

A Detailed Look at a Meso-scale Heavy Snow Event: 6 Dec 2007

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Presented to the 12th Annual High Plains Conference
Sept 4-5, 2008

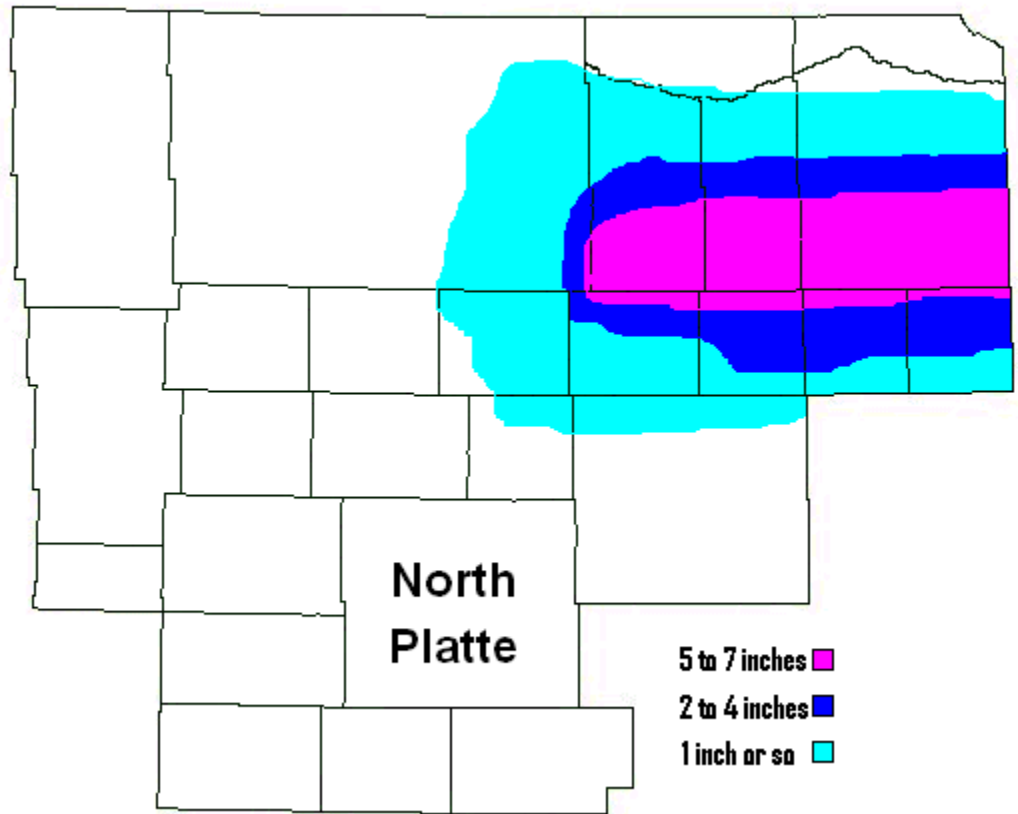
Overview

- Event Began at ~06Z on 6 Dec and ended at ~15Z on that same day
- Significant why?
 - Snow totals ranged from 4-7 inches with locally higher amounts
 - Snowfall rates approached 2 inches per hour in spots
 - Convective enhancement?

Overview

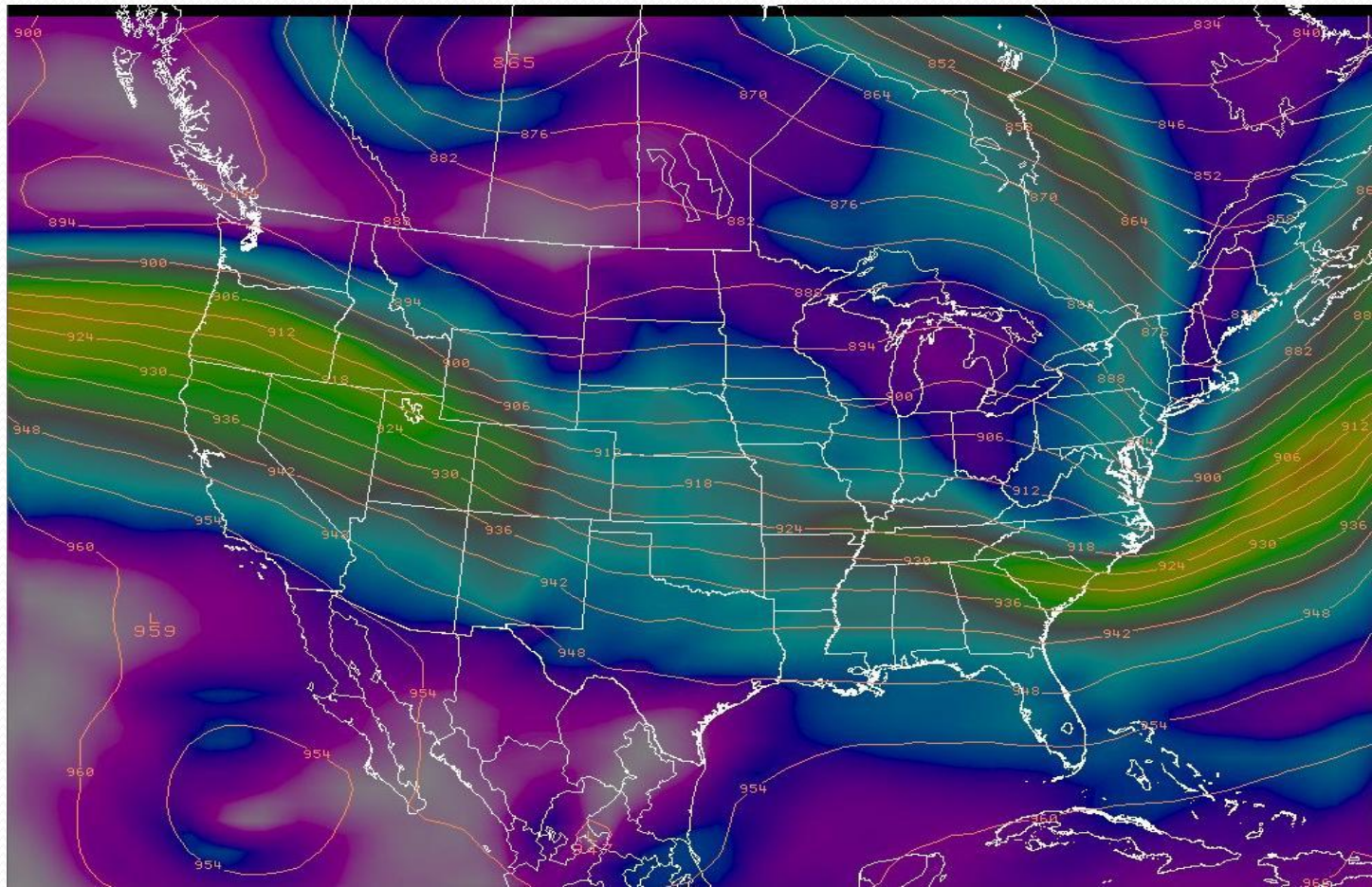
- Forecasts:
 - Winter Wx Advisory was issued at 0853Z with morning package
 - ZFP called for -zr early in morning, changing to -s/-ip during the morning, then ra/s during afternoon.

Overview



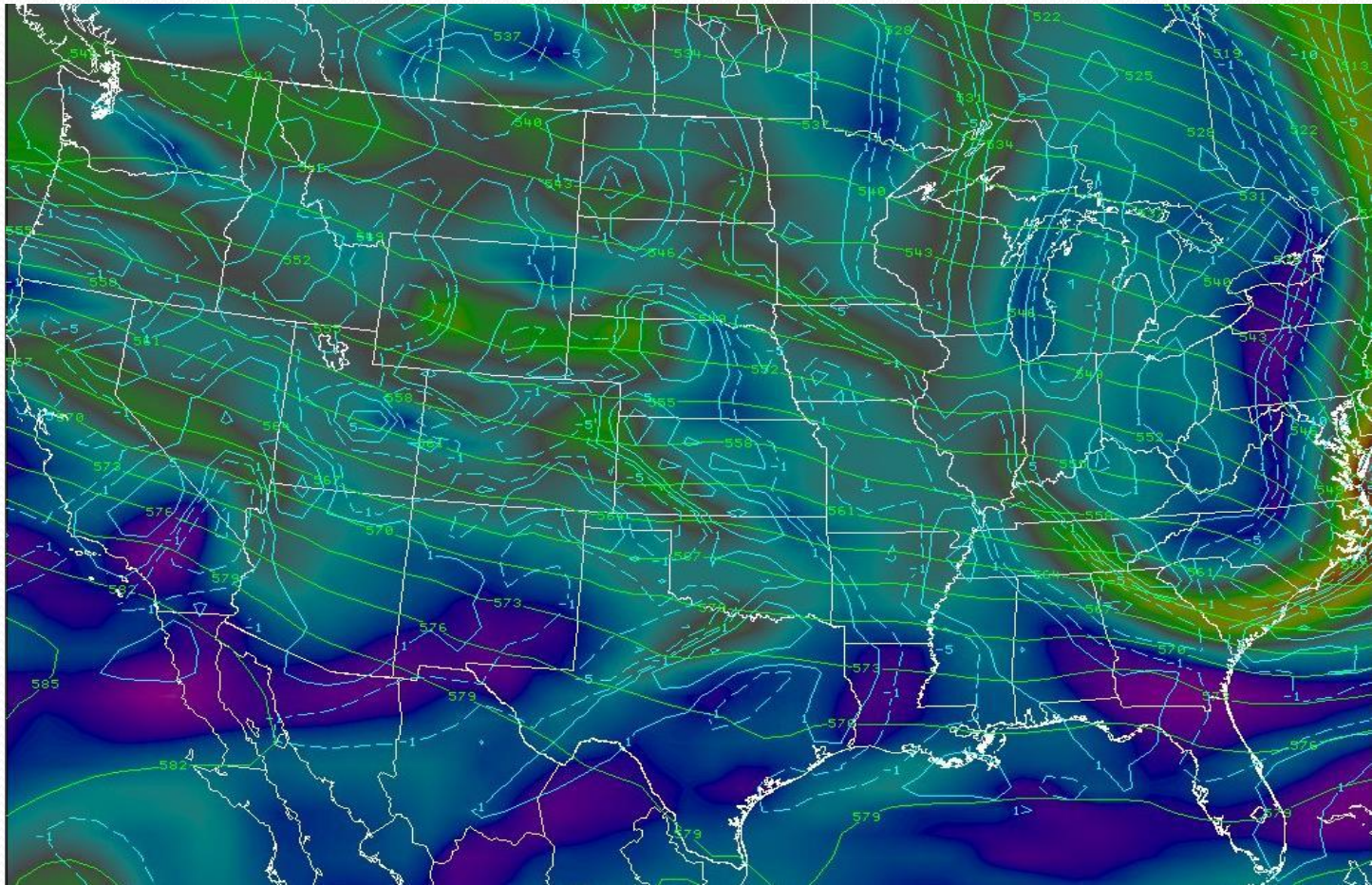
Synopsis

300mb RUC80 Initialization Field



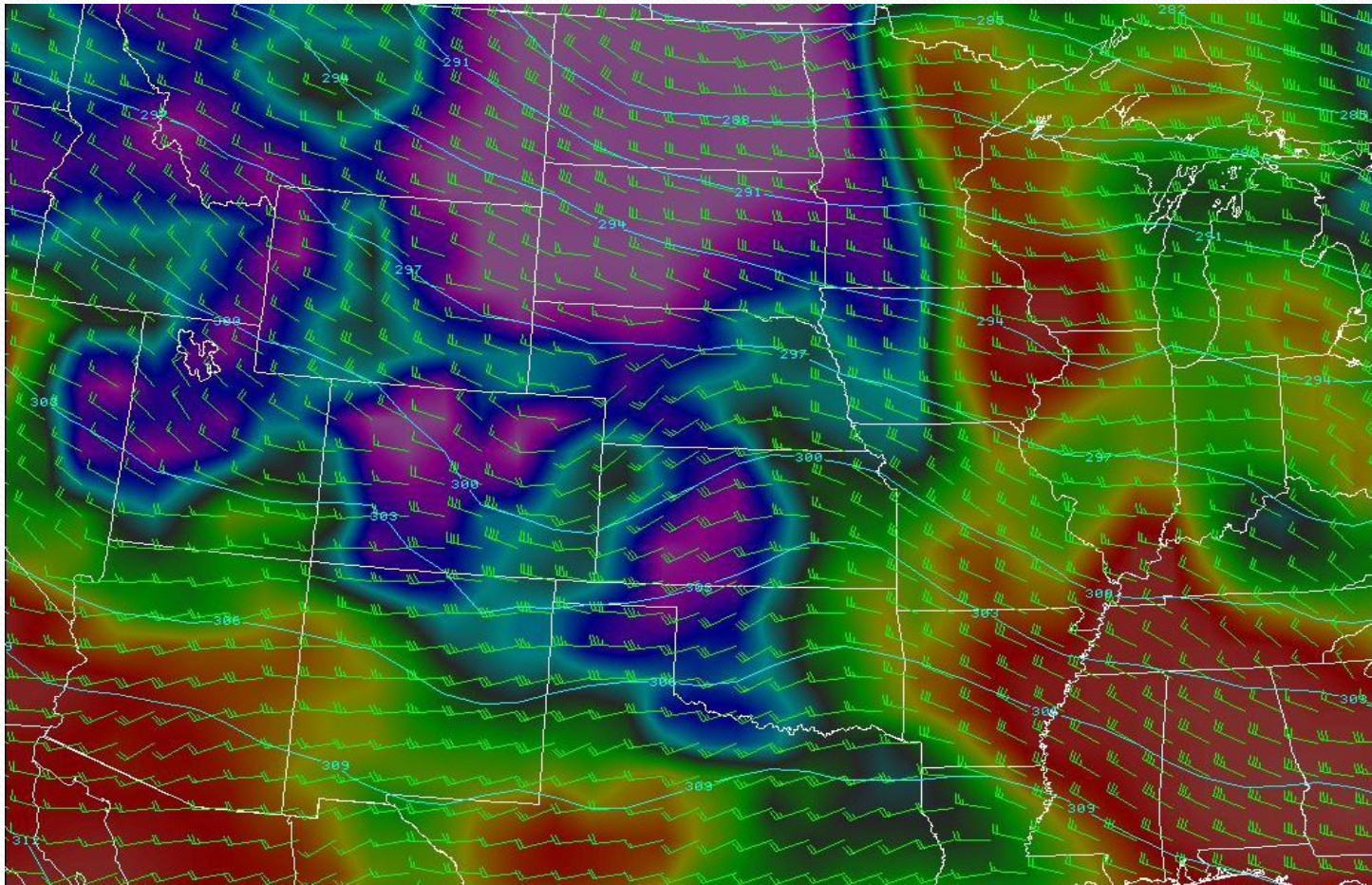
Synopsis

500mb RUC80 Initialization Field



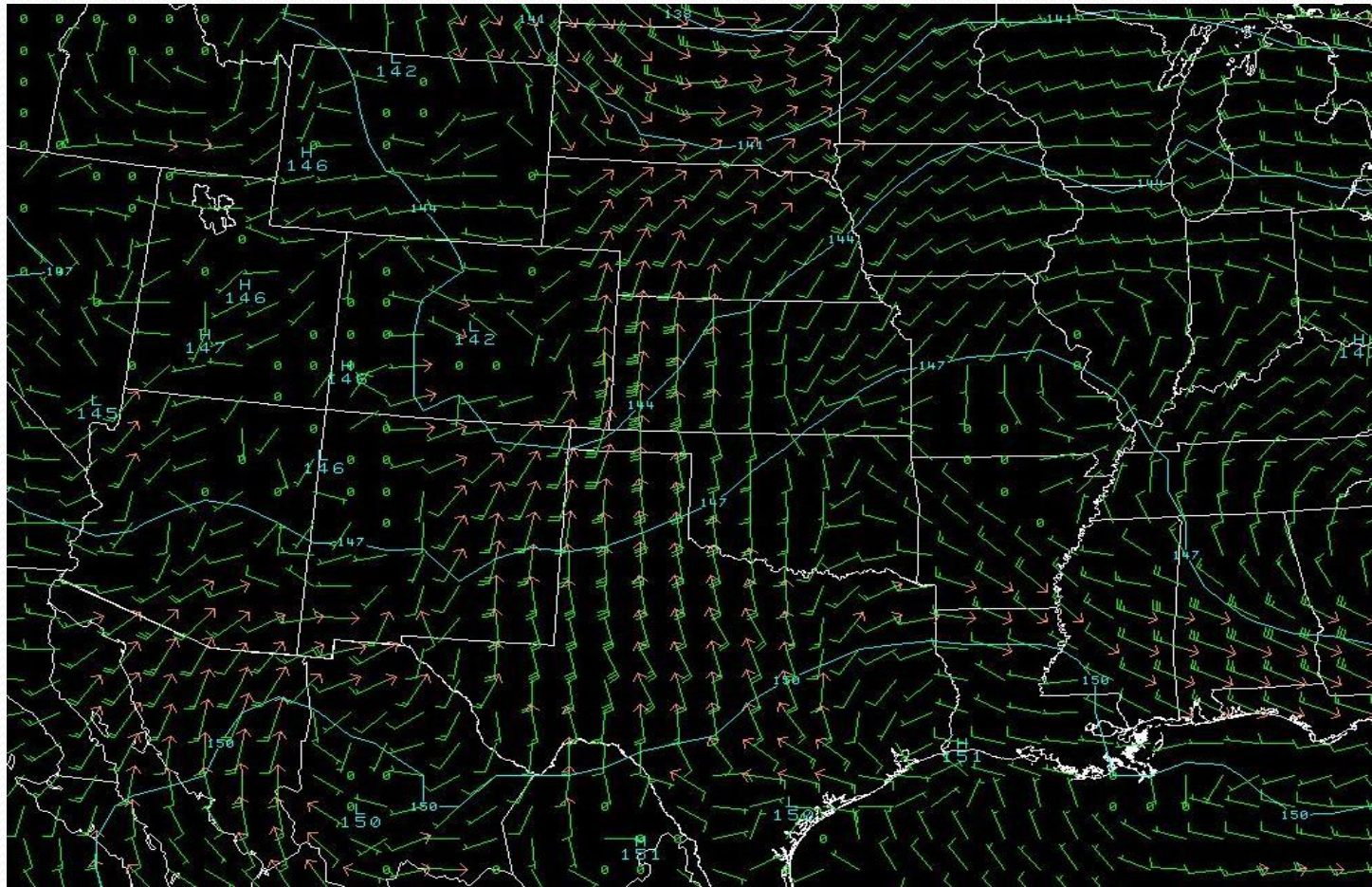
Synopsis

700mb RUC80 Initialization Field



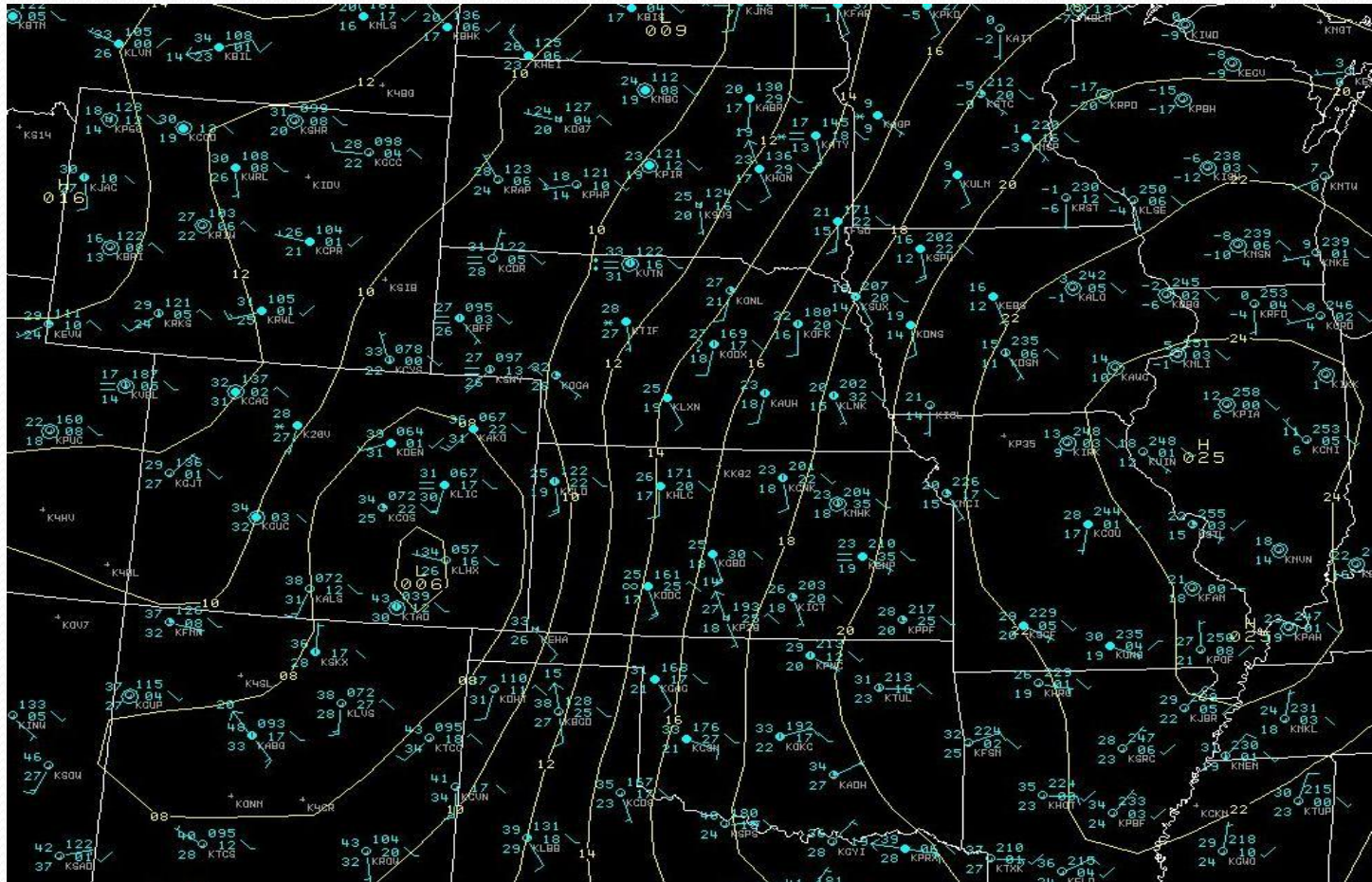
Synopsis

850mb RUC80 Initialization Field



Synopsis

Sfc RUC80 Initialization Field



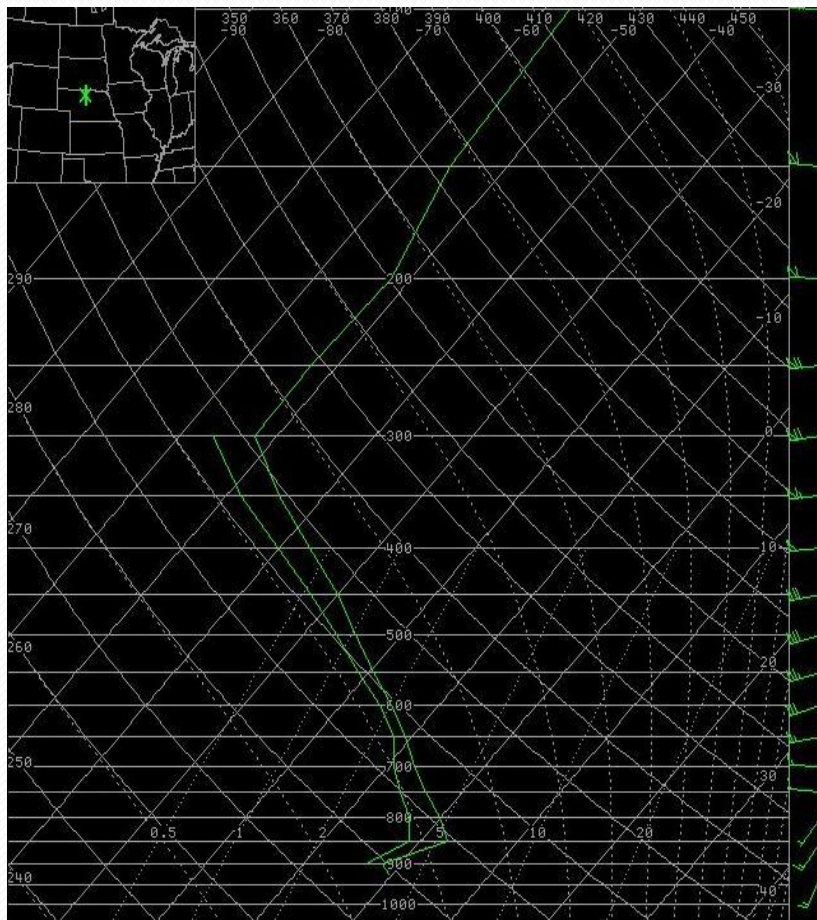
Methodology

- RUC40 proximity soundings and NAMBufr soundings
- Comparison to LBF observed sounding (12Z day of)
- Cross-sectional Analysis
- Isentropic Analysis
- FSI and Echo Tops (convective analysis)

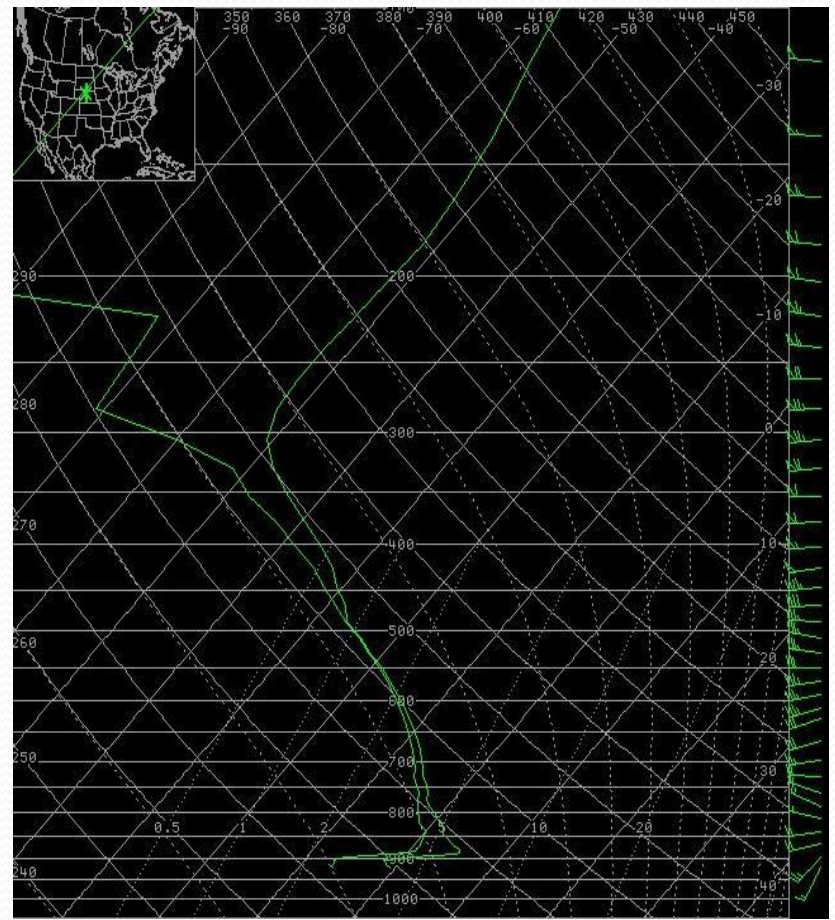


Sounding Analysis

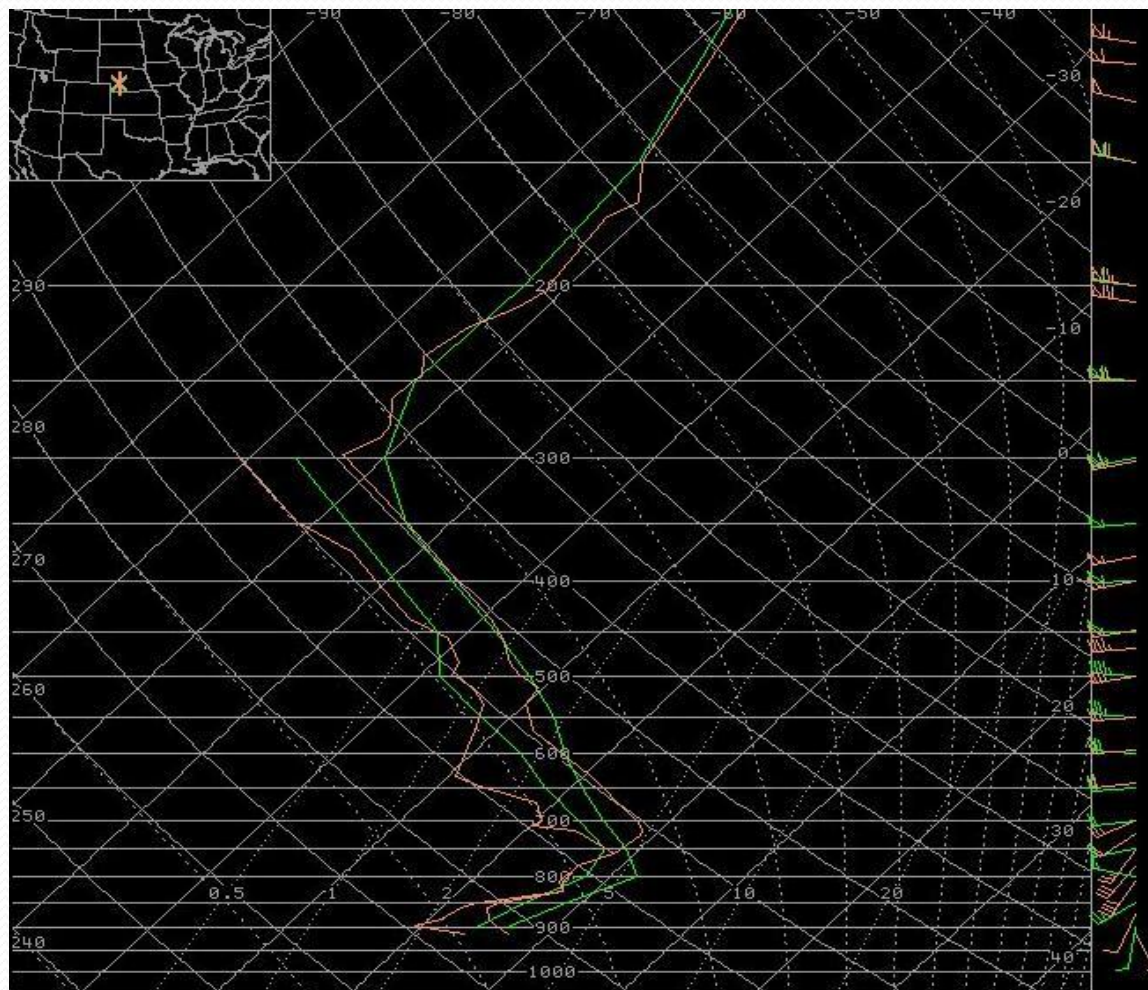
RUC40 09Z run 00hr forecast



Nam Bufr sounding 00Z run 09hr forecast



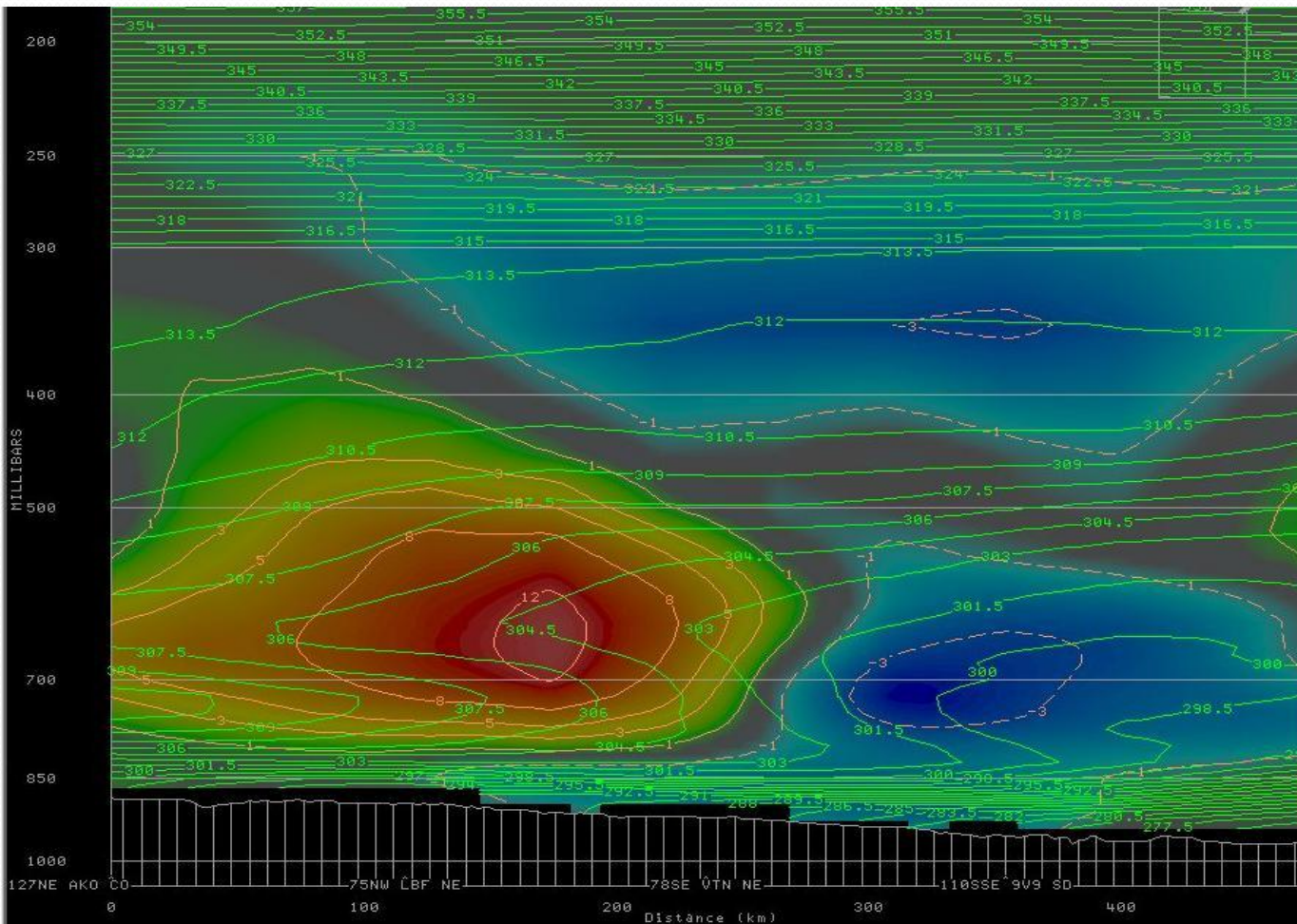
RUC40 12hr Proximity Sounding Compared to LBF Observed Sounding



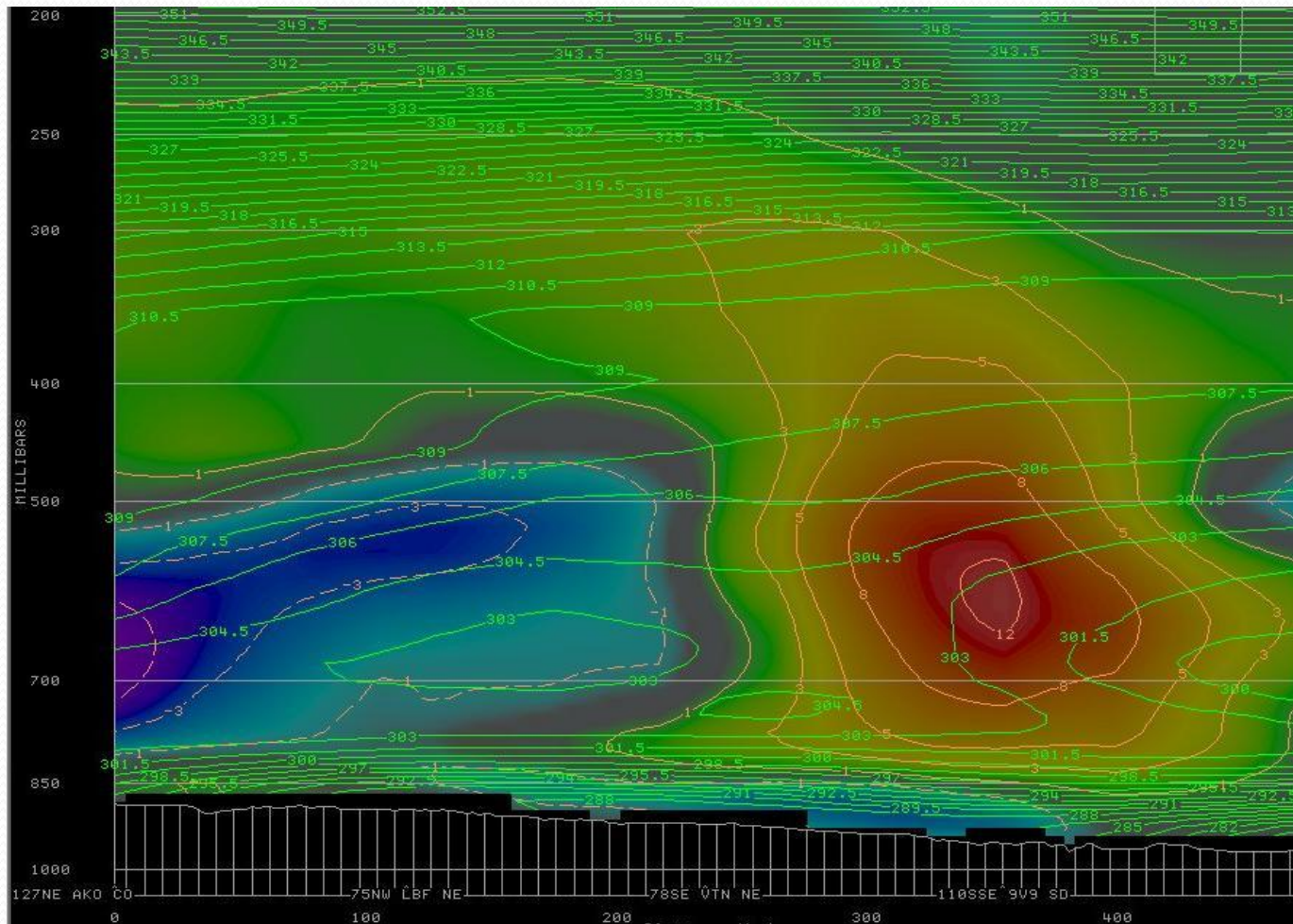


Cross-Sections

GFS40 X-section 06Z run 00hr Forecast: Theta-e and Omega



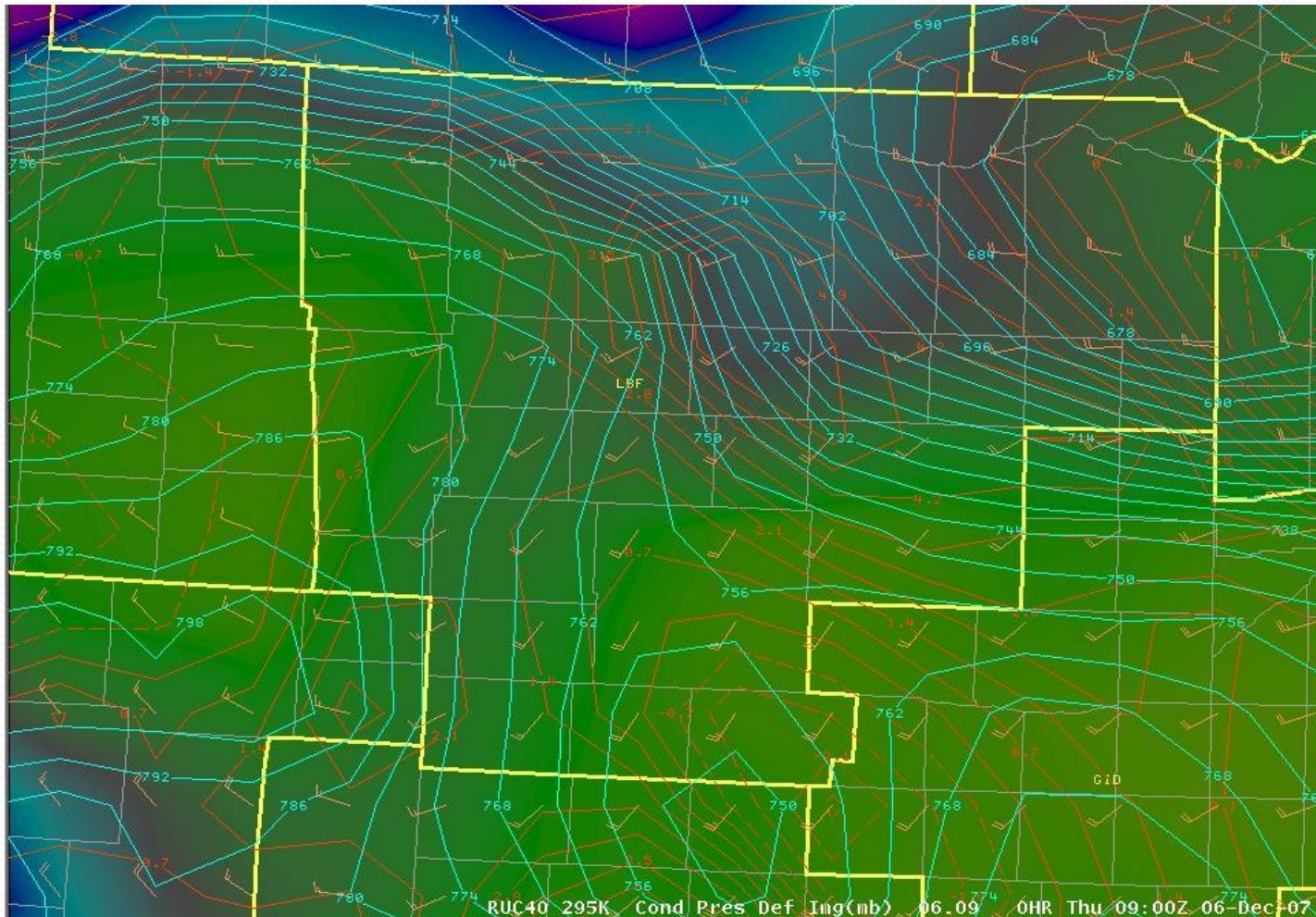
GFS40 X-section 12Z run 00hr Forecast: Theta-e and Omega



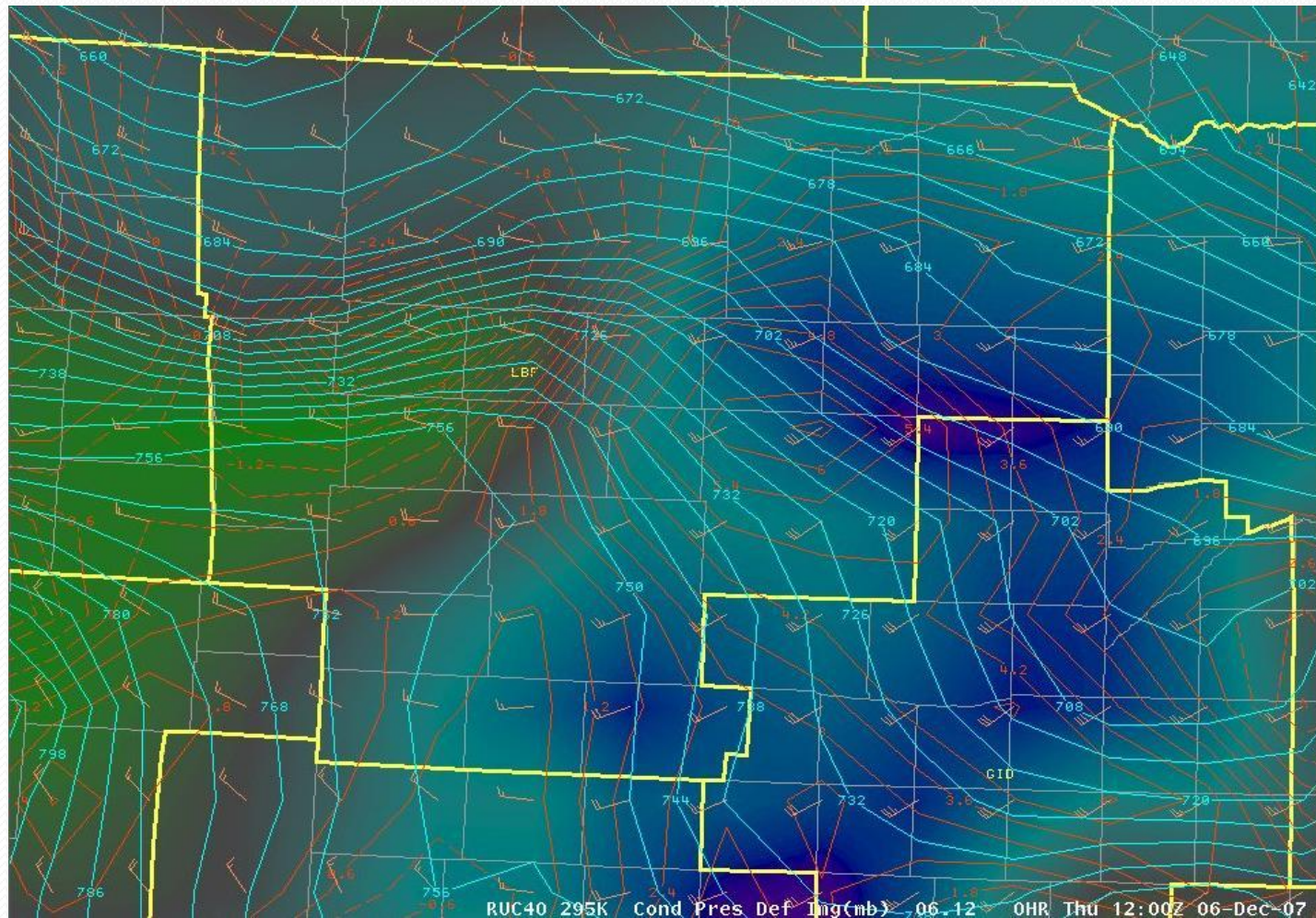


Isentropic Analysis

RUC40 09Z run 00hr Forecast



RUC40 12Z run 00hr Forecast



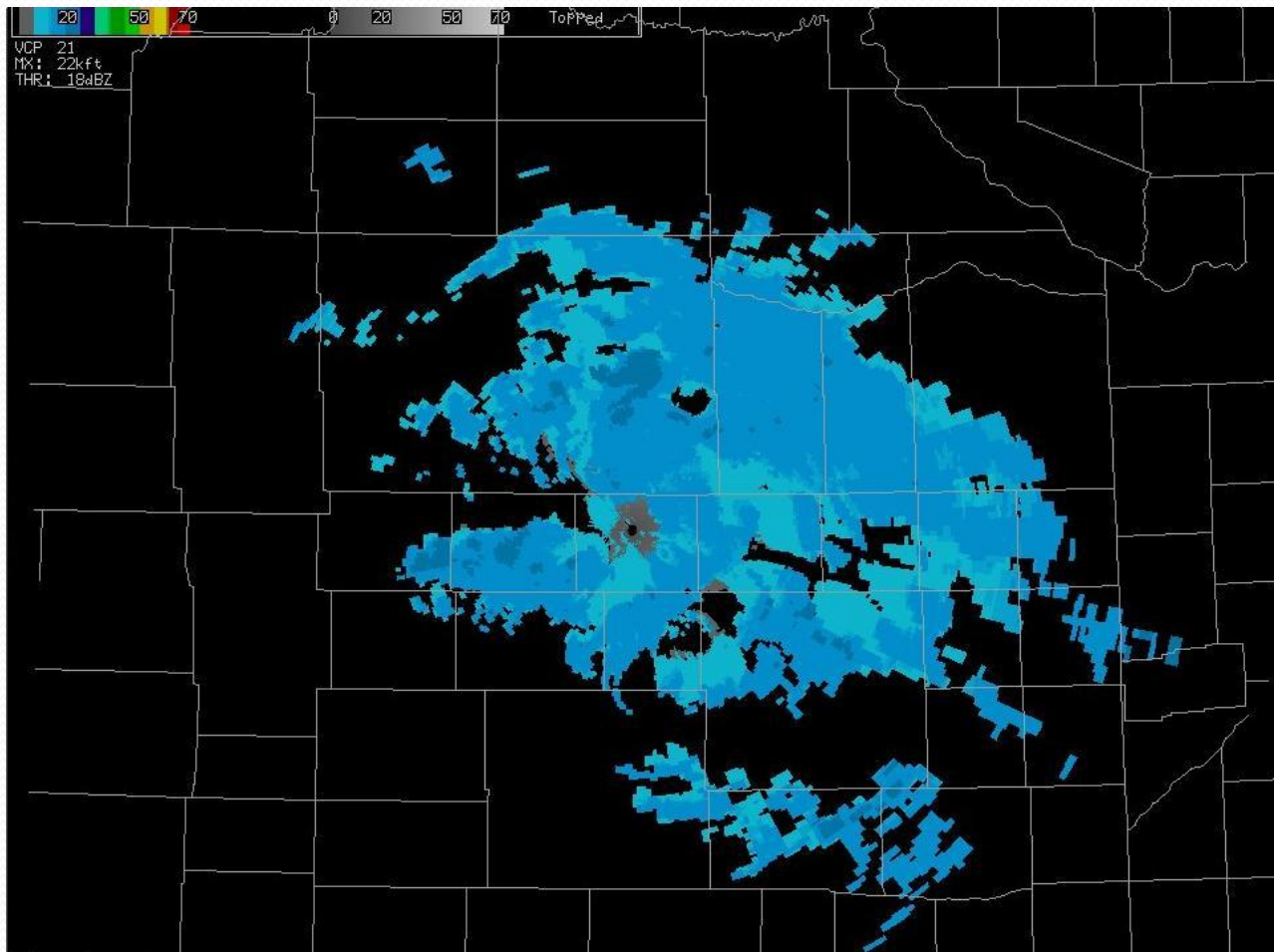


Convective Hypothesis

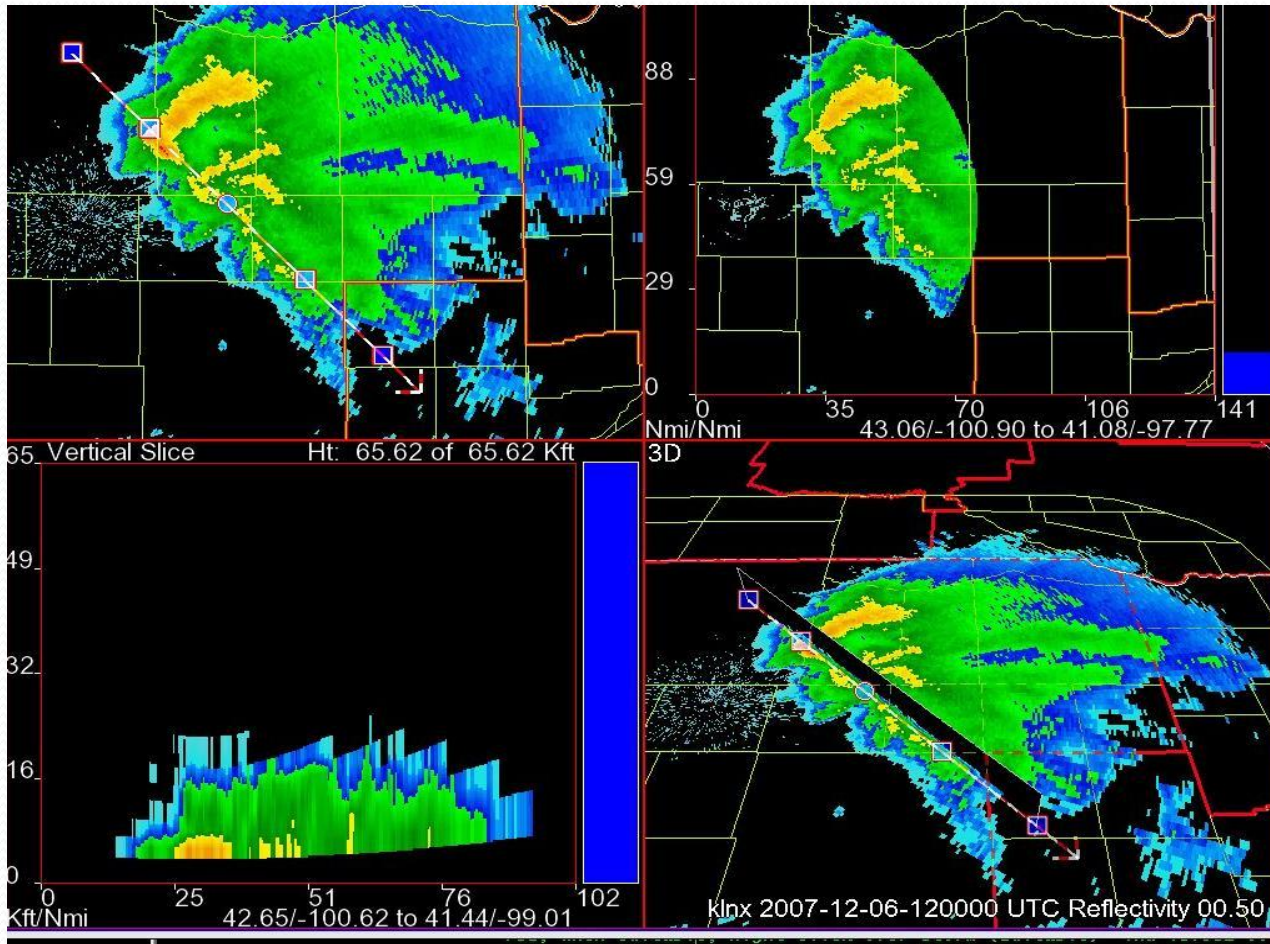
Convective Hypothesis

- Approximate hail growth zone (-15C to -30C) from 12Z LBF observed sounding
 ~11300 to 18700 ft AGL
- Use FSI to determine character of precipitation bearing clouds (convective updrafts or stratiform)
- Use Echo Tops to determine whether convective updrafts exist within aforementioned layer
- If YES to 2nd and 3rd bullets, then one may assume the possibility of convection

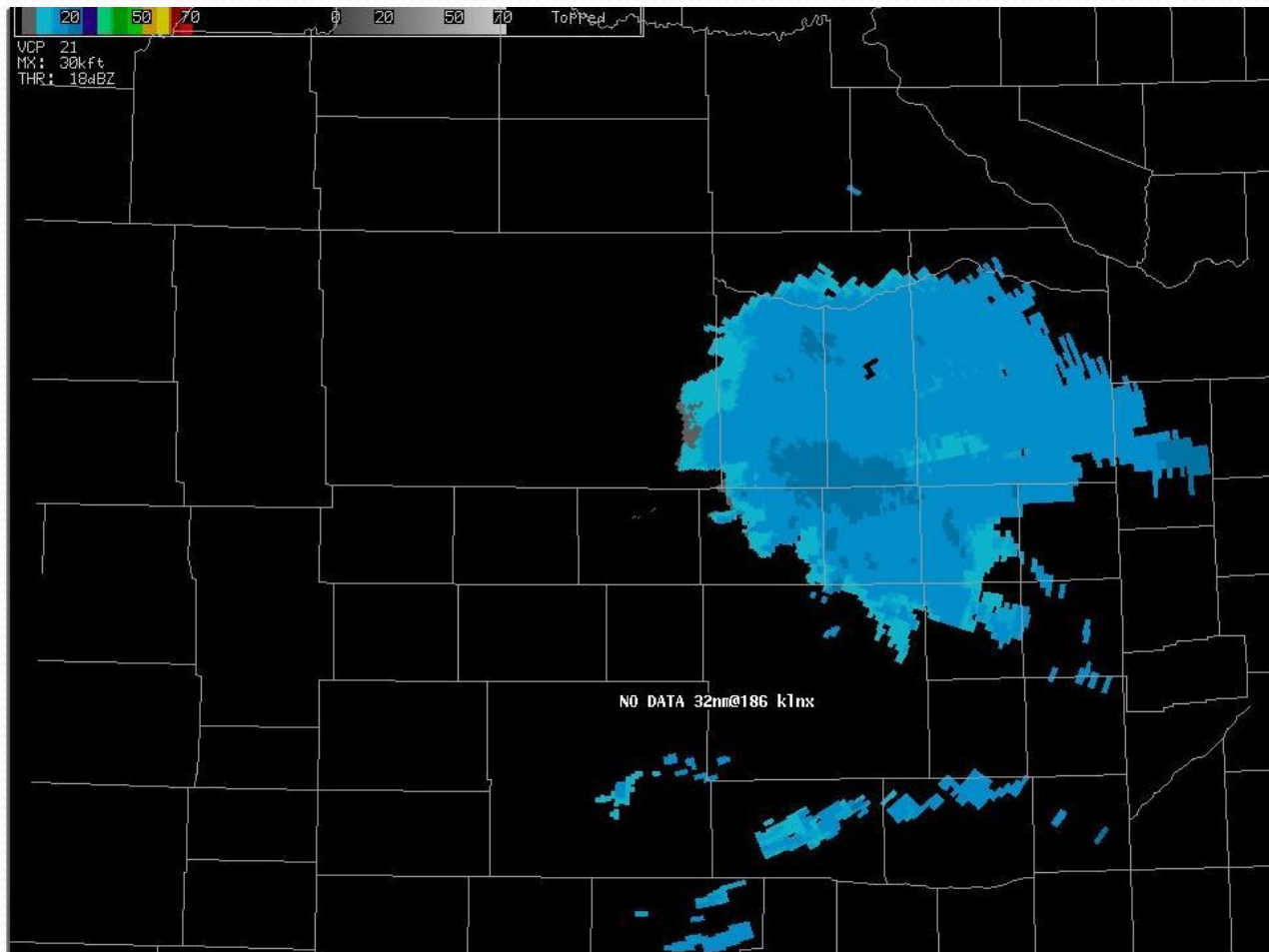
Echo Tops 855Z



FSI investigation 1202Z



Echo Tops 1202Z



Conclusions

- Transition to snow occurred earlier due to warm layer eroding (critical time around 09Z)
 - CAA within the 750-850 hPa evidenced in 12Z LBF ob
- Convective Instability present at 09Z and 12Z in Theta-e X-section with strong forcing through a deep layer

Conclusions

- Possibility of convection exists
 - character of radar echoes have the appearance of a convective cloud
 - Updrafts exist within approximated hail growth zone
 - Snowfall rates of 2 in per hour hard to achieve without convective processes aiding

Thank You

- John Stoppkotte (NWS North Platte)
- Chris Buttler (NWS North Platte)
- NWS North Platte



Thank You!

Questions/Comments/Criticisms

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