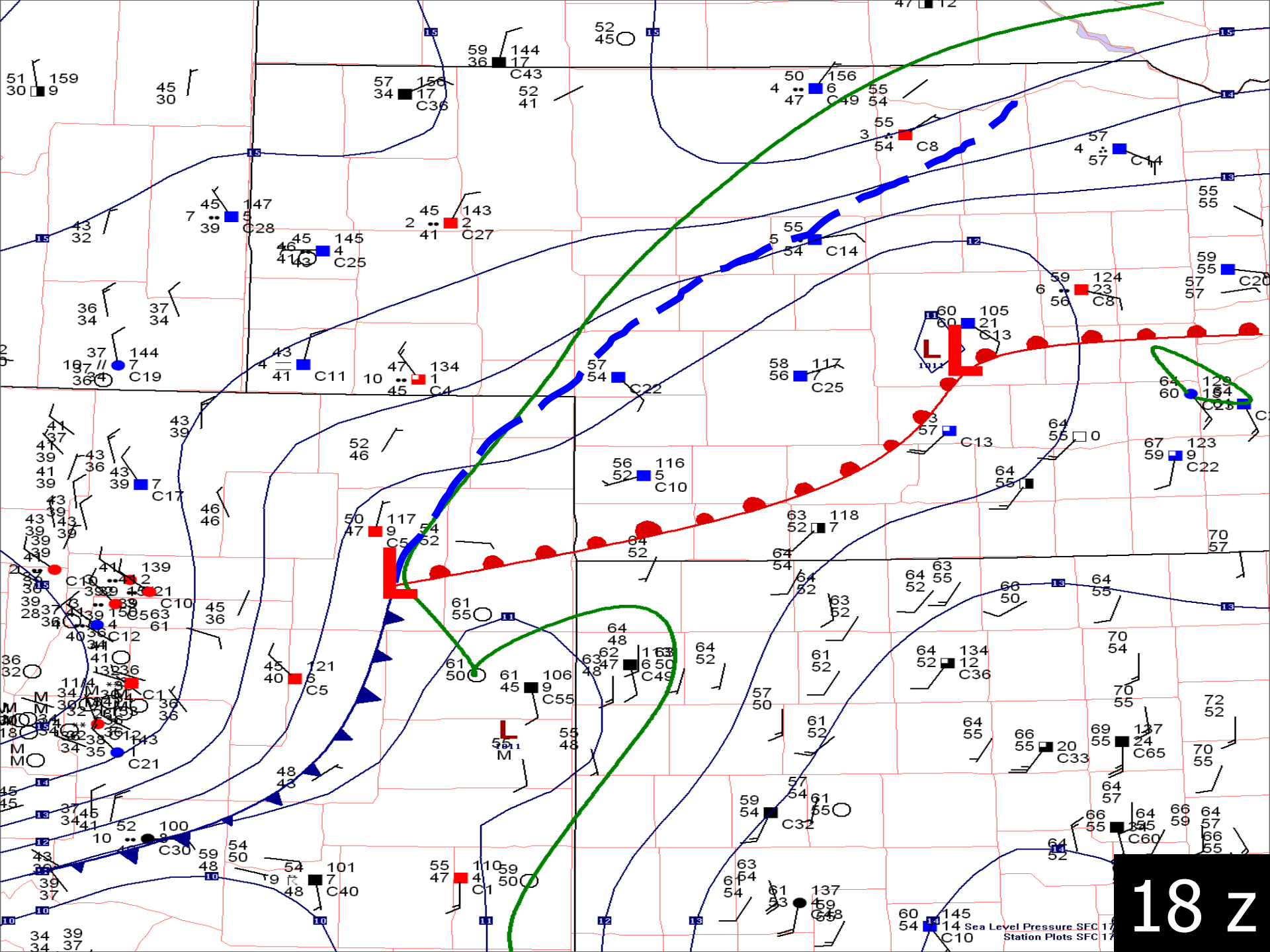
500 mb


12 z
L 1008
L 1011
Sea Level Pressure SFC
Station Plots SFC
Wed 06-Aug-08

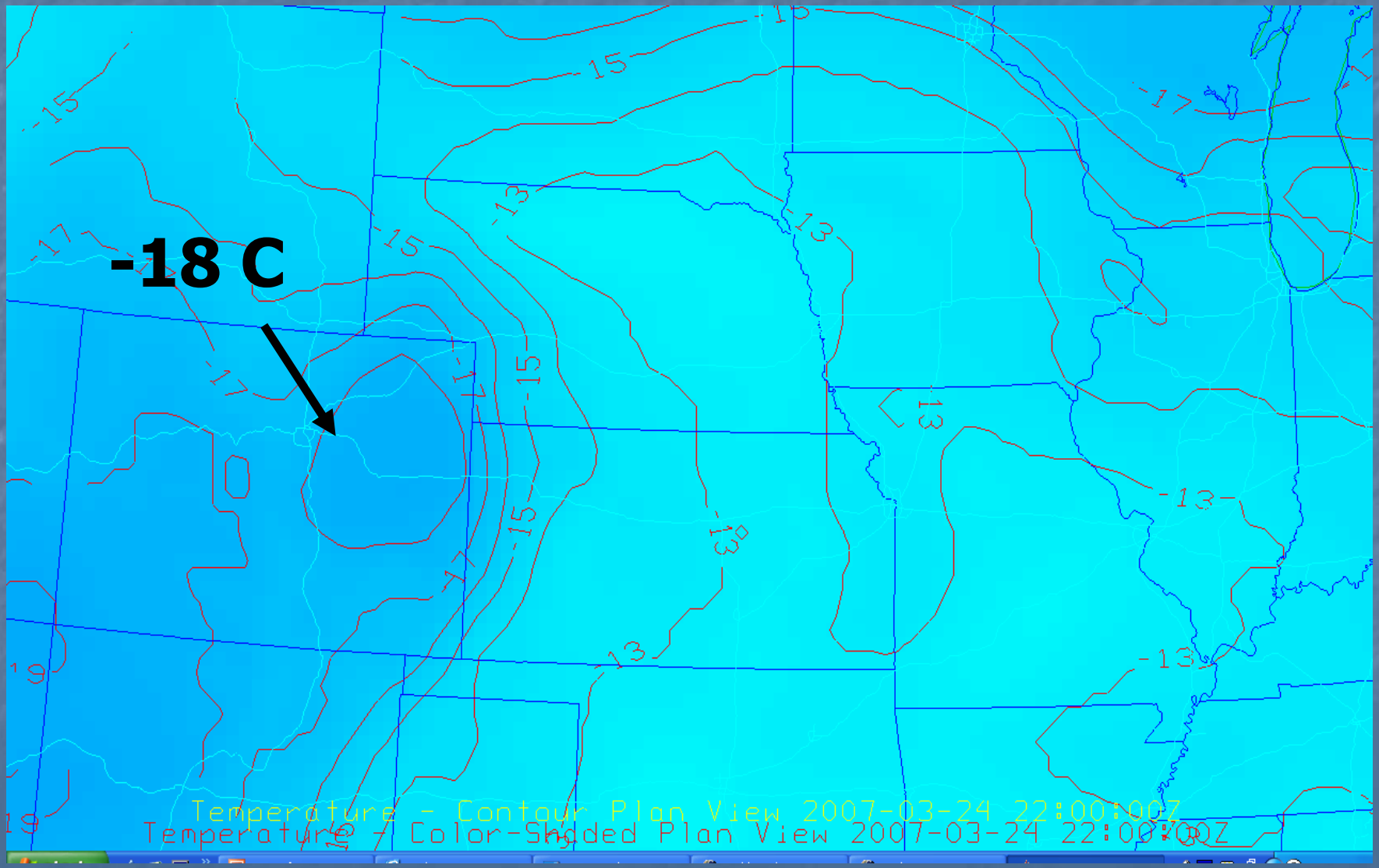

15 z
Sea Level Pressure SFC 14
Station Plots SFC 14

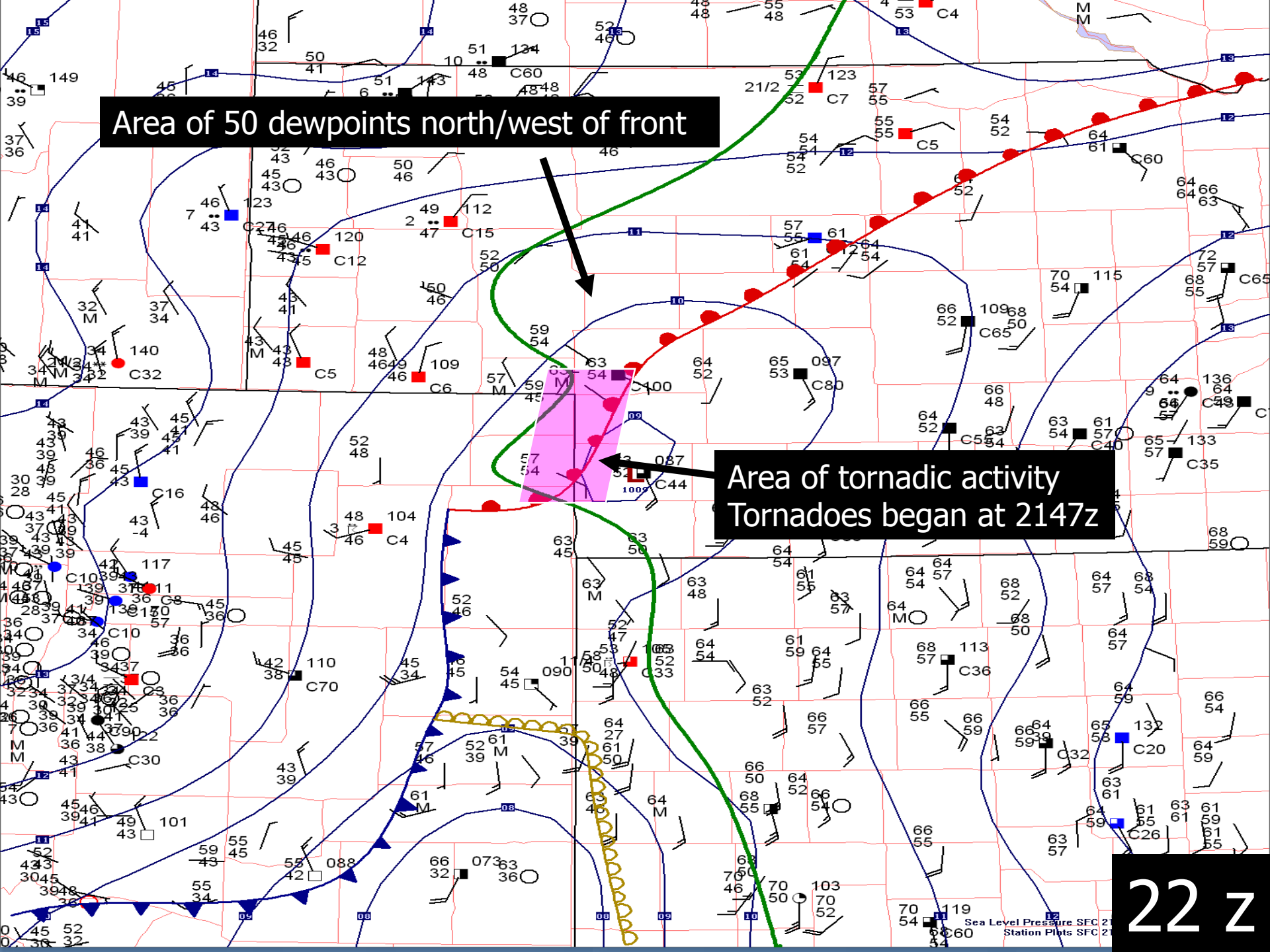
18z RUC H5 Tmp/Height

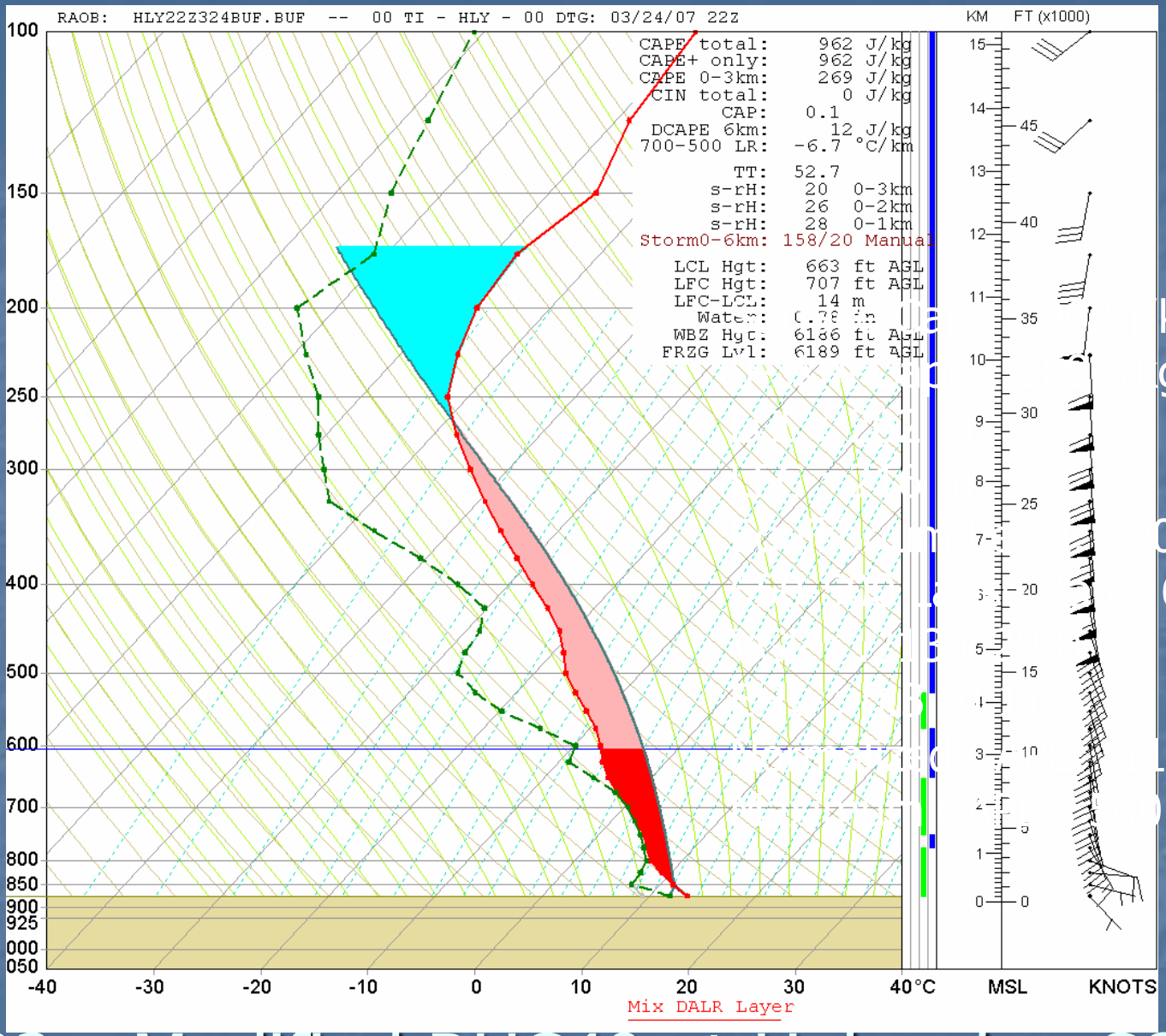



Sea Level Pressure SFC 17
Station Plots SFC 17
18 z

22z RUC H5 Tmp/Height

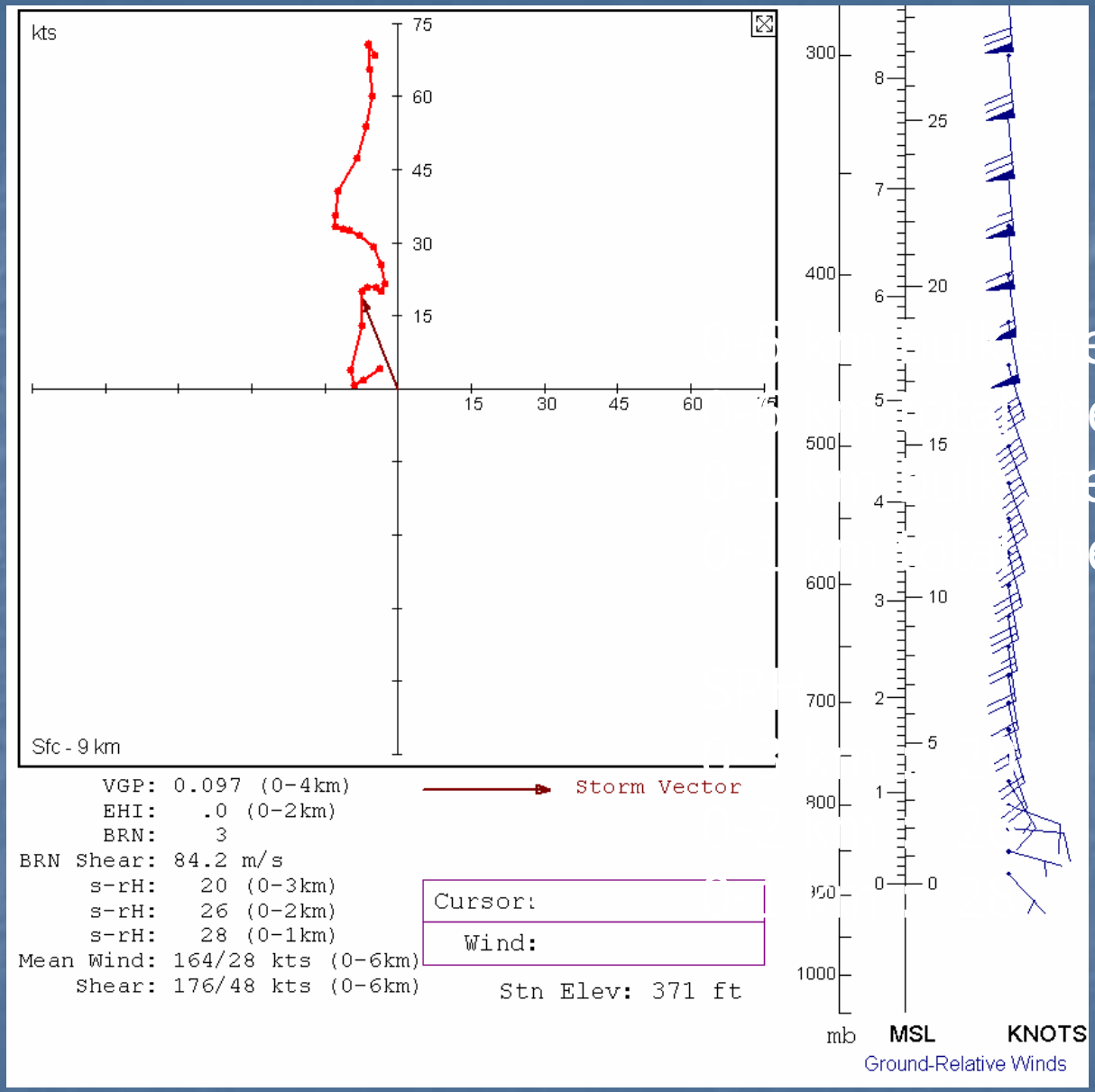



Area of 50 dewpoints north/west of front
Area of tornadic activity
Tornadoes began at 2147z
22 z



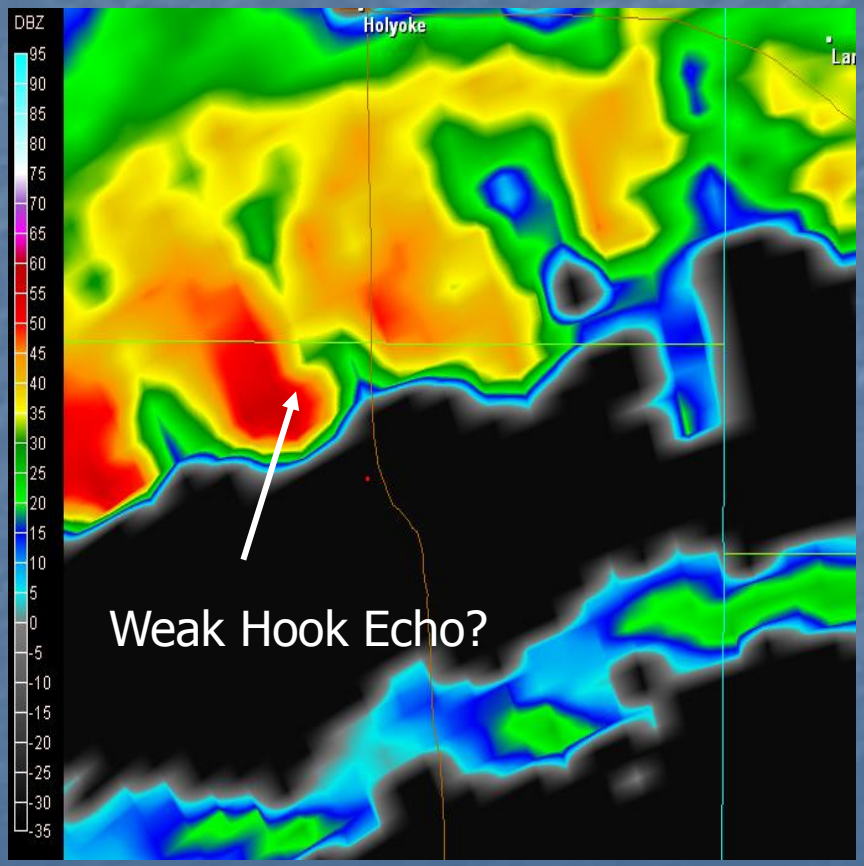
22z Modified RUC40 at Holoyoke, CO

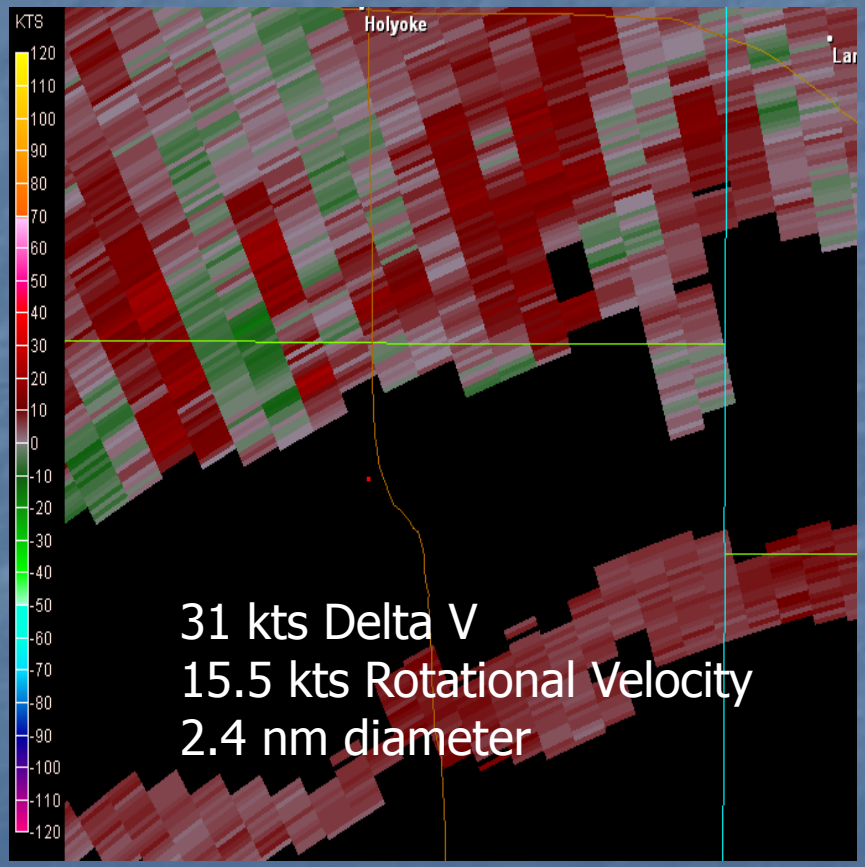
Surface 57/54



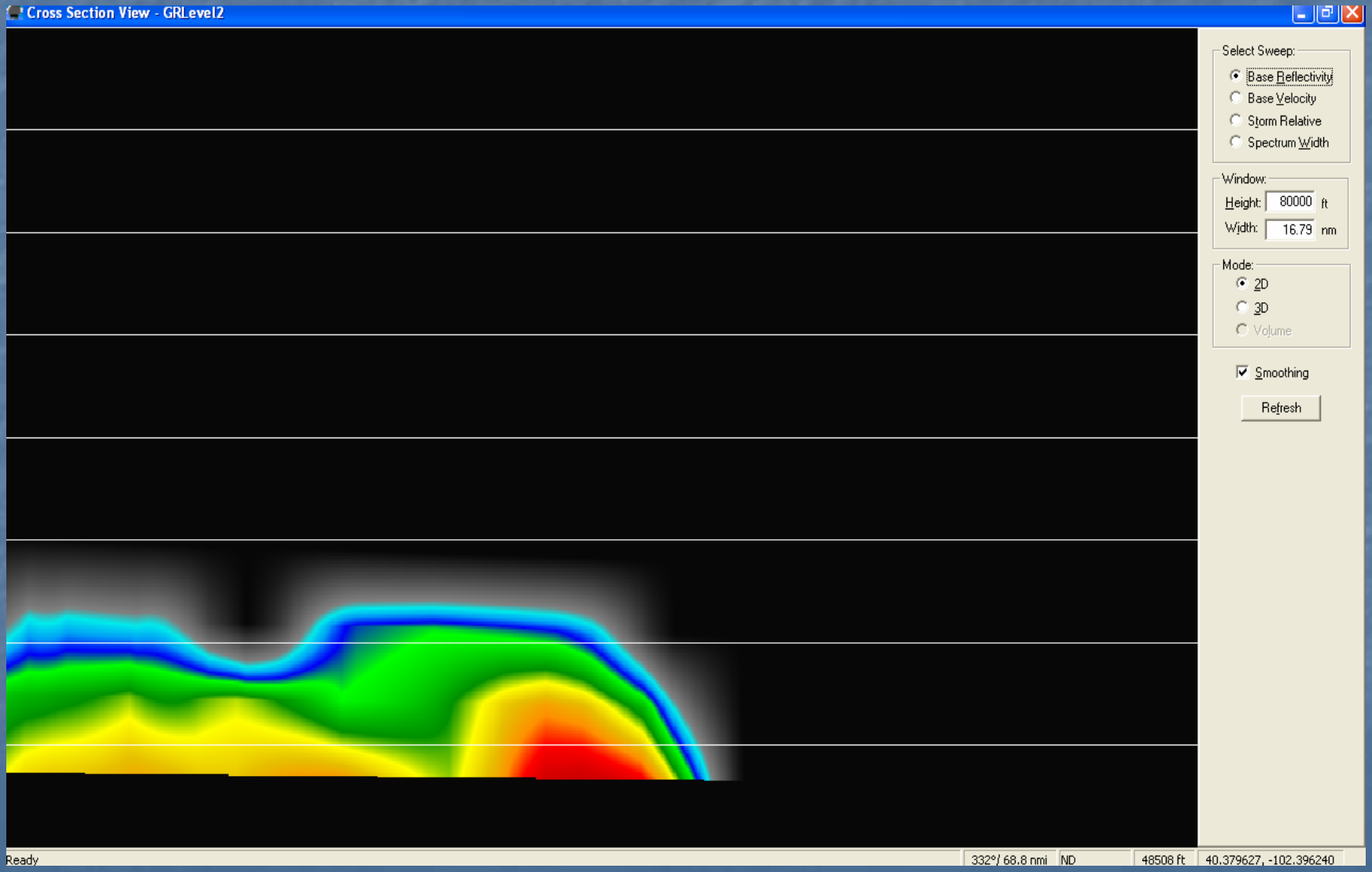
ear : 48 kts
ear : 69 kts
ear : 9 kts
ear : 18 kts

2147z 0.5 Z/SRM





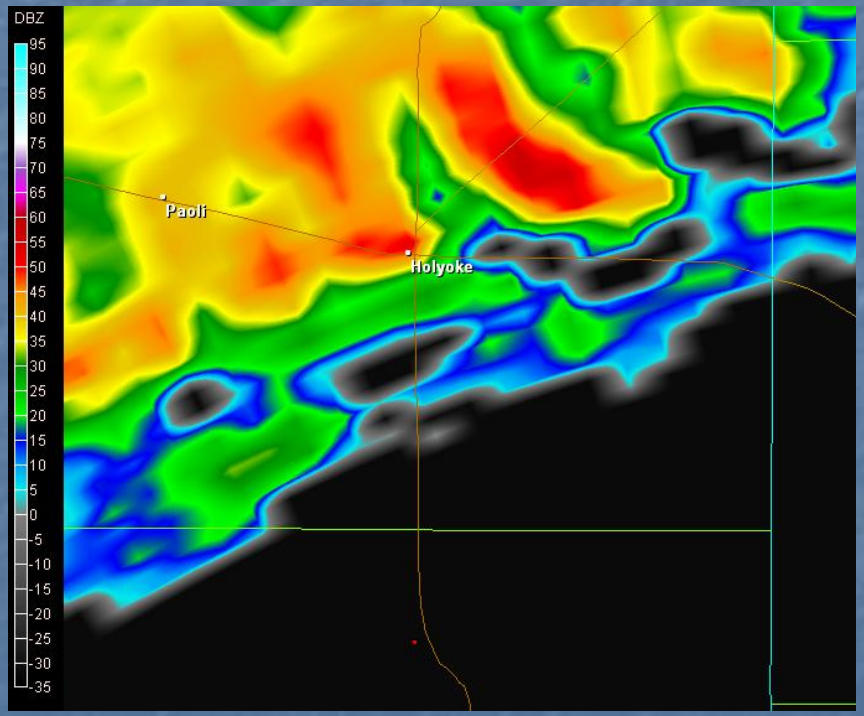
2147z Reflectivity

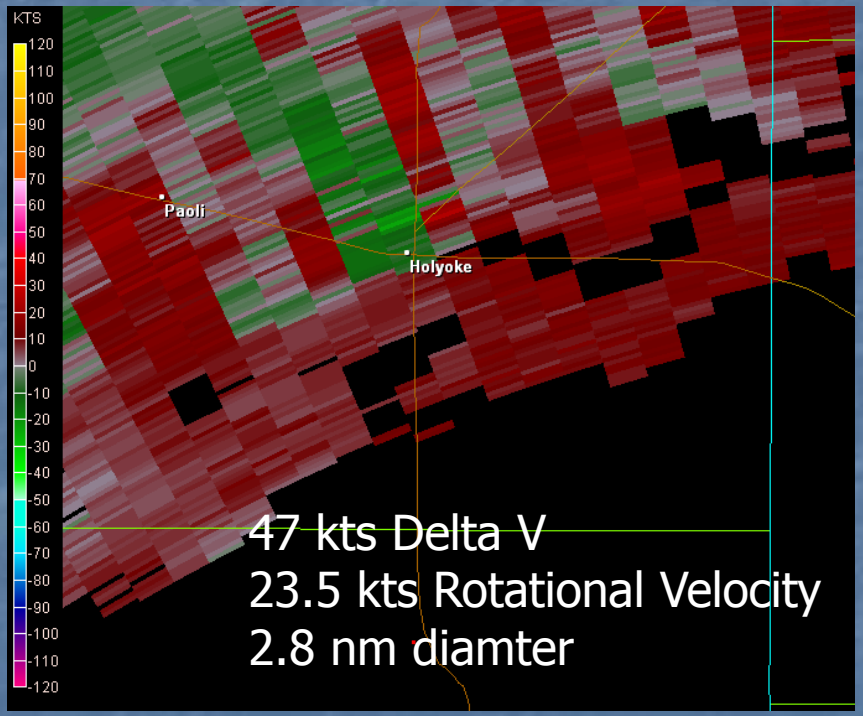


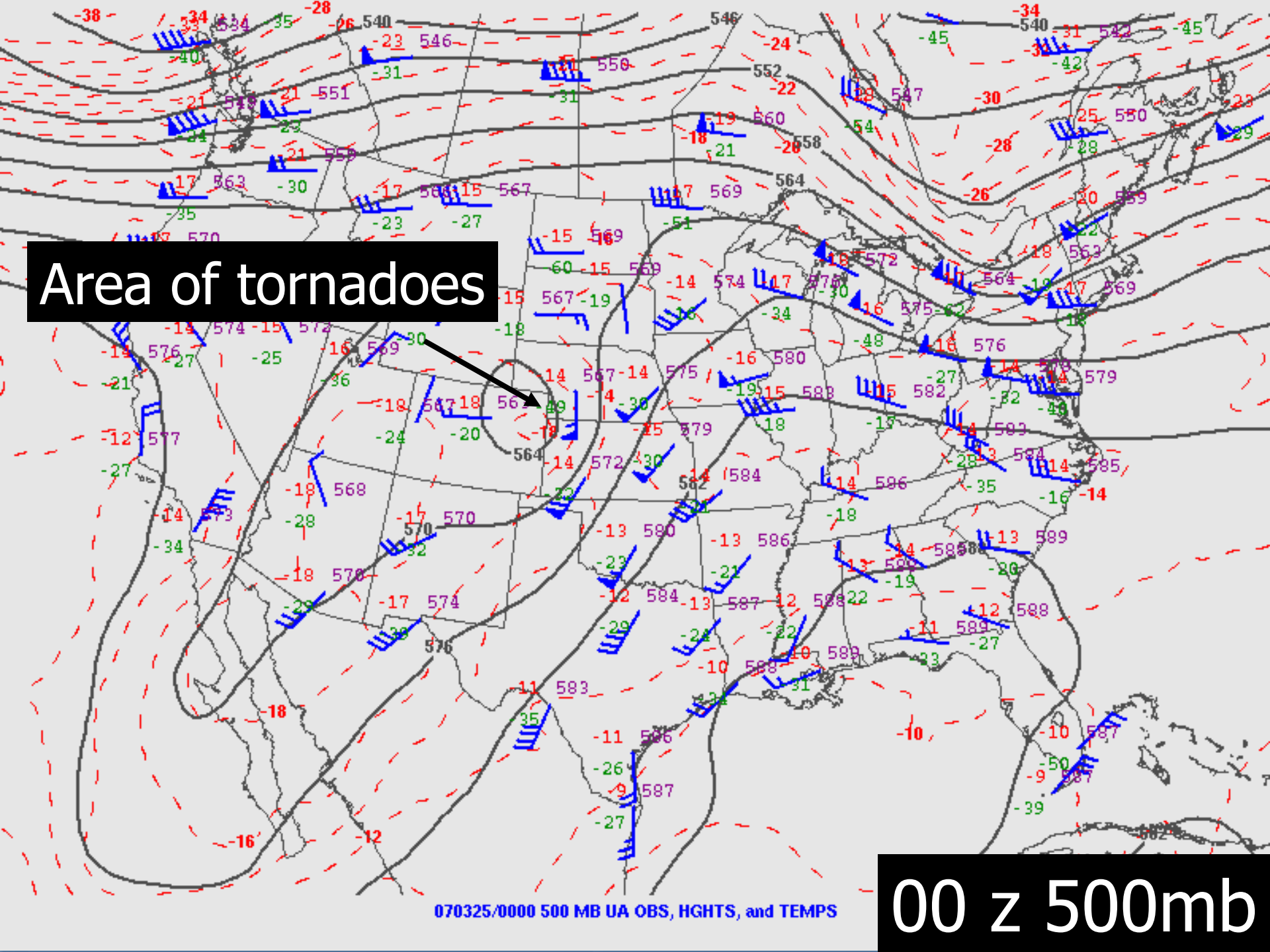
Holyoke Tornado

Pictures courtesy of Al Pietrycha

2219Z 0.5 Z/SRM






Area of tornadoes
070325/0000 500 MB UA OBS, HGHTS, and TEMPS
00 z 500mb

Conclusions

- Position of surface warm front played a vital role in both events.
- Strong 0-3km CAPE (150-250 j/kg) and 0-1km total shear >15 kts
- Low (<400m) LFC and LCL in place just north of the front.

References

- Davies, J.M., and J.L. Guyer, 2004: A preliminary climatology of tornado events with closed cold core 500mb lows in the central and eastern United States. Preprints, 22nd Conf. on Severe Local Storms, Hyannis, MA, Amer. Meteor. Soc
- Storm Prediction Center (http://www.spc.noaa.gov)