Evolution of Environmental Conditions Supportive of Tornadic Supercells on 11 June 2008

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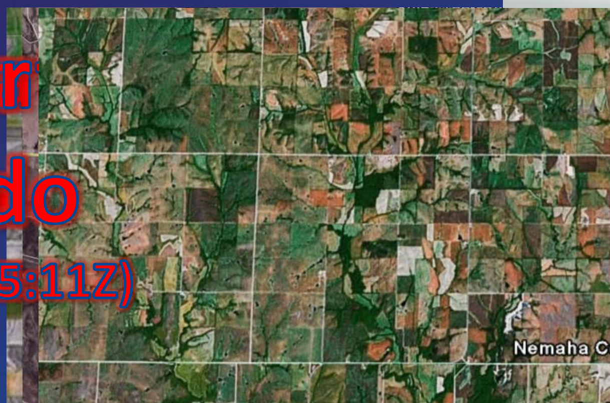
NOAA/NWS WFO Topeka, KS

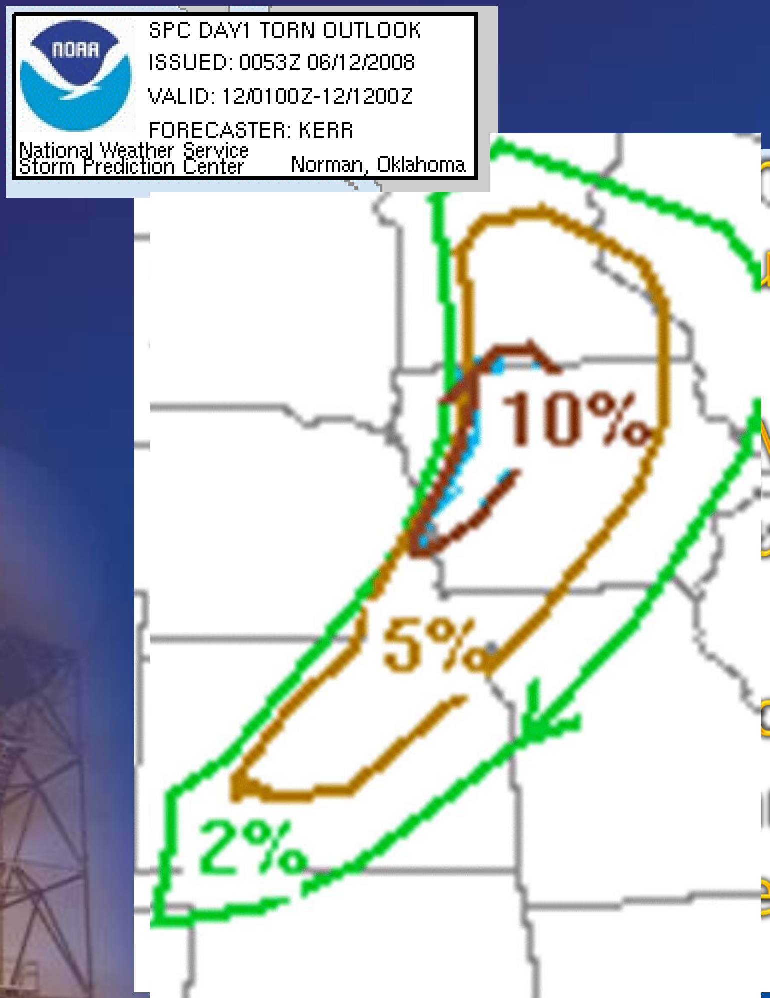
The Night of June 11, 2008

Soldier Tornado

(04:48Z–05:11Z)



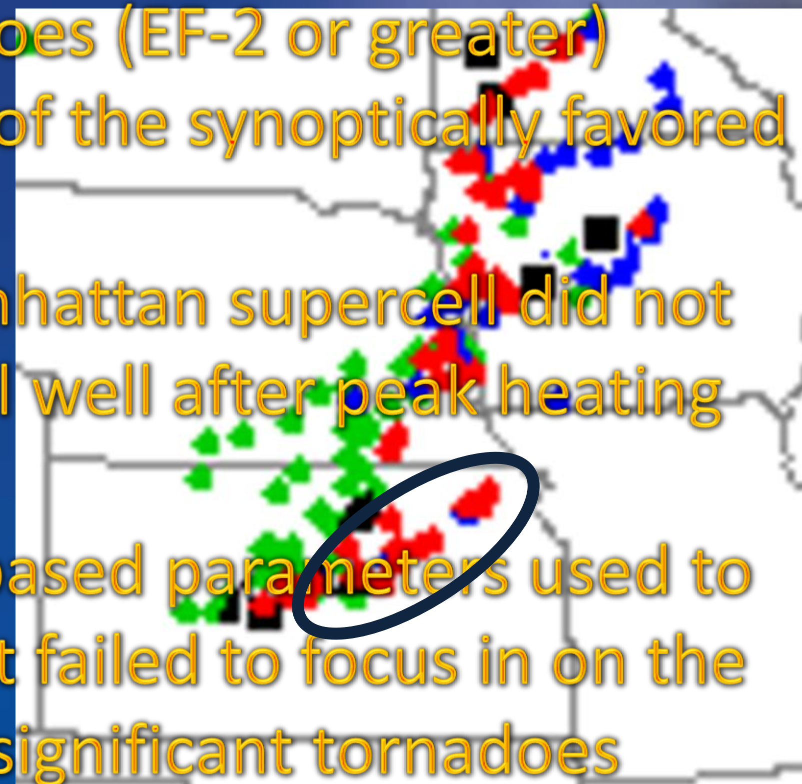
Why is this event important?



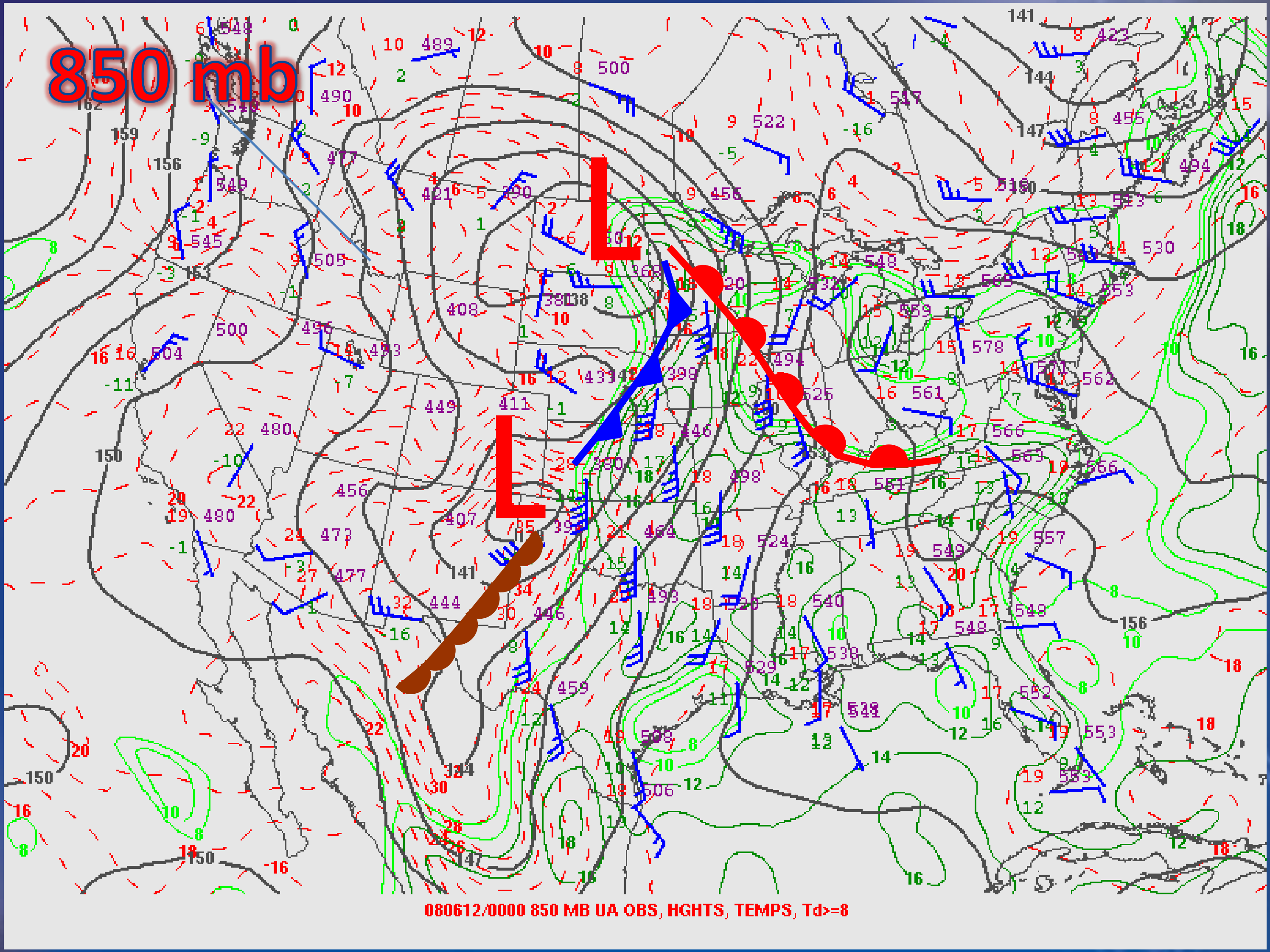
nadoes (EF-2 or greater)
uth of the synoptically favored

Manhattan supercell did not
until well after peak heating

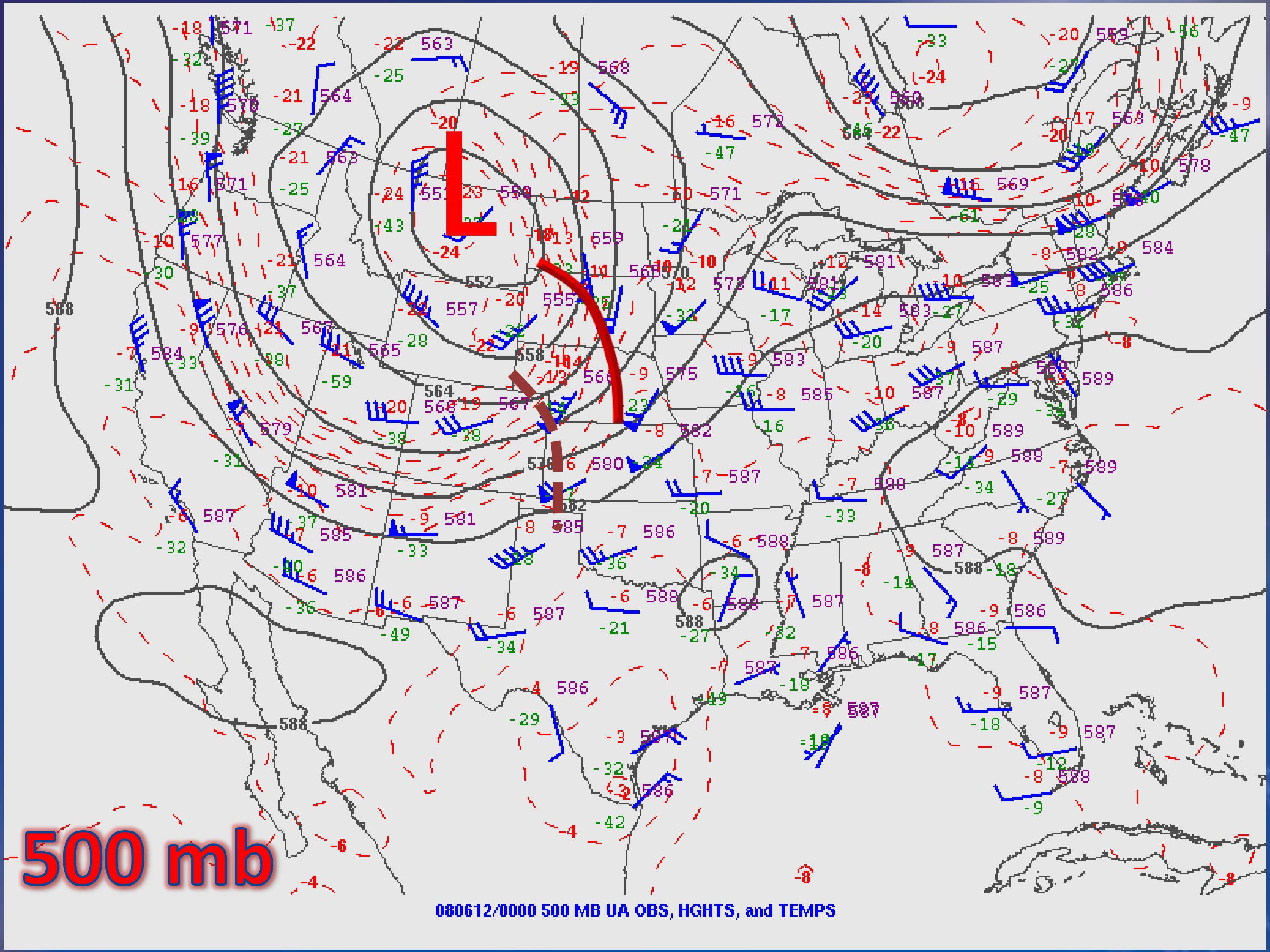
ce based parameters used to
reat failed to focus in on the
ere significant tornadoes



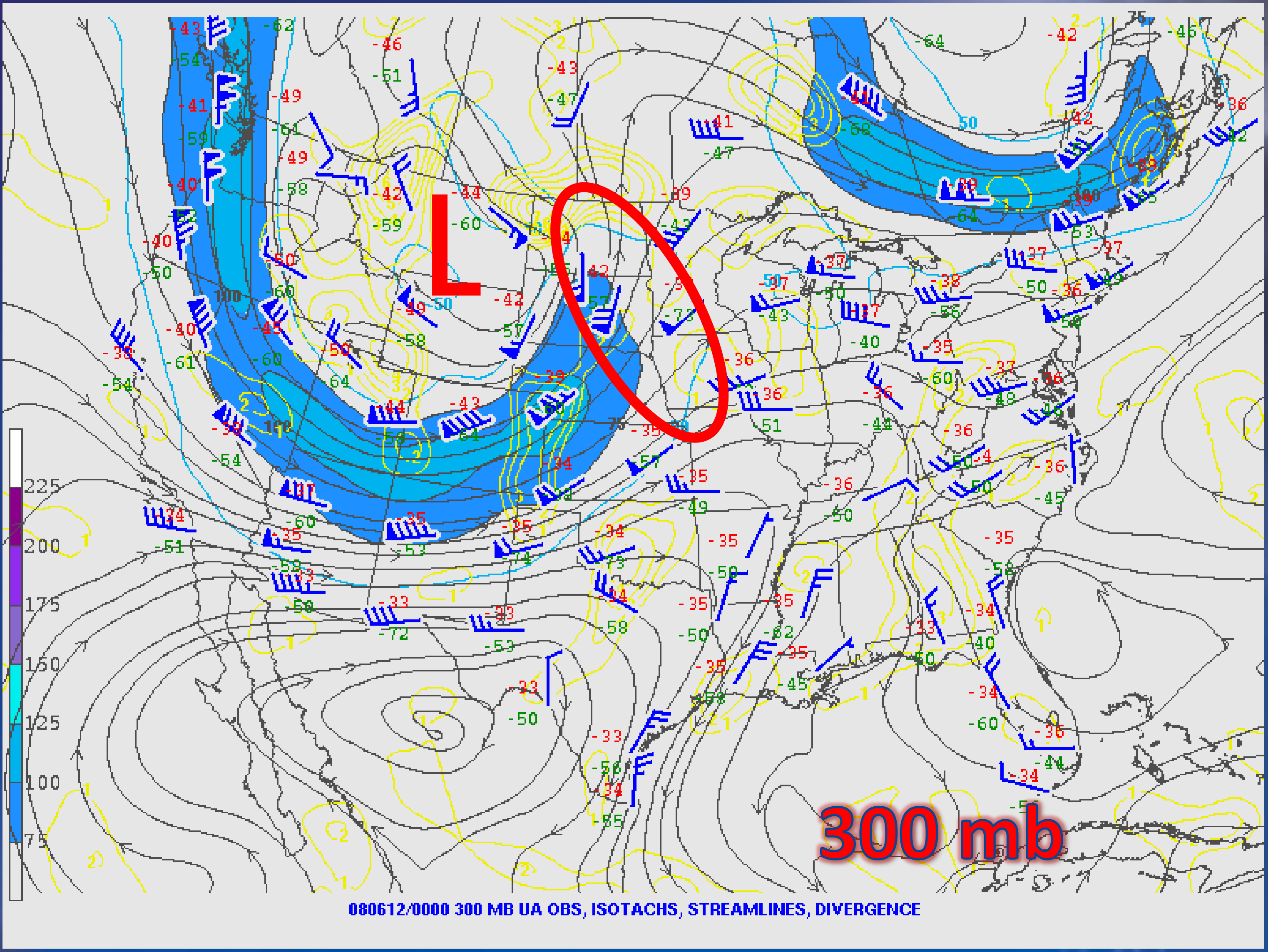
Synoptic Overview



Synoptic Overview

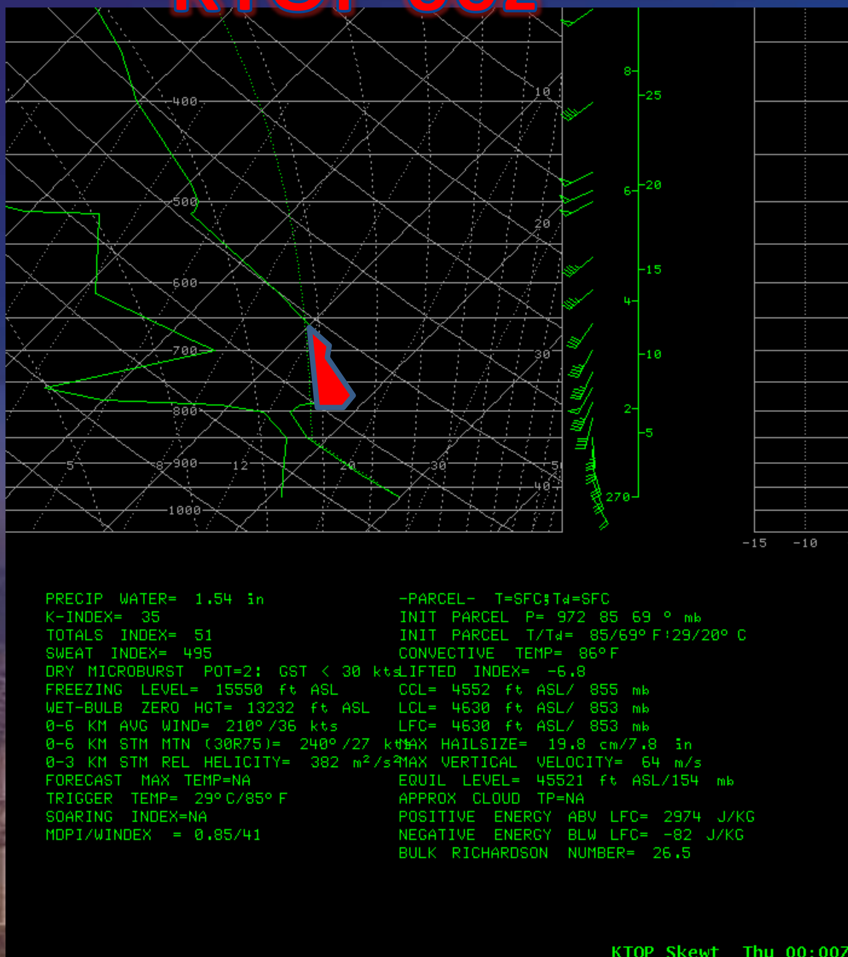


Synoptic Overview

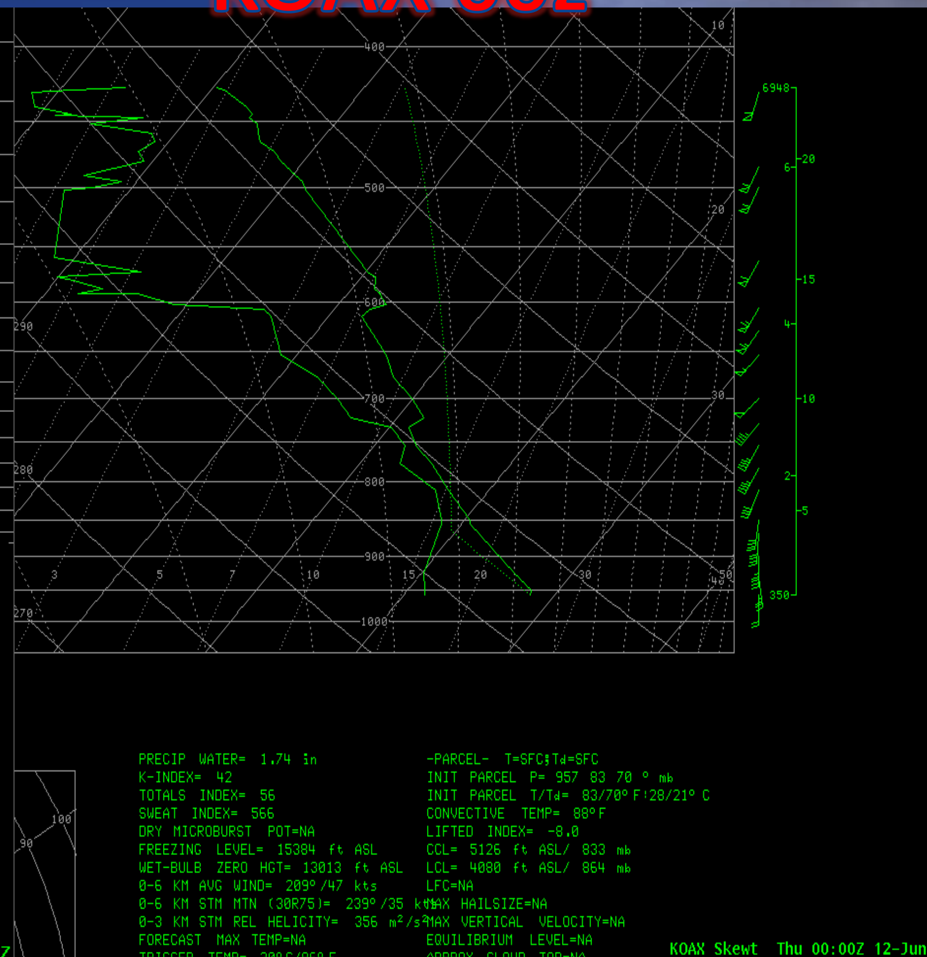


Synoptic Overview

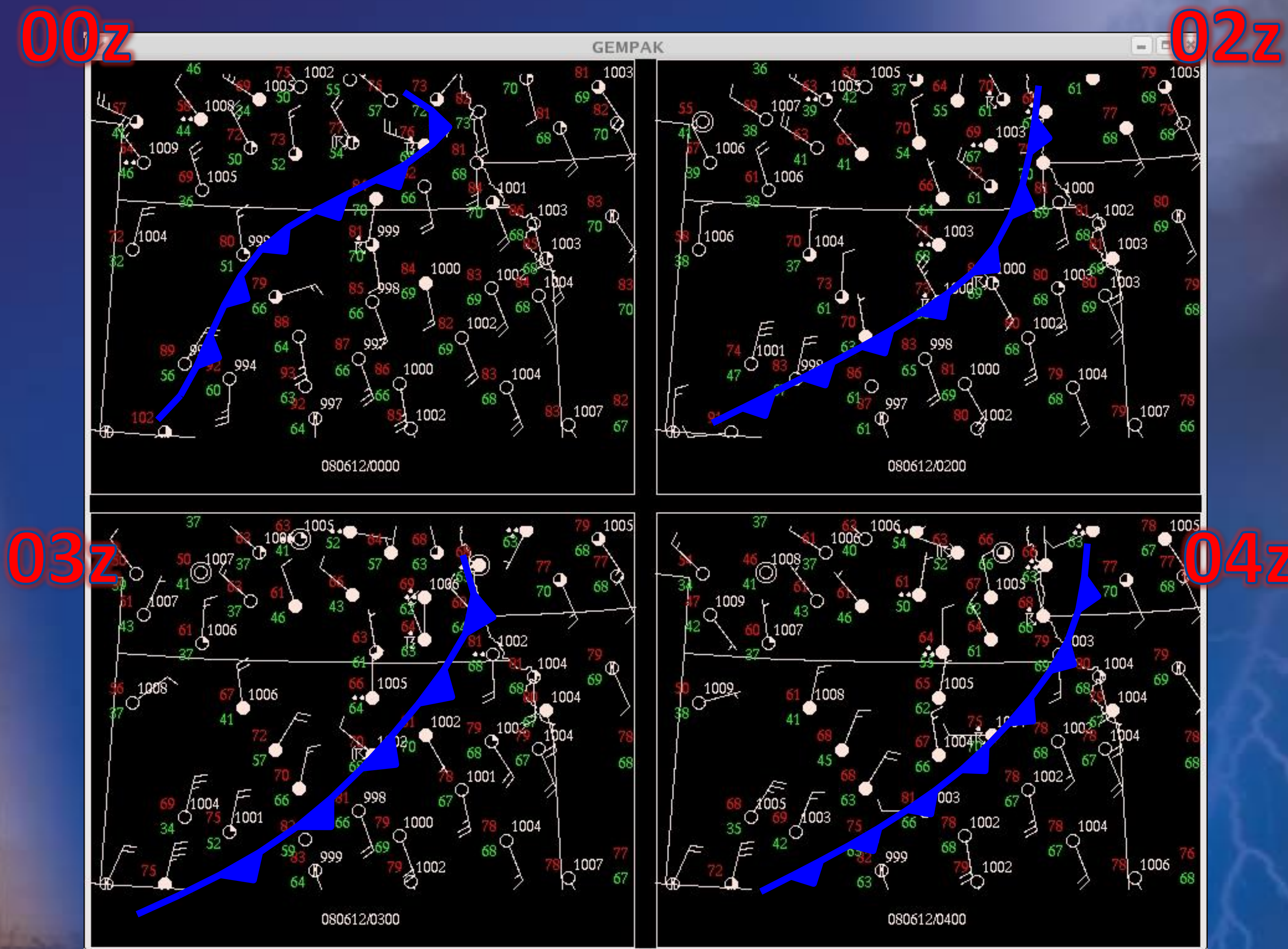
KTOP 00z



KOAX 00z

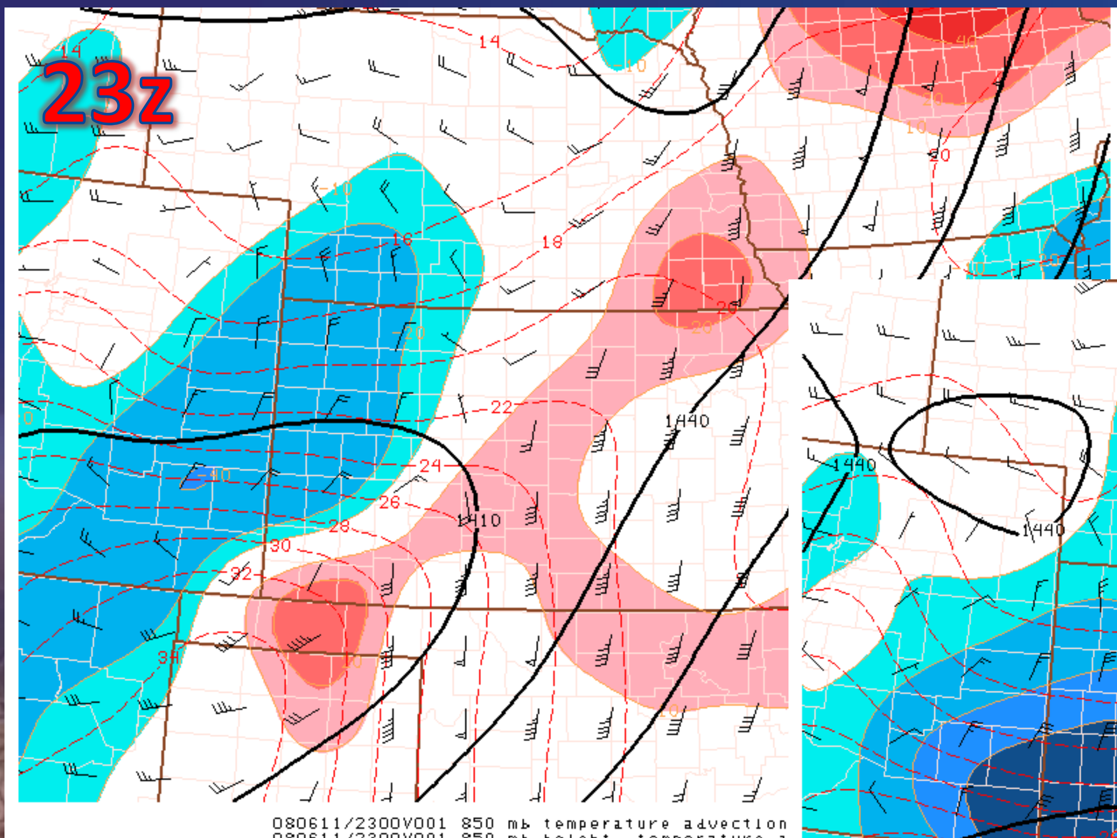


Evolution of Cold Front

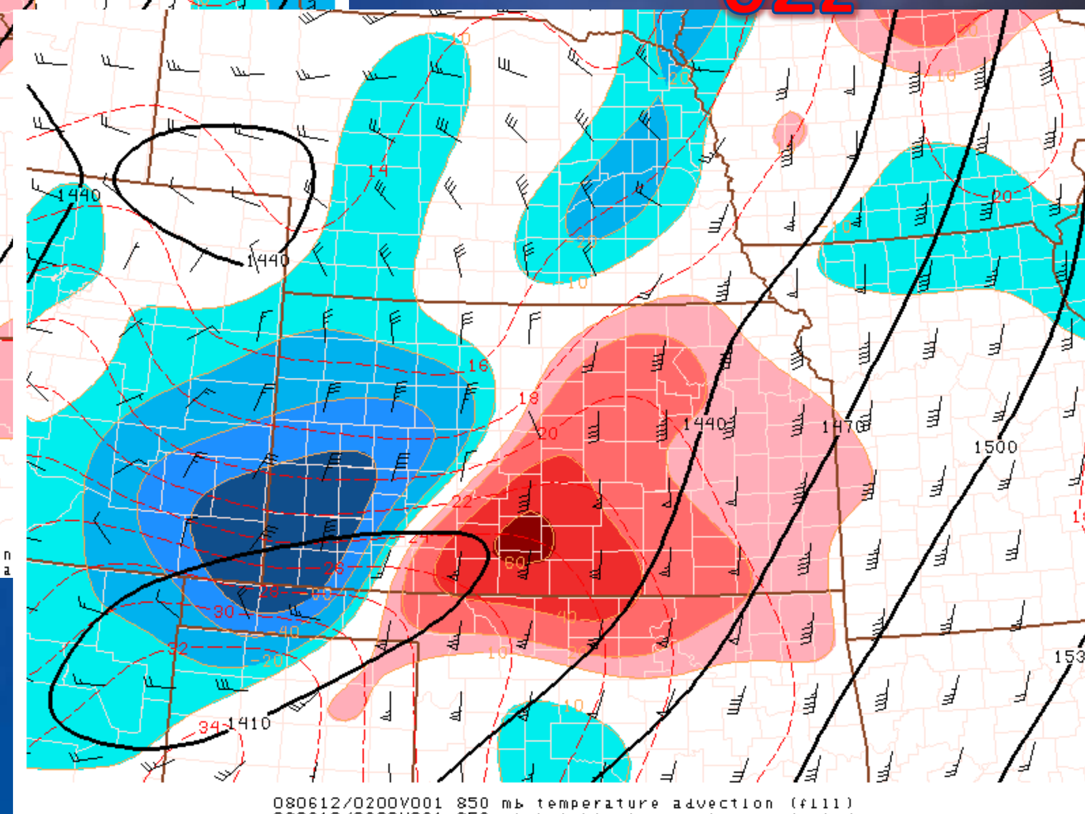


Rapid Increase of Low Level Thermal Gradient

850 mb



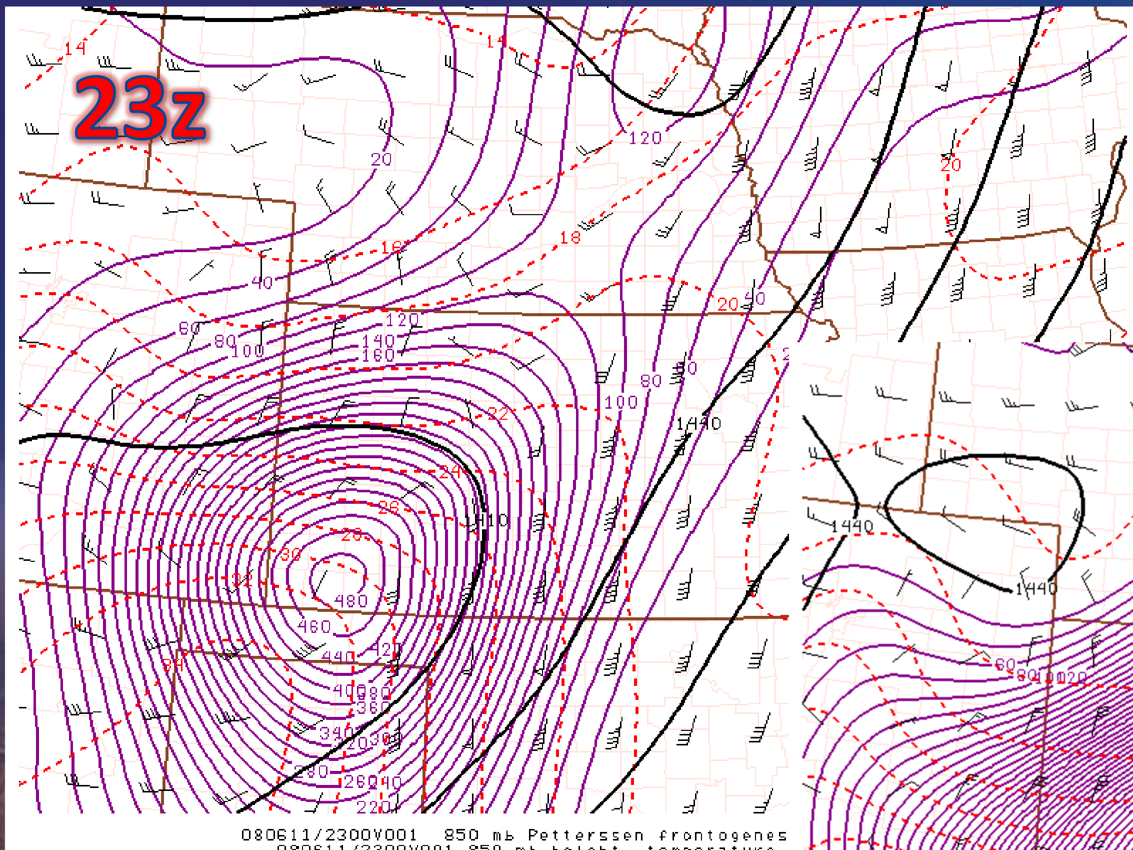
02z



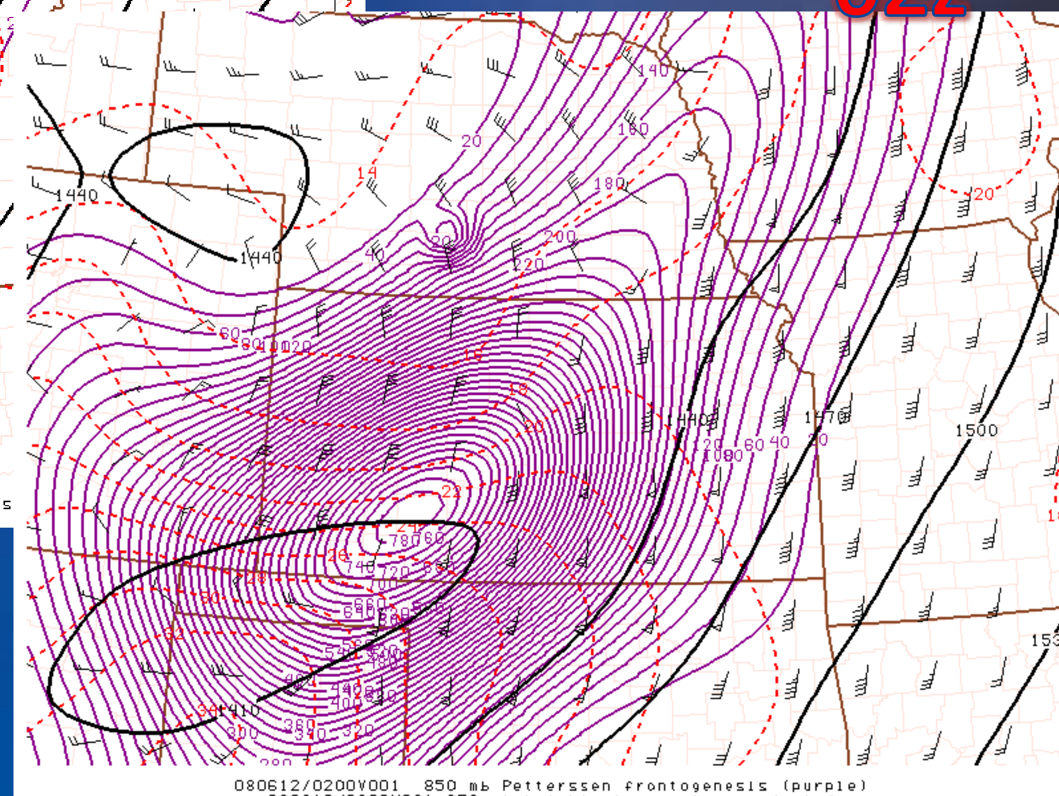
Low Level Frontogenesis Increases

850 mb

23z



02z



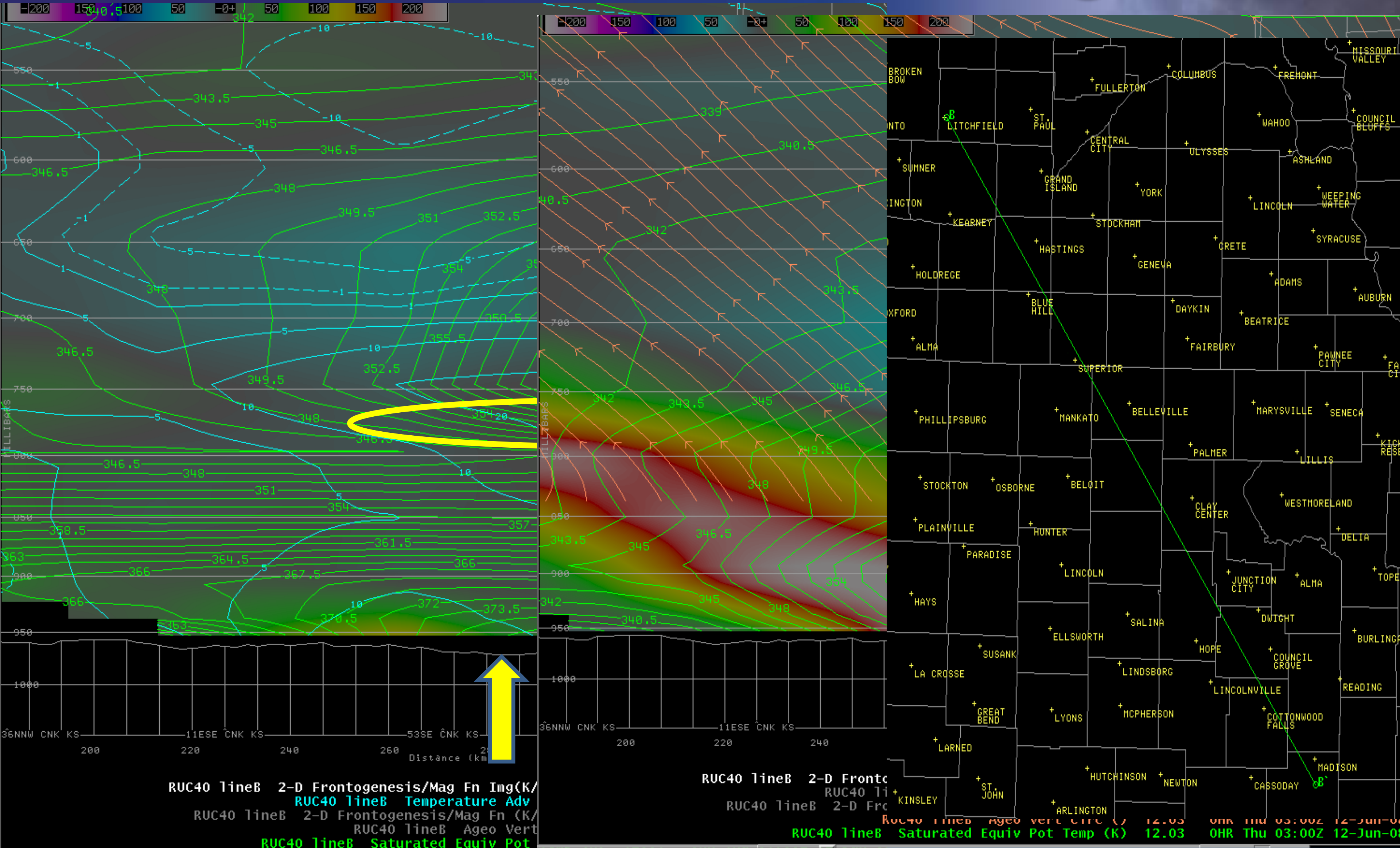
- Sat. Eq. Pot. Temp.

- Temp. Advection

-Ageo. Vert. Circ.

Background Image is Petterson Frontogenesis

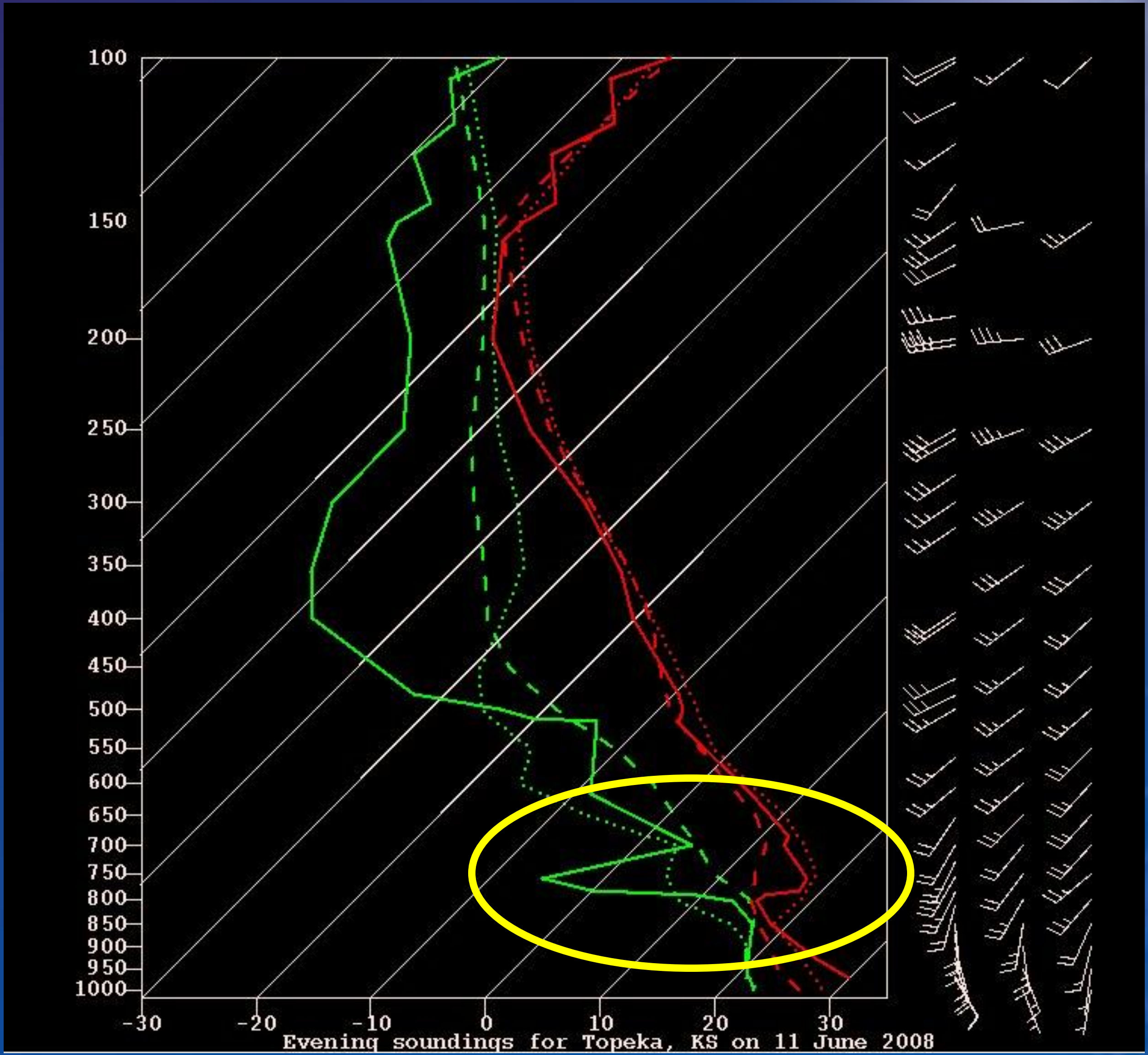
A Cross Section Look at Front



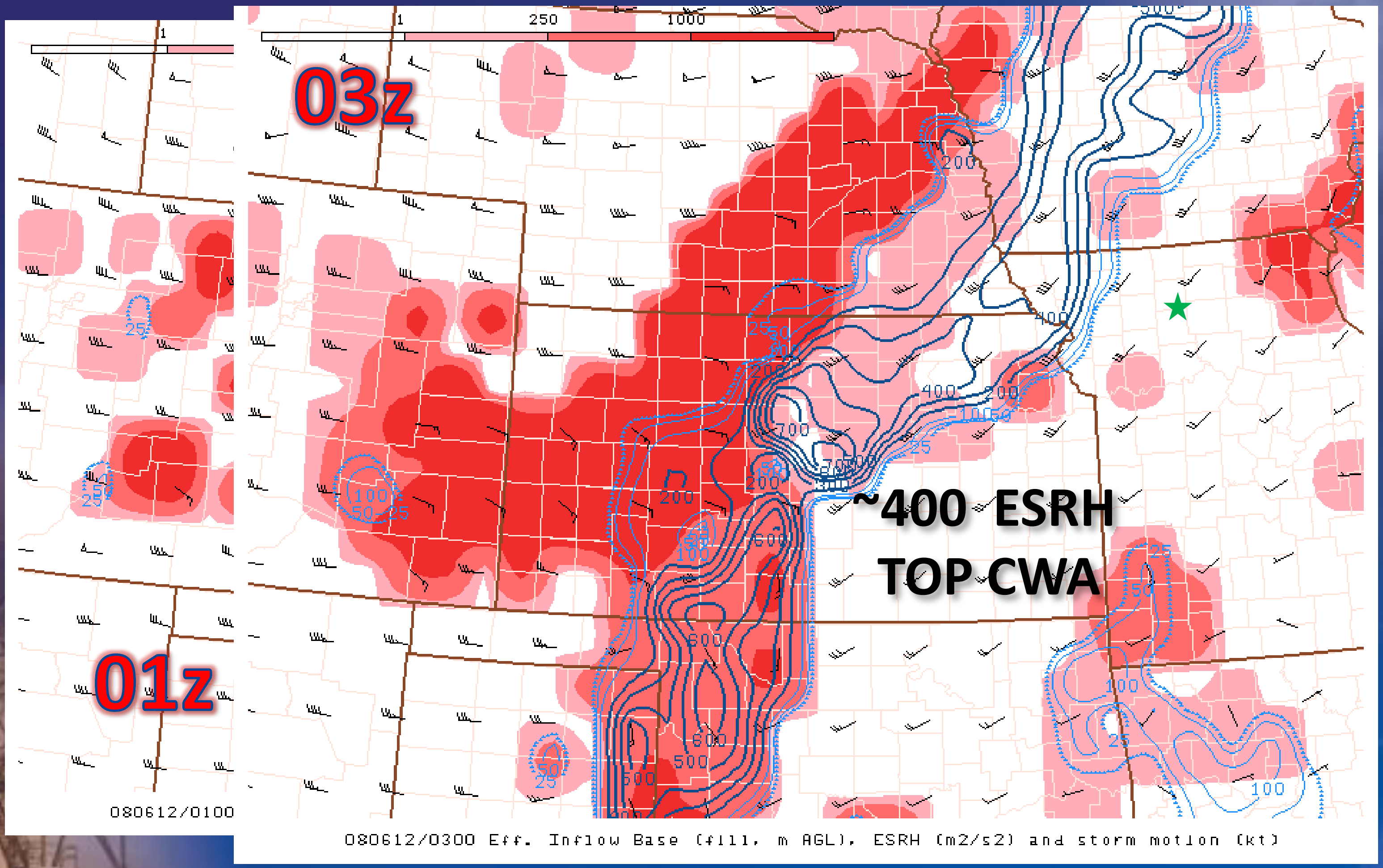
Thermodynamic Evolution

KTOP

- 00z Observed
- 03z RUC
- 06z RUC

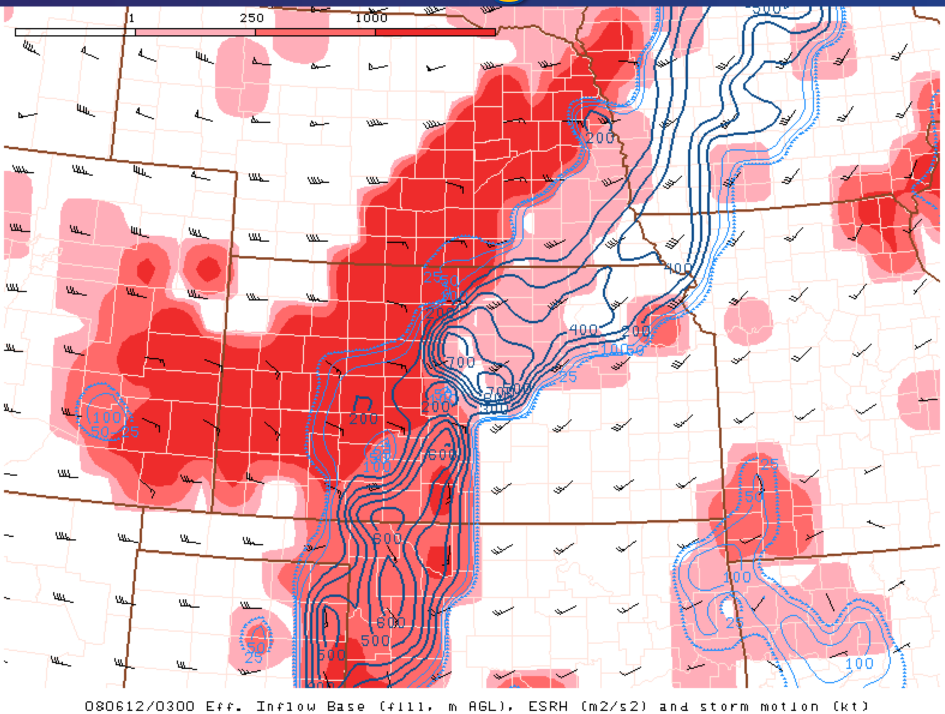


Increased Effective Layer SRH

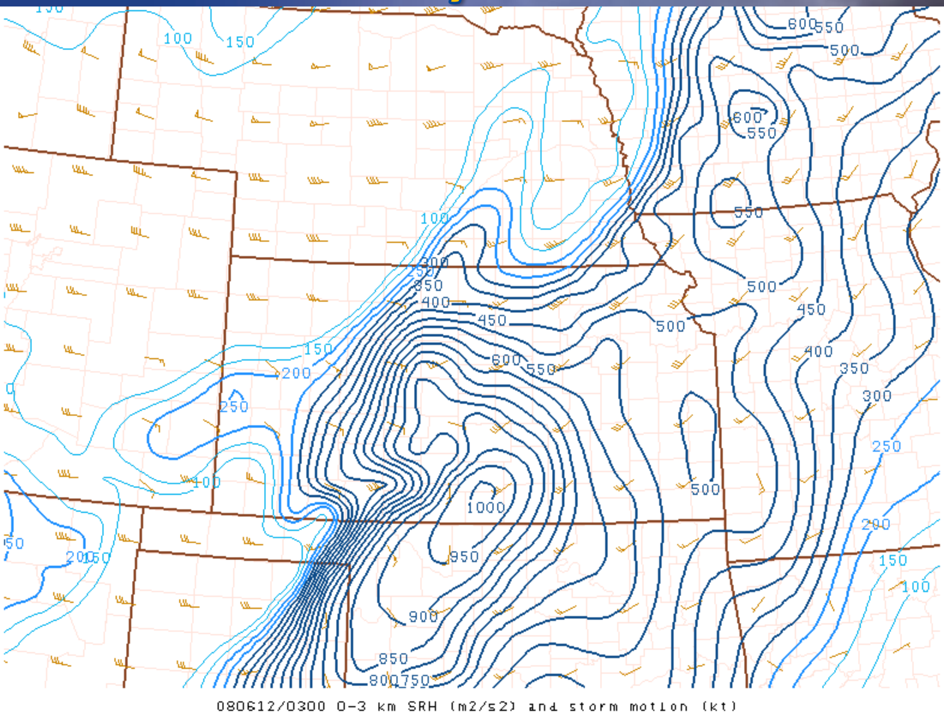


Parameters and TOR Threat

SPC Effective SRH – 03Z



SPC 0-3 km SRH – 03Z



Conclusions

- On the night of June 11th, low level frontogenetic forcing seems to have played a critical role in destabilizing the atmosphere along a narrow band on the leading edge of a cold front which allowed thunderstorms to remain surface based after sunset.
- The low level jet increase after sunset significantly increased low level SRH.
- Storm motion was parallel to the frontal boundary, providing an ideal environment for supercell thunderstorms to tilt and stretch enhanced horizontal vorticity increasing the probability these storms would produce a tornado.
- Effective layer parameters seemed more effective than fixed layer parameters when analyzing tornado potential.
- A mesoscale analyst can recognize rapidly evolving mesoscale features and mentally adjust model data.

Questions?