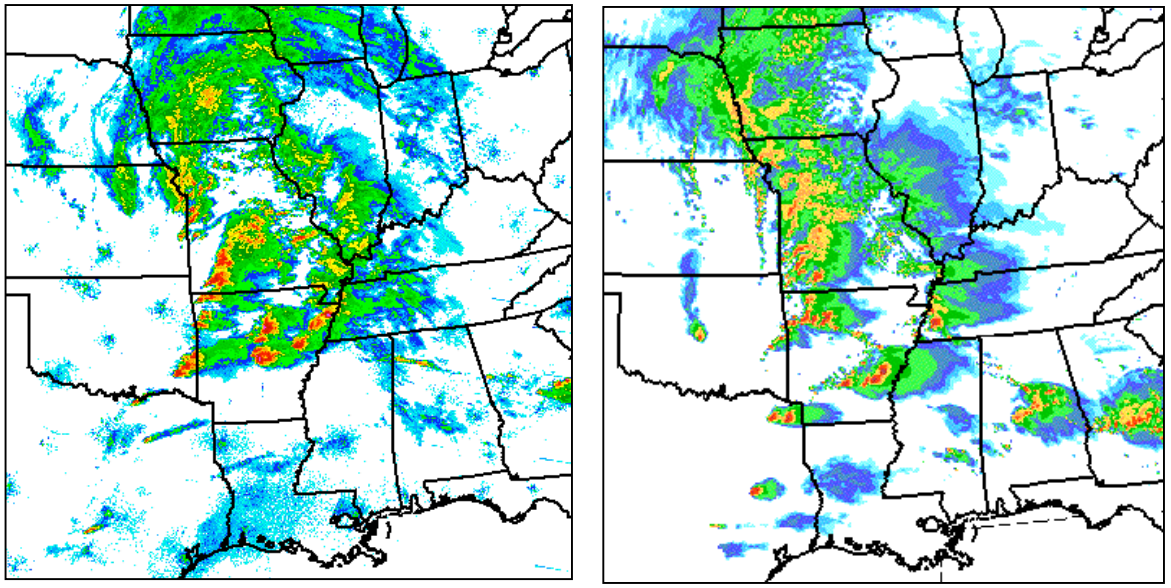
9th WRF User's Workshop: June-23-27 2008

The Use of WRF-3DVAR for 36 h Real Time Explicit (3 km) Convective Forecasts with WRF-ARW:

Nexrad
00 UTC
05/11/08

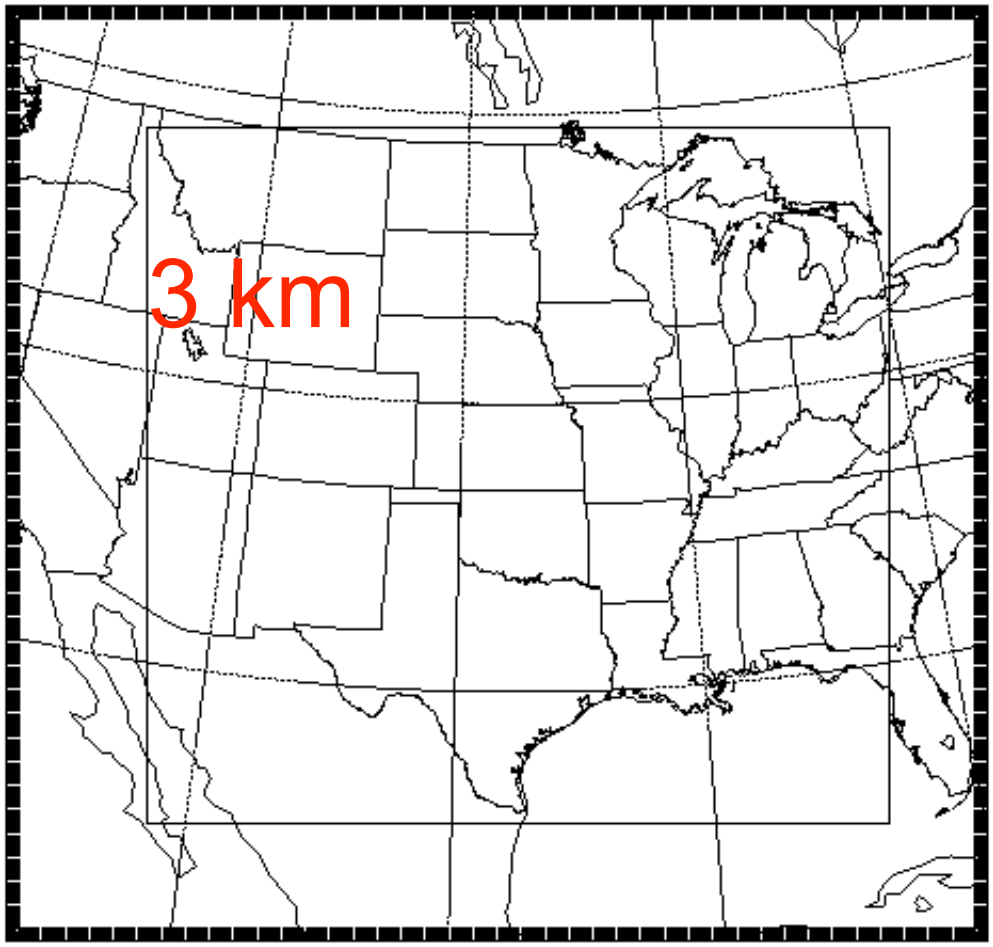


3 km ARW
24h
Forecast:

Morris Weisman, Wei Wang, Zhiquan Liu,
Kevin Manning; NCAR/MMM

2008 Domain: 9 km/3 km nest

9 km (GFS IBC)



3 April - 5 June 2008

9 km domain:

….initialized at 12 UTC

….cycled 3h to 00 UTC

….Kain-Fritsch CP

3 km domain:

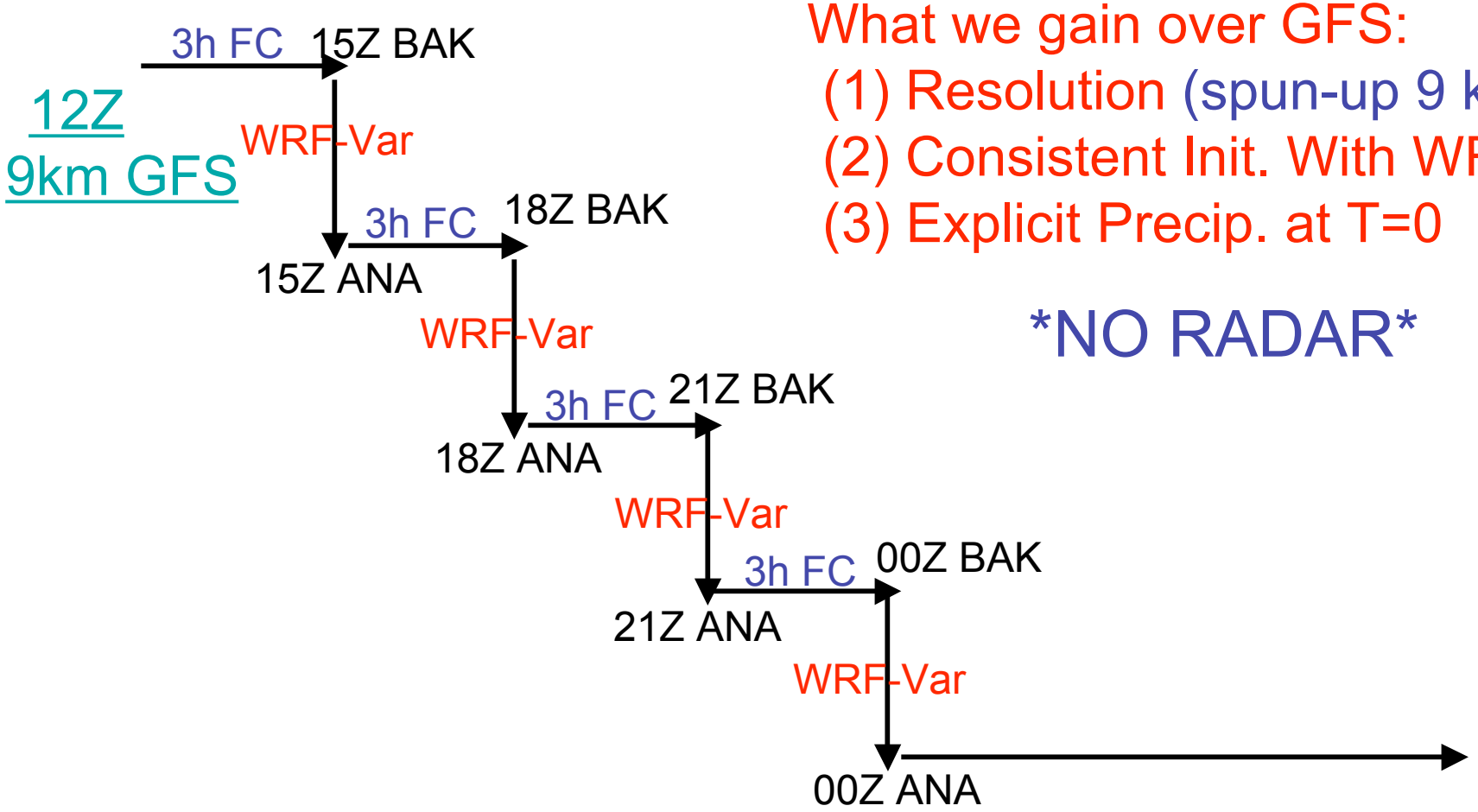
….initialized at 00 UTC

….MYJ BL

….Thompson Micro

….GW absorbtion layer

Assimilation Scheme: 3-hour cycling



What we gain over GFS:

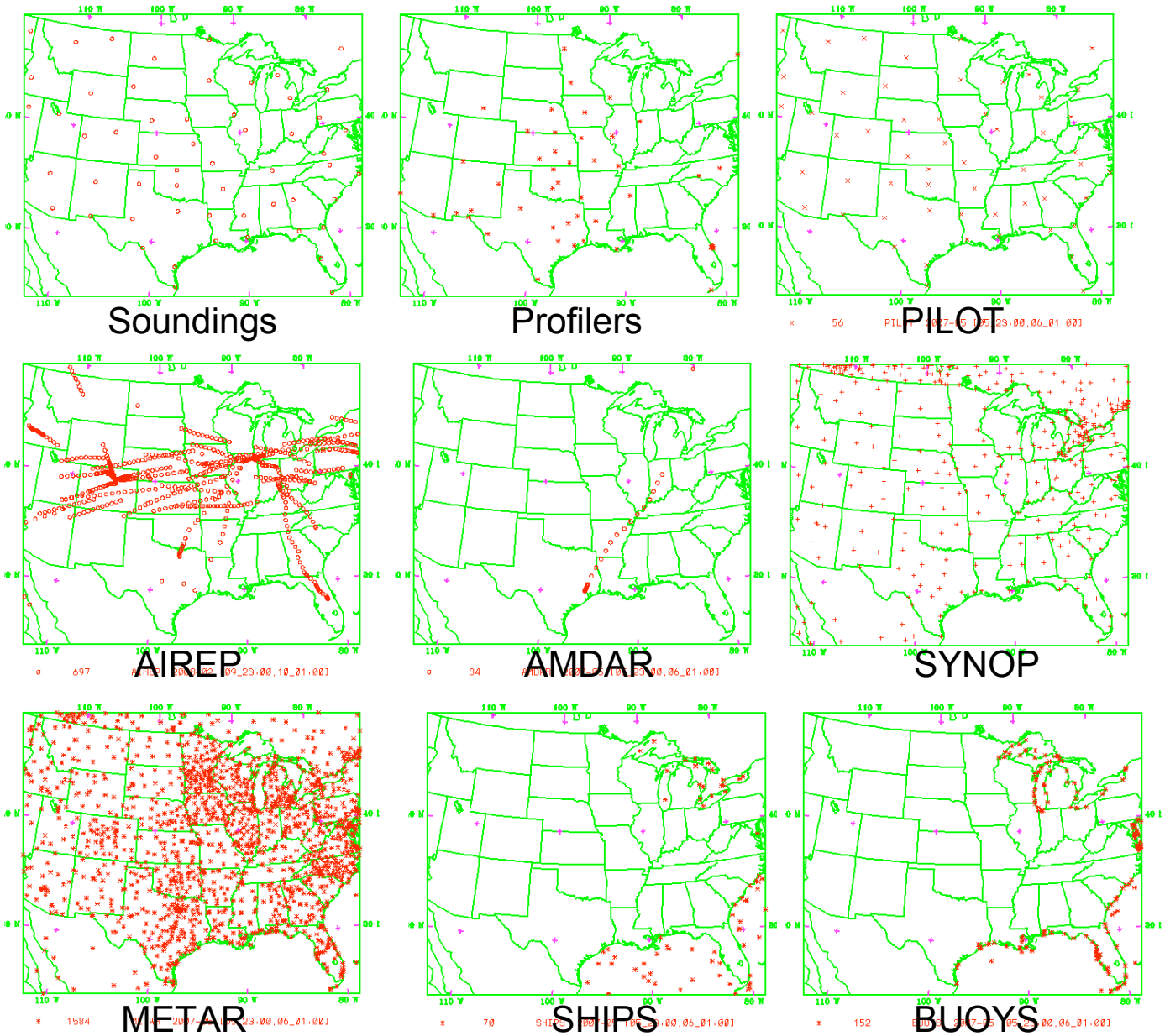
(1) Resolution (spun-up 9 km IC)

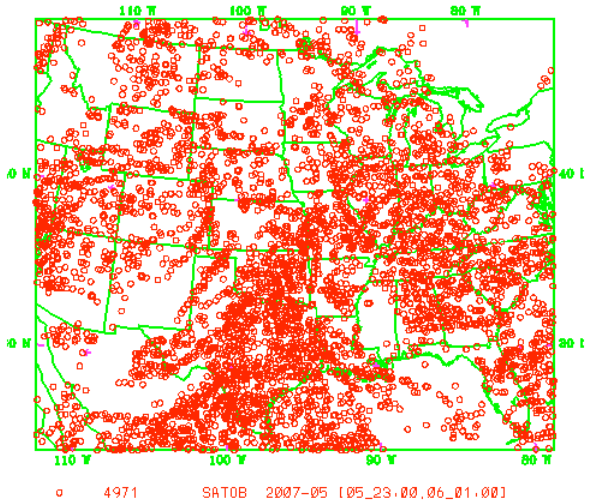
(2) Consistent Init. With WRF

(3) Explicit Precip. at T=0

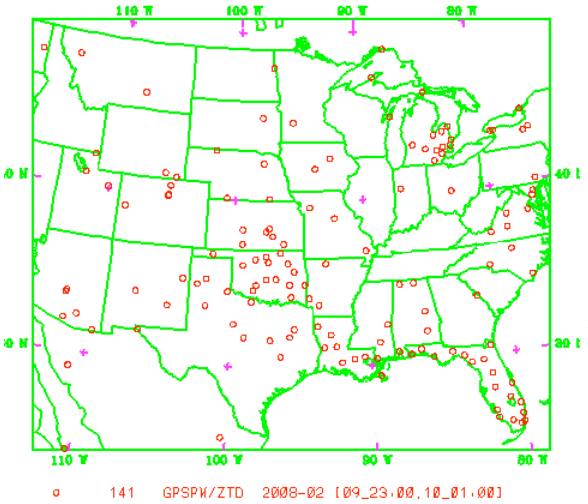
NO RADAR

OBS available (+-1hour), 3-hourly obs in 2008 (Demonstrated using 2007 data)





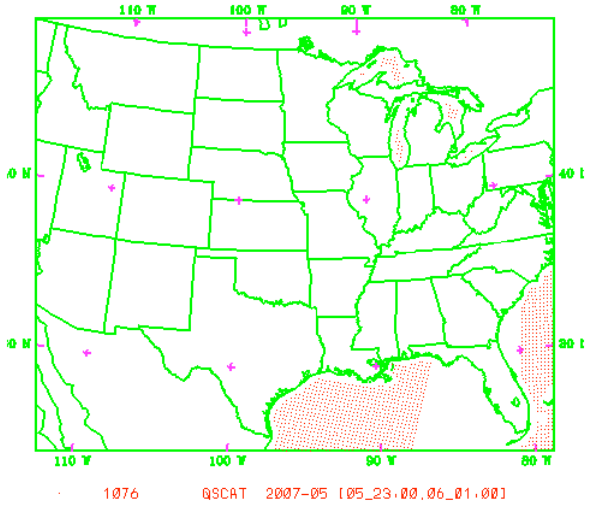
SAT-WIND (multi-levels)



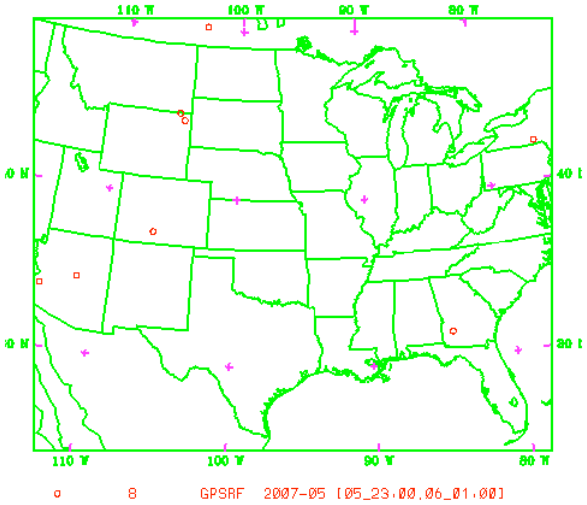
GPSPW

OBS from 2008021000

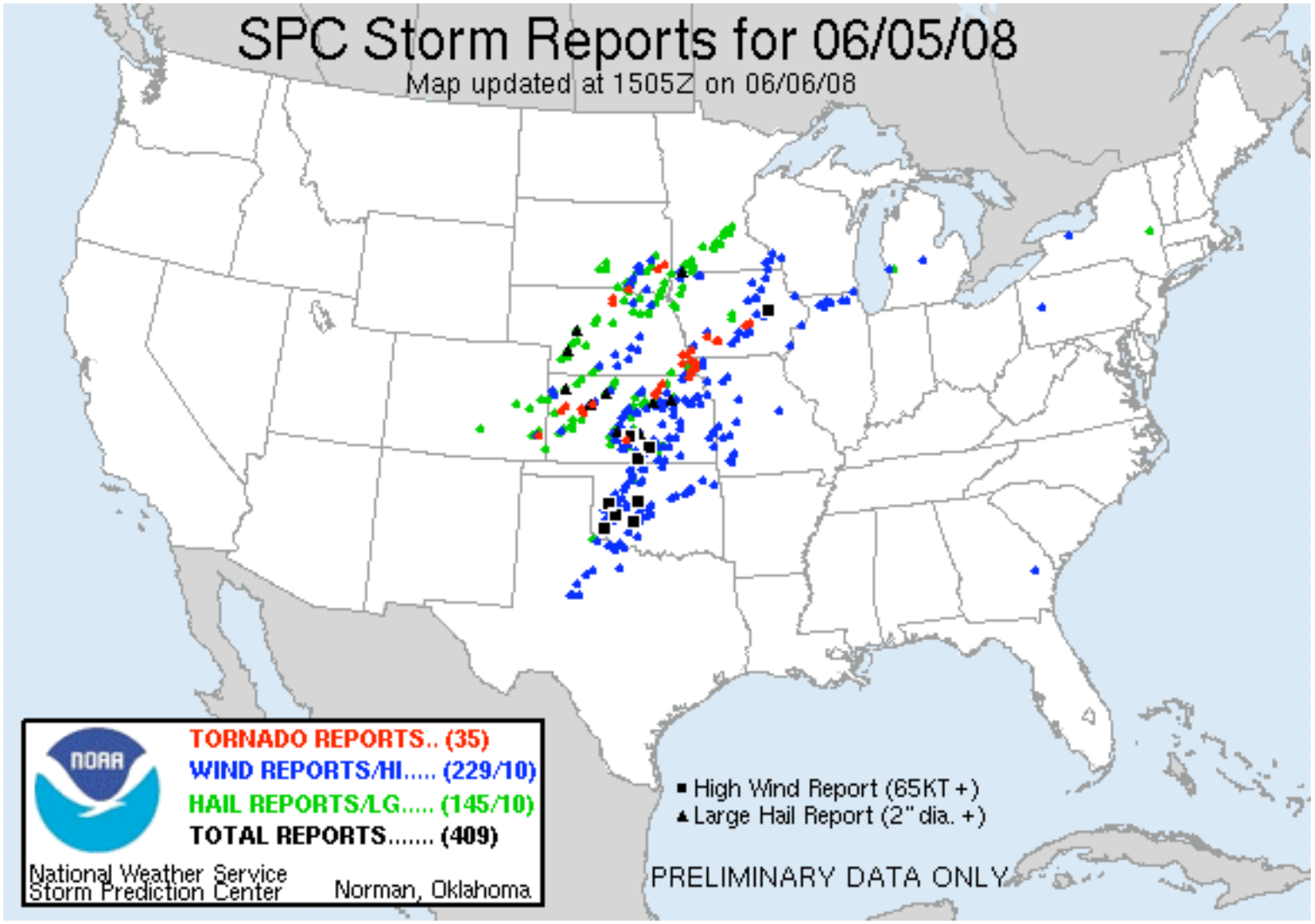
3-hourly OBS in 2008



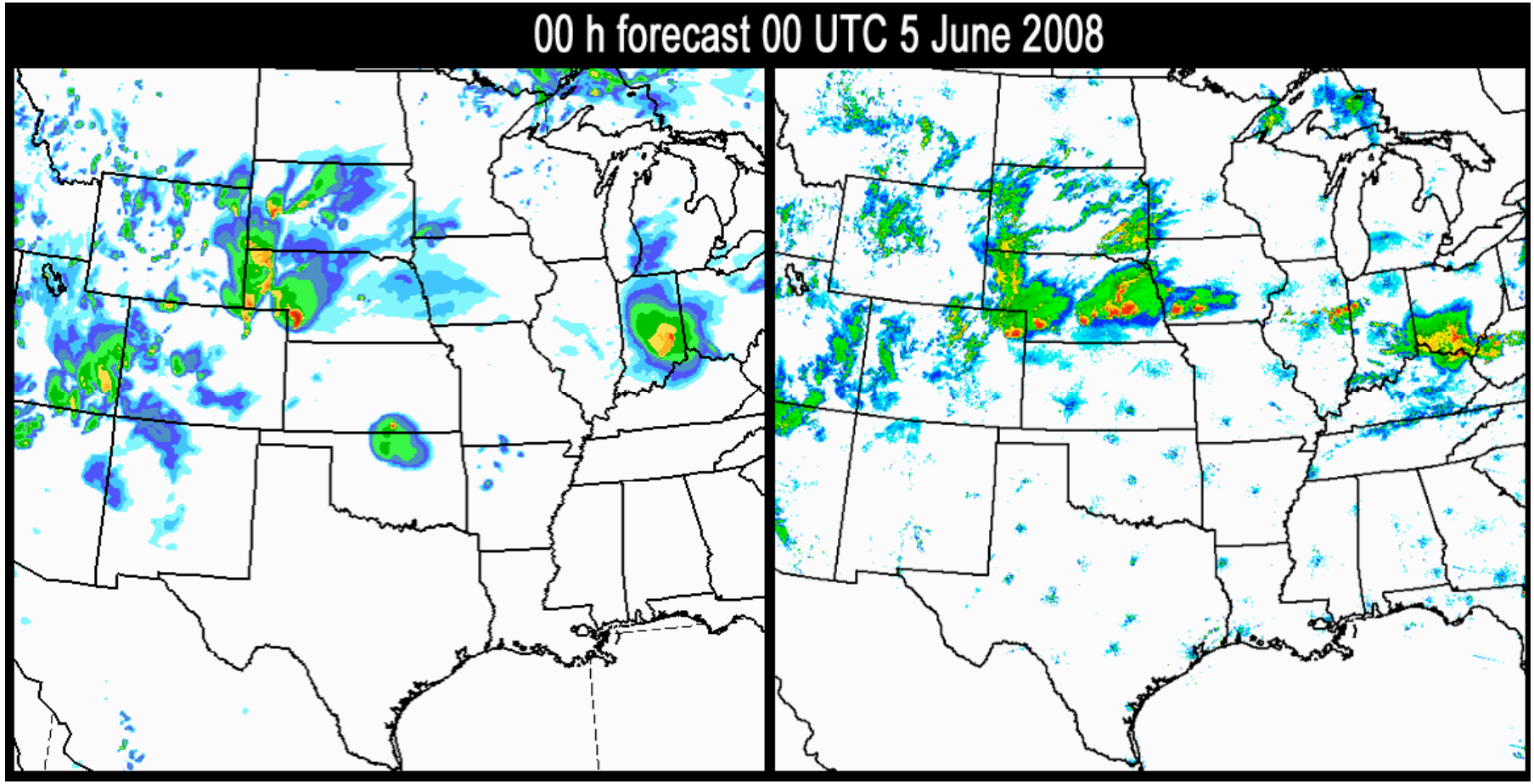
QSCAT



GPSAF


SPC Storm Reports for 06/05/08
Map updated at 1505Z on 06/06/08
TORNADO REPORTS.. (35)
WIND REPORTS/HI..... (229/10)
HAIL REPORTS/LG..... (145/10)
TOTAL REPORTS..... (409)
National Weather Service
Storm Prediction Center
Norman, Oklahoma
■ High Wind Report (65KT +)
▲ Large Hail Report (2" dia. +)
PRELIMINARY DATA ONLY

05 June 2008



3 km ARW

NEXRAD

However……..

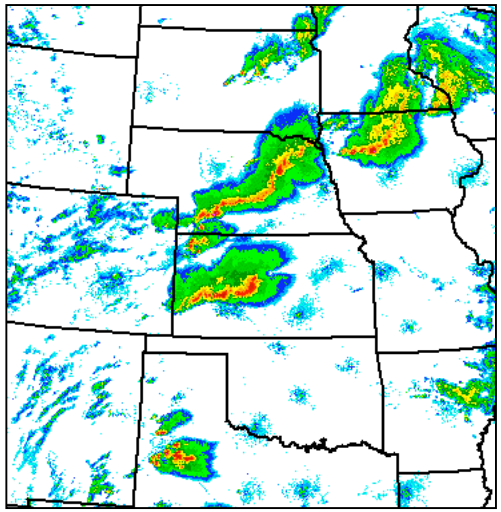
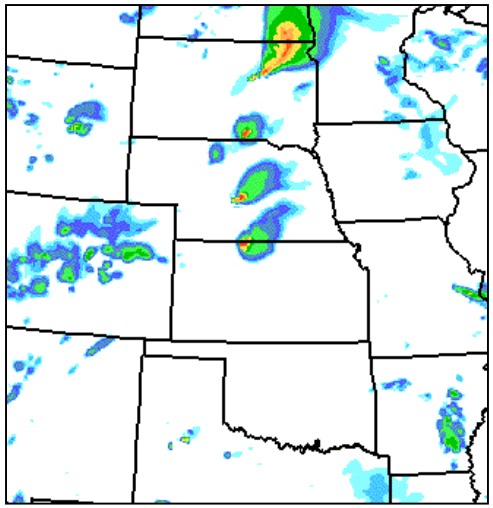
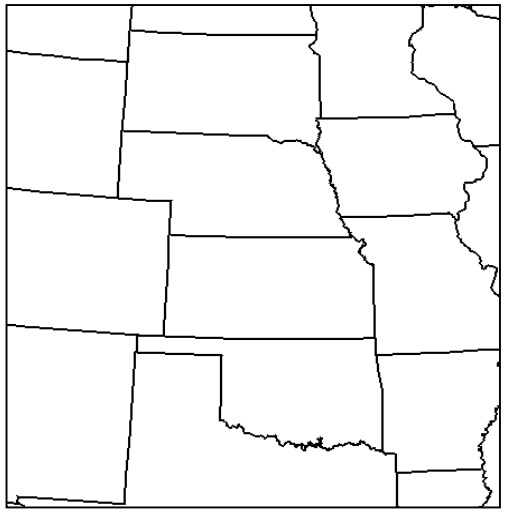
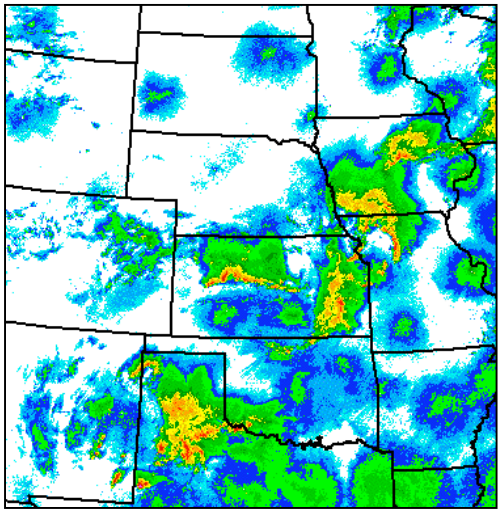
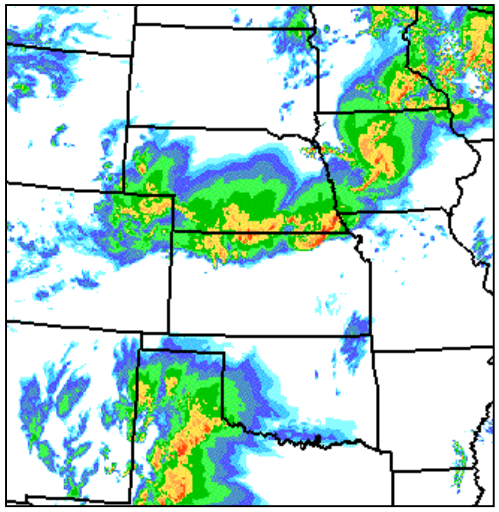
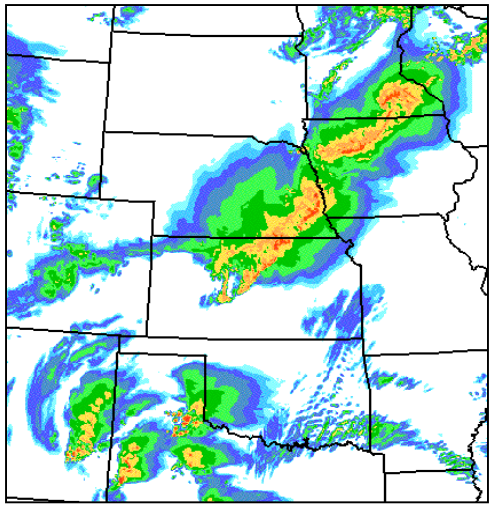
There are ``issues'' with erroneous precipitation at T=0!!!

Will look at:

……cycled 3D-VAR versus cold start

……cycled 3D-VAR using BMJ versus KF

05/07/08

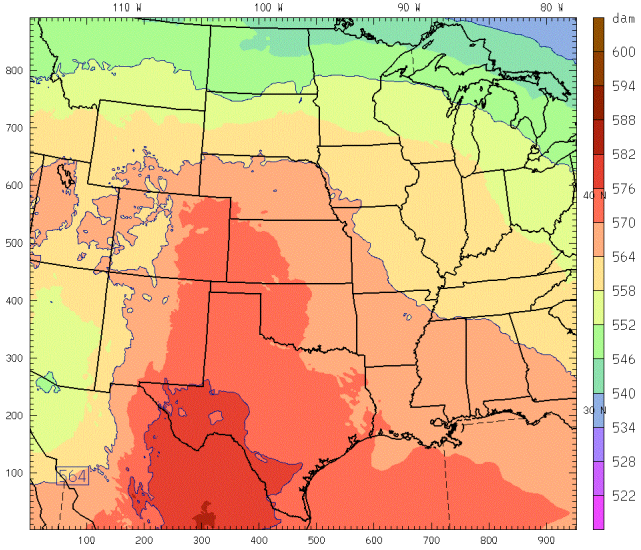
	NEXRAD	3 km ARW (cycled)	3 km ARW (cold)
00 UTC			
06 UTC			

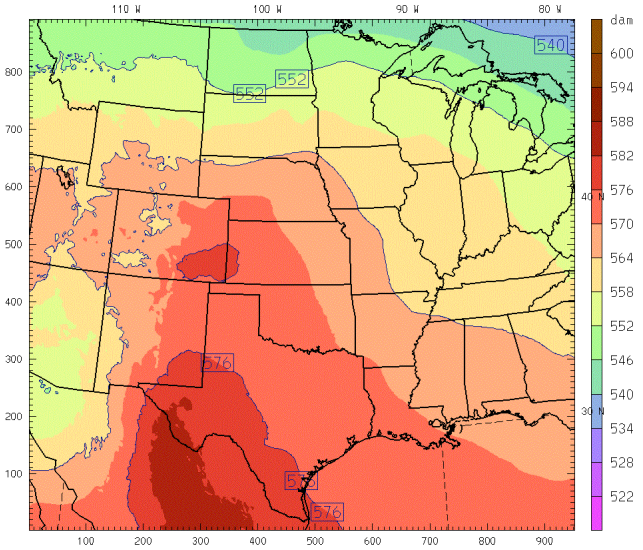
05/07/08 00 UTC

GFS 12 h Cycle

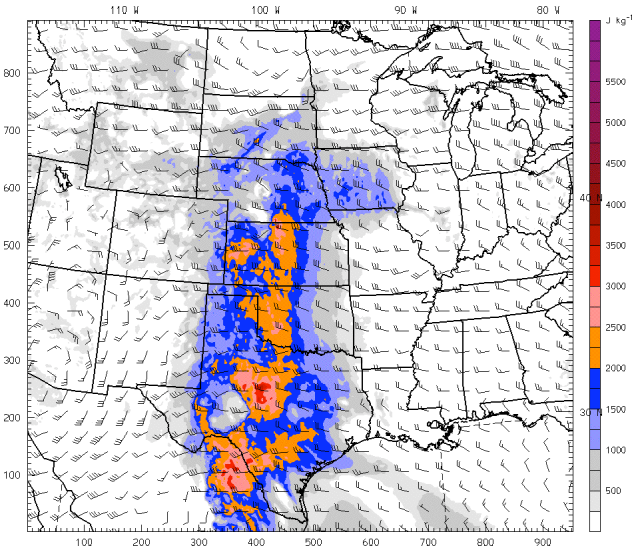
GFS COLD

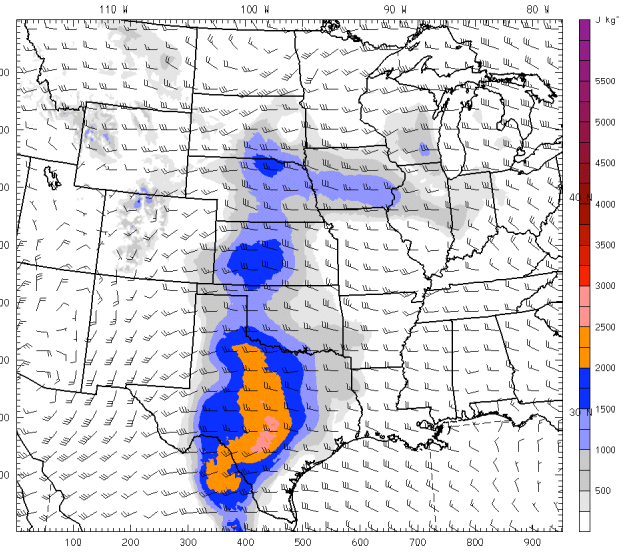
1000-500 Thickness



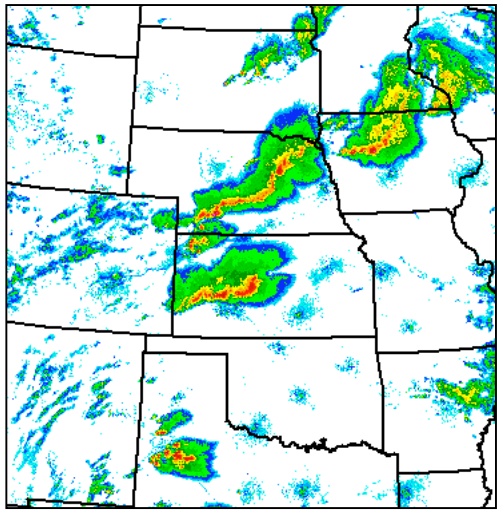
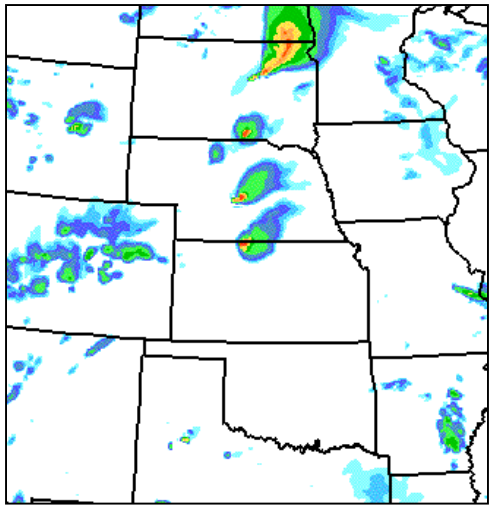
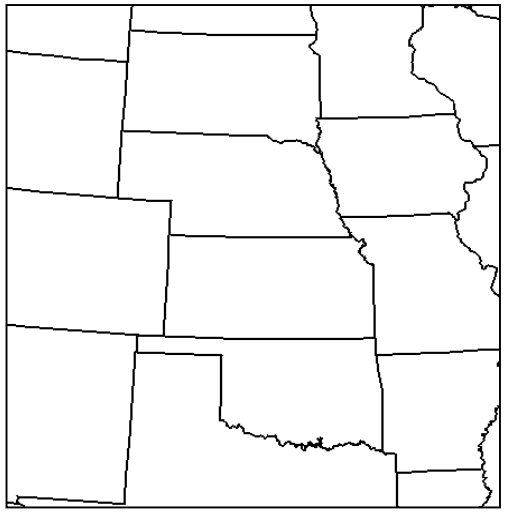
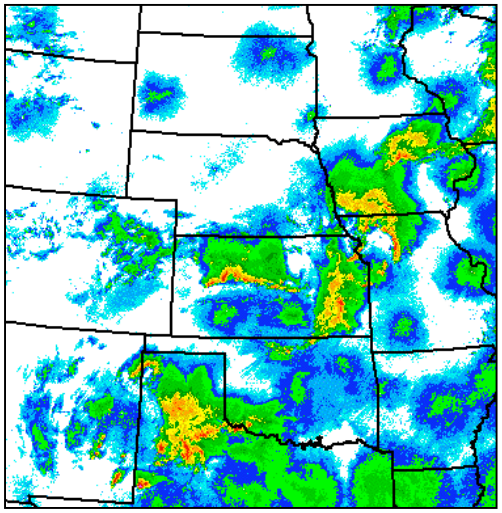
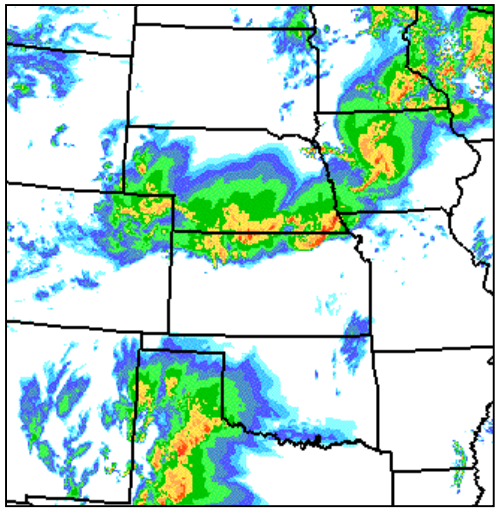
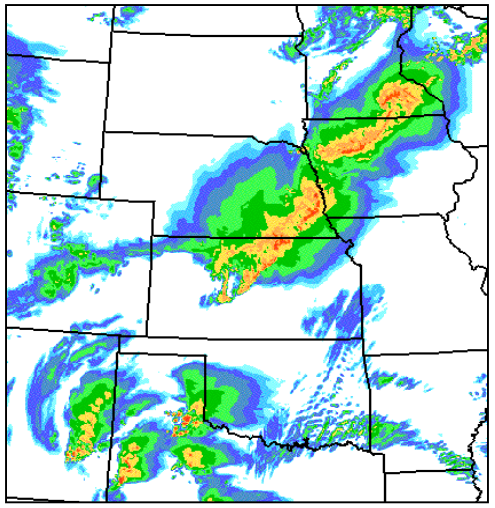


CAPE / 6 km Shear





05/07/08

	NEXRAD	3 km ARW (cycled)	3 km ARW (cold)
00 UTC			
06 UTC			

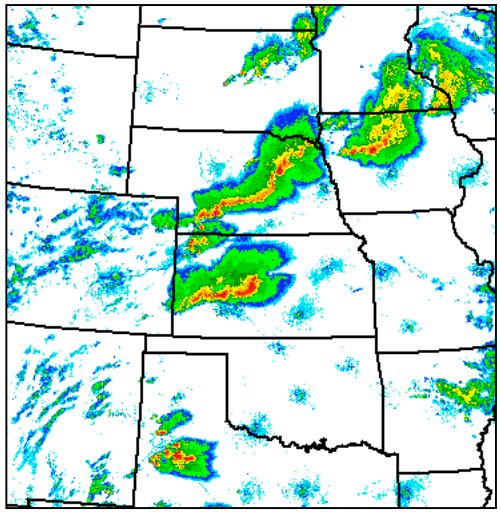
05/07/08

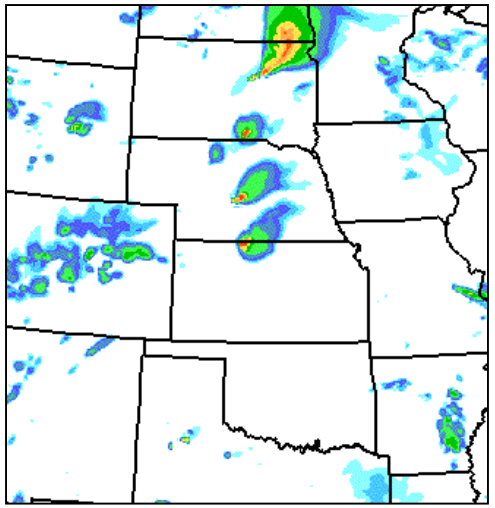
NEXRAD

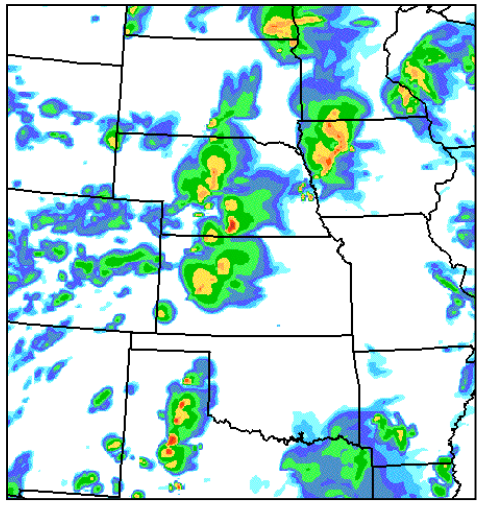
3 km ARW (cycled)

3 km ARW (cycled) BMJ

00 UTC







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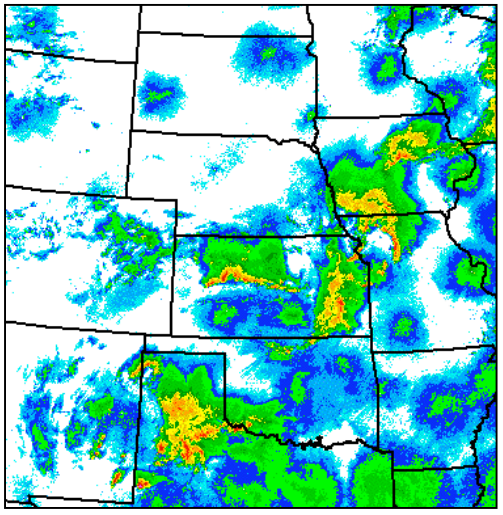
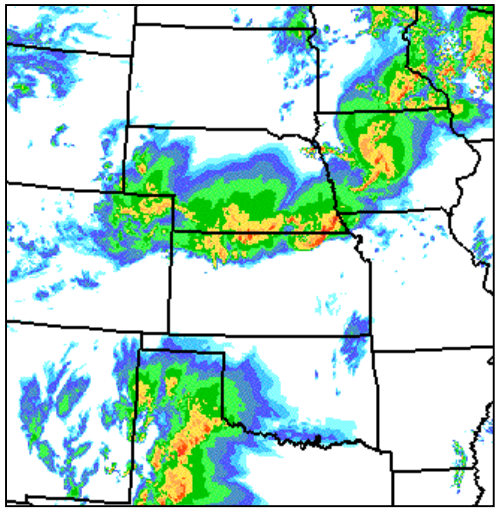
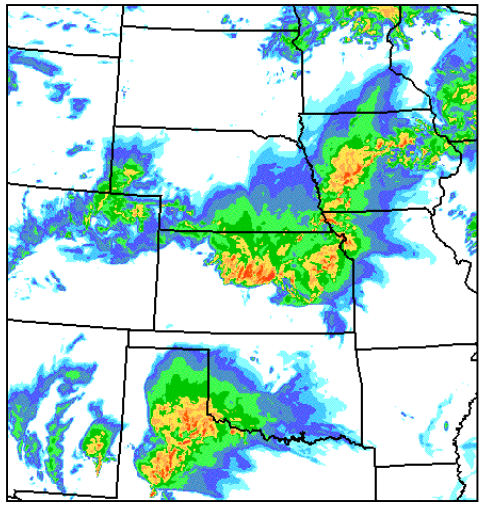
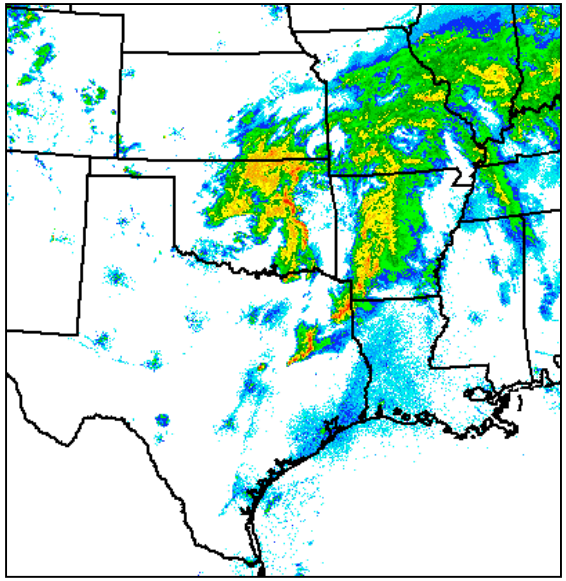


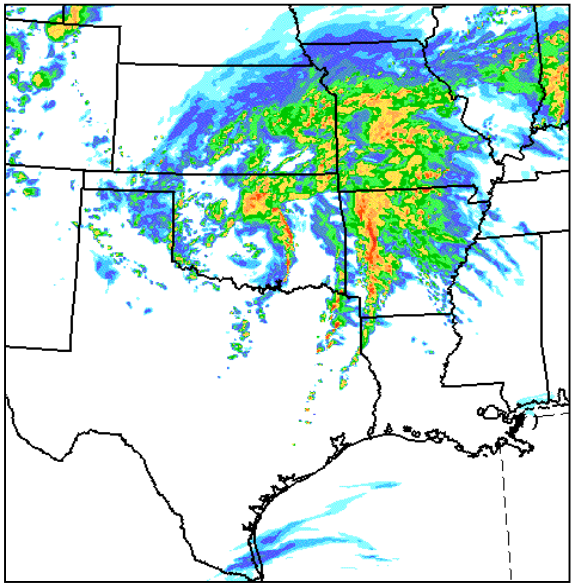




24 h Forecast: valid 05/08/08 00 UTC

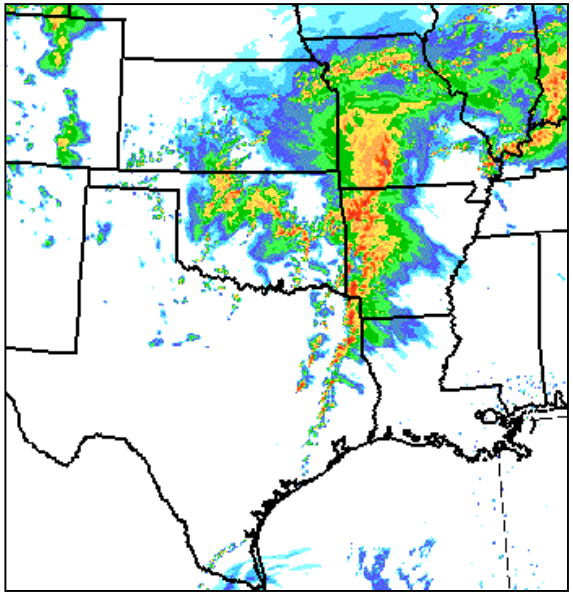
NEXRAD

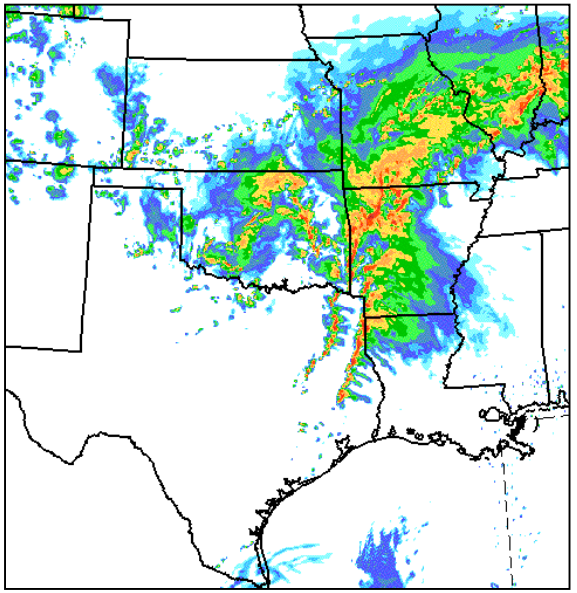




3 km ARW
COLD (KF)

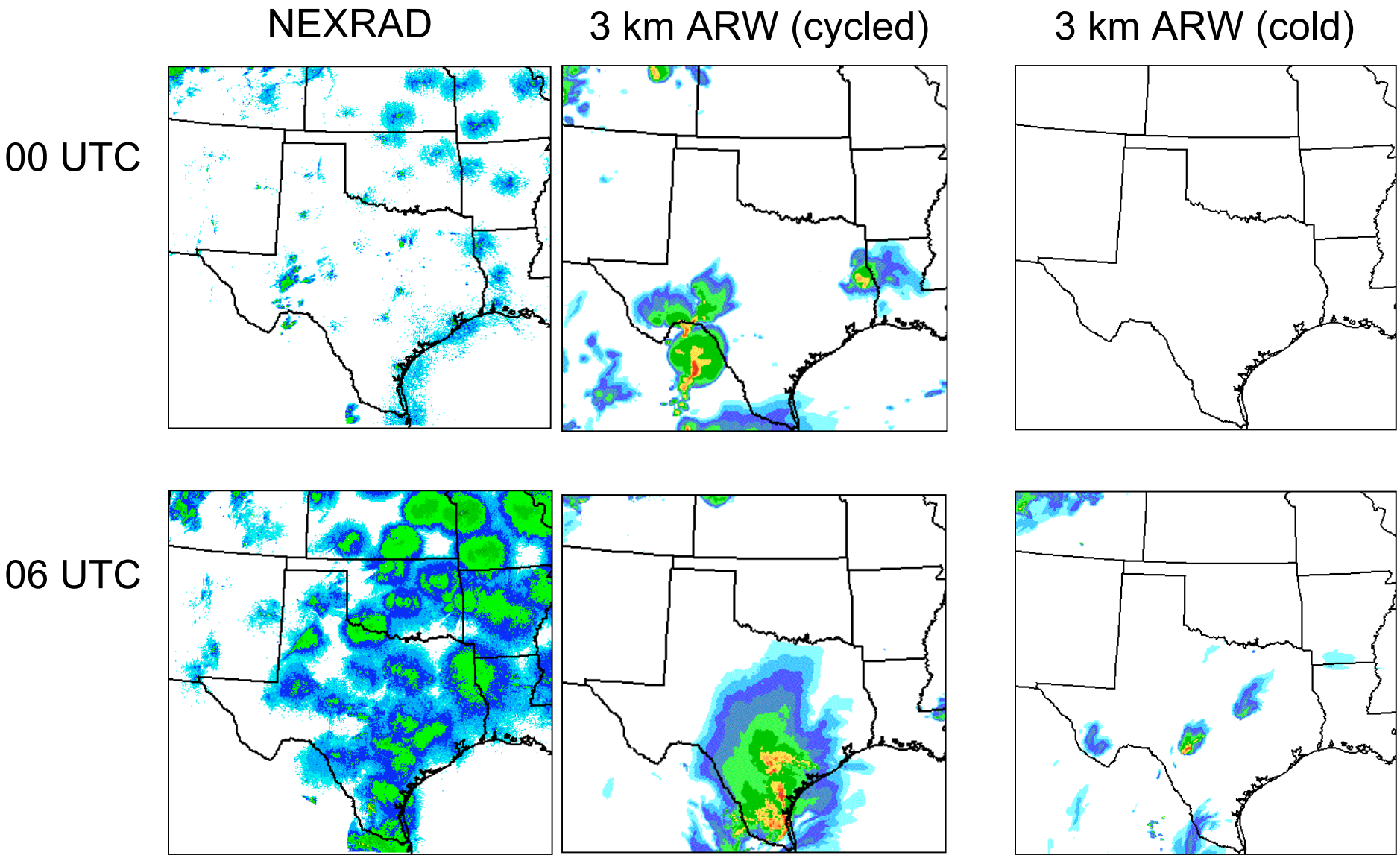
3 km ARW
cycled (KF)





3 km ARW
cycled (BMJ)

05/13/08

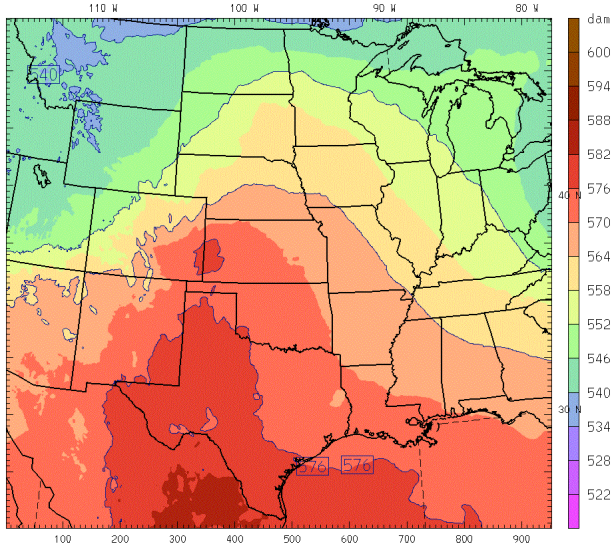


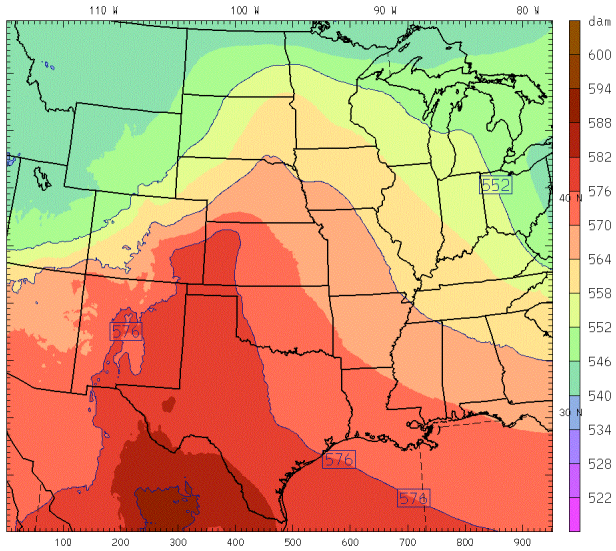
5/13/08 00 UTC

GFS 12 h Cycle

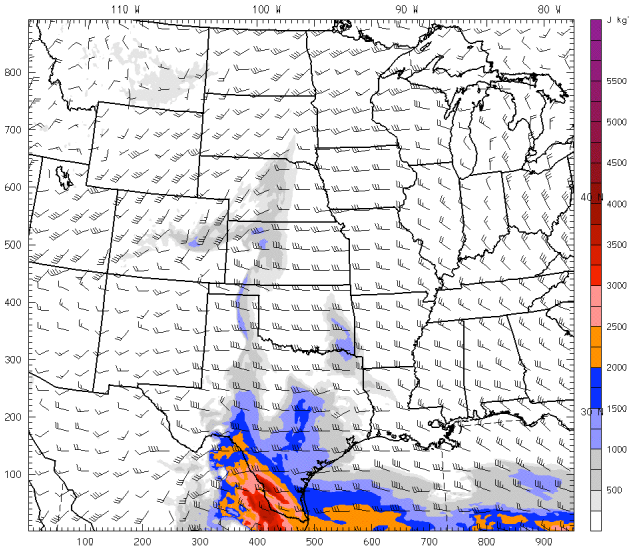
GFS COLD

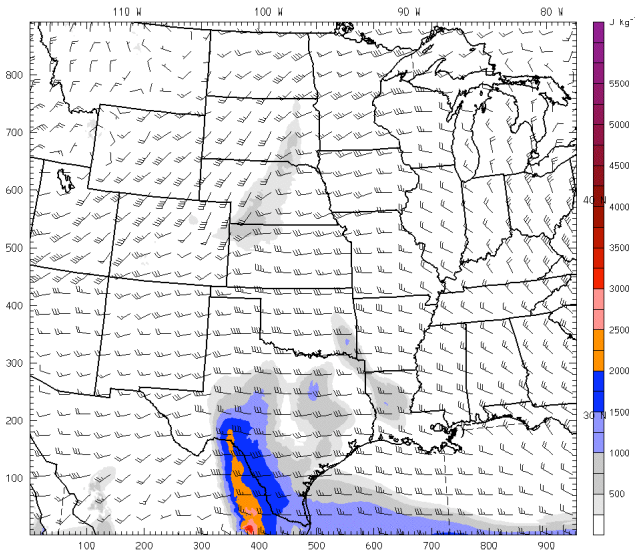
1000-500 Thickness





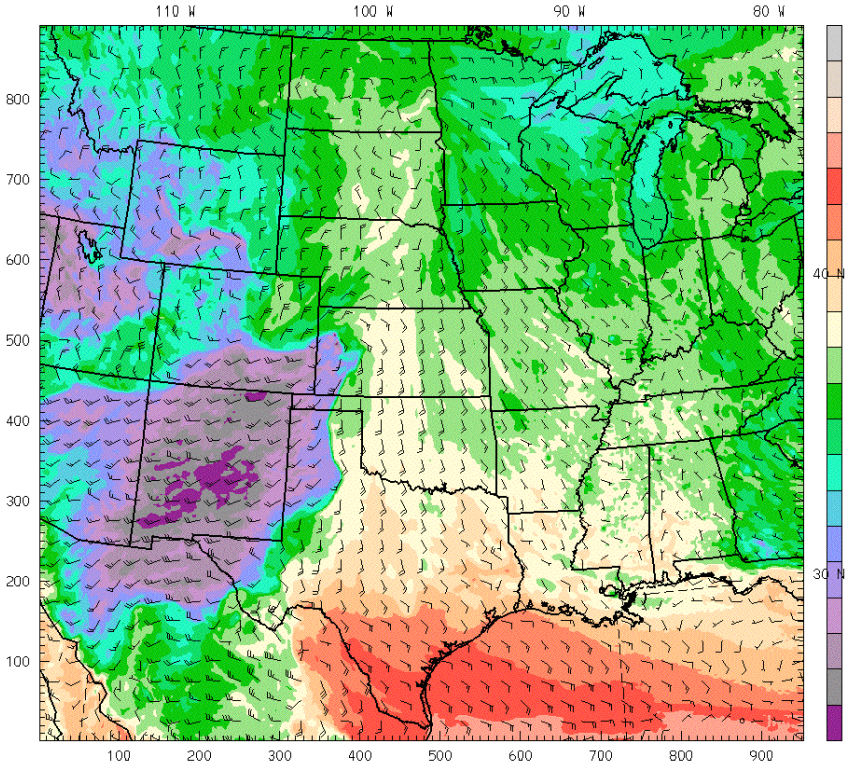
CAPE / 6 km Shear



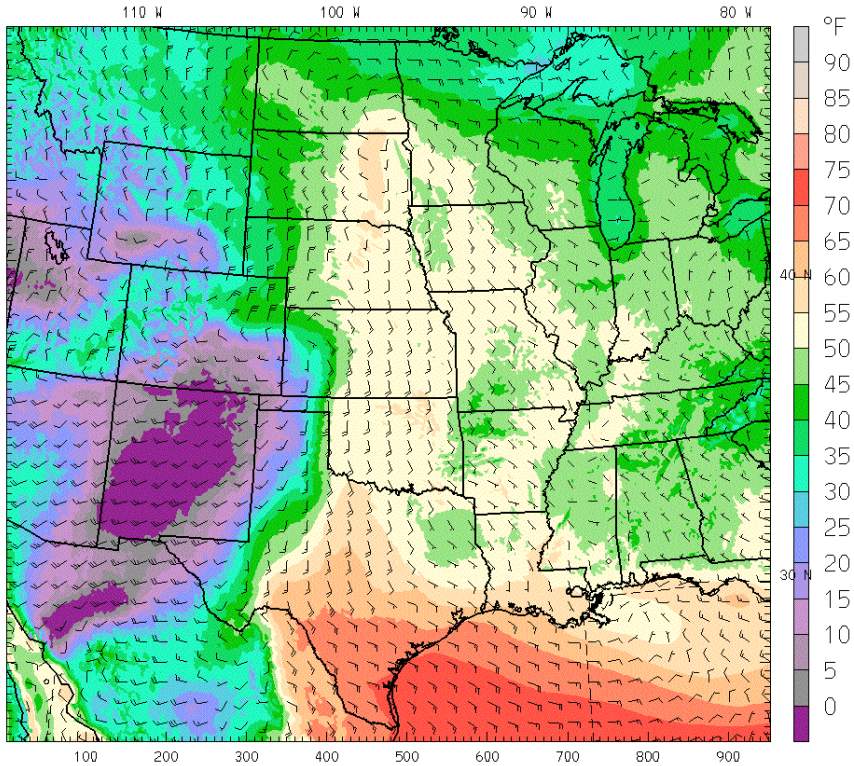


5/13/08 00 UTC

GFS 12 h Cycle

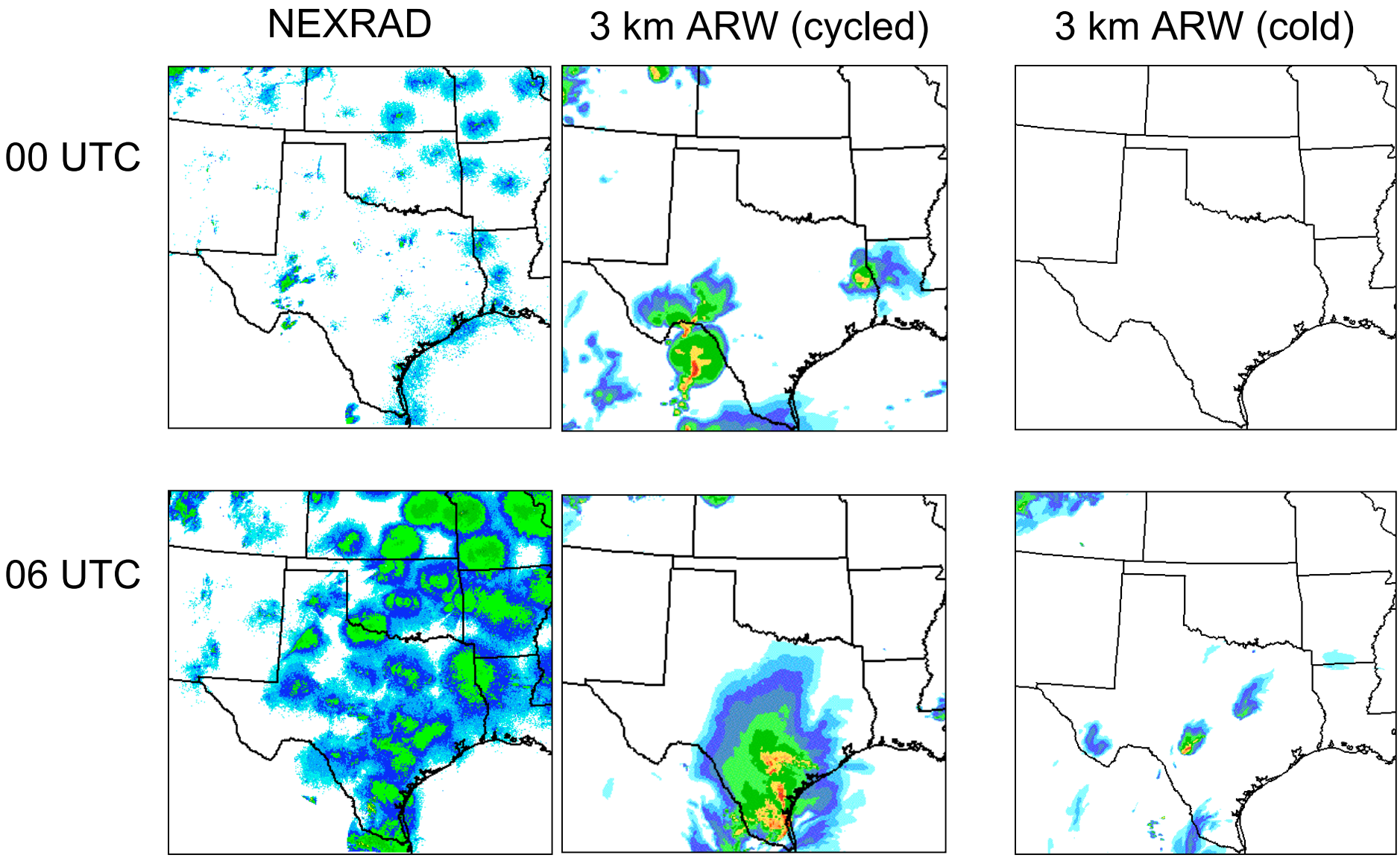


GFS COLD



Surface Winds/ Dew Point

05/13/08



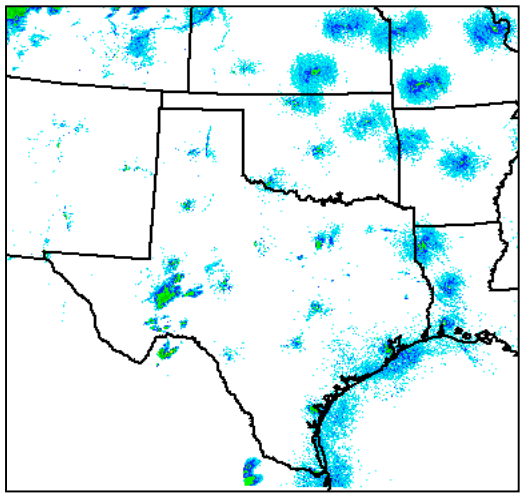
05/13/08

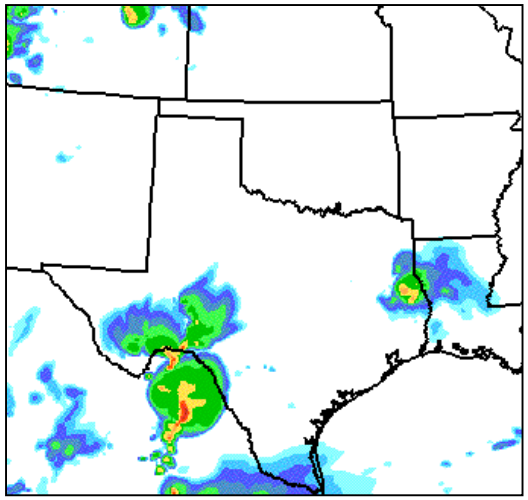
NEXRAD

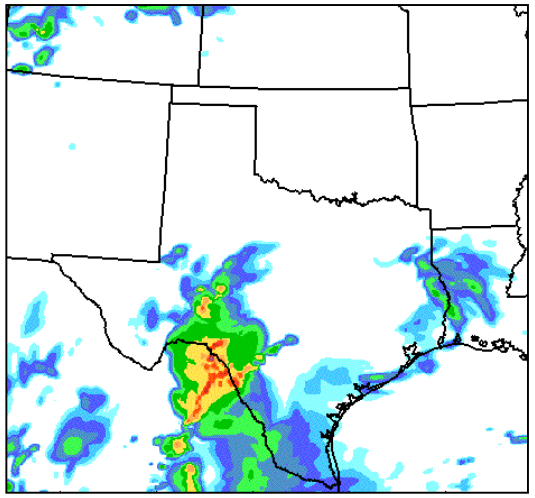
3 km ARW (cycled)

3 km ARW (cycled) BMJ

00 UTC







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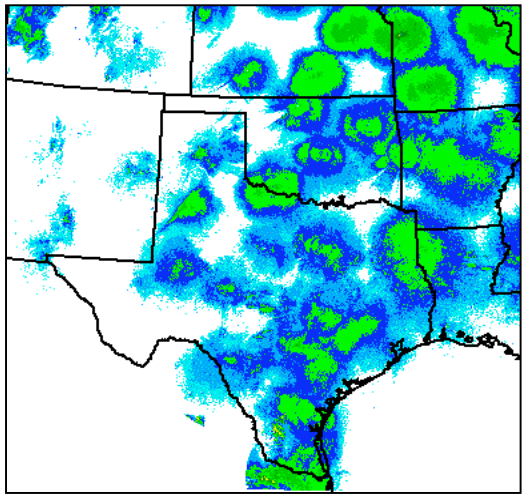
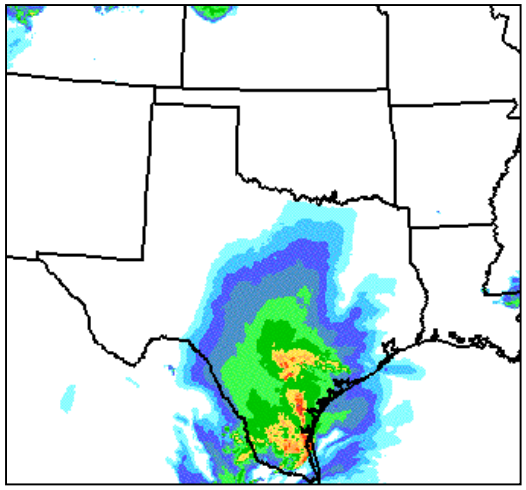
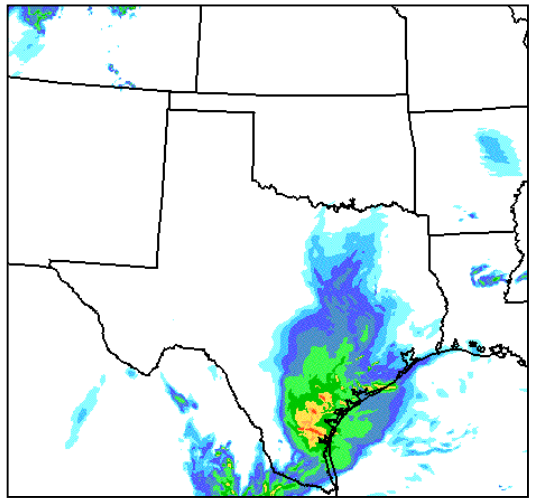
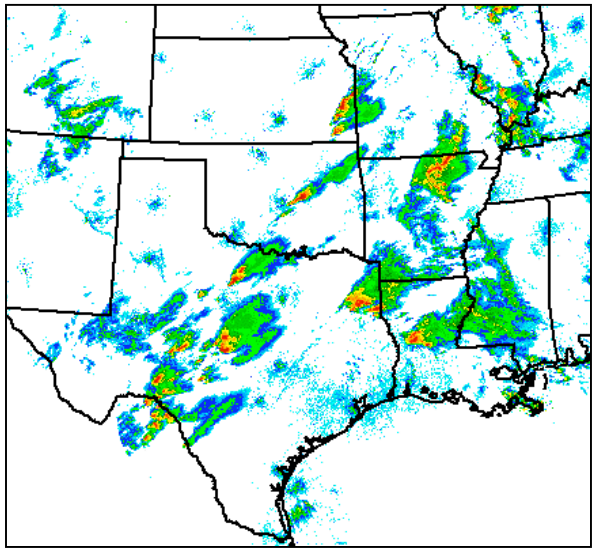


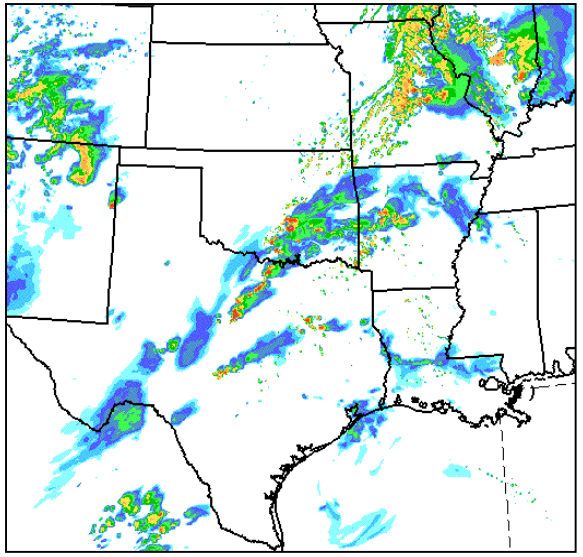




24 h Forecast: valid 05/14/08 00 UTC

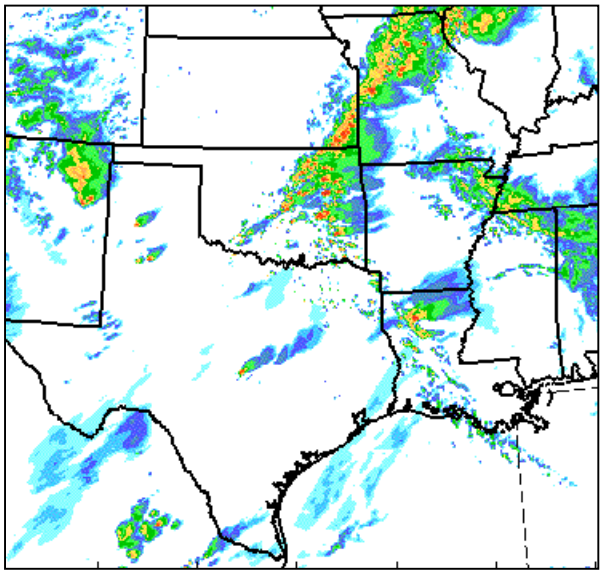
NEXRAD

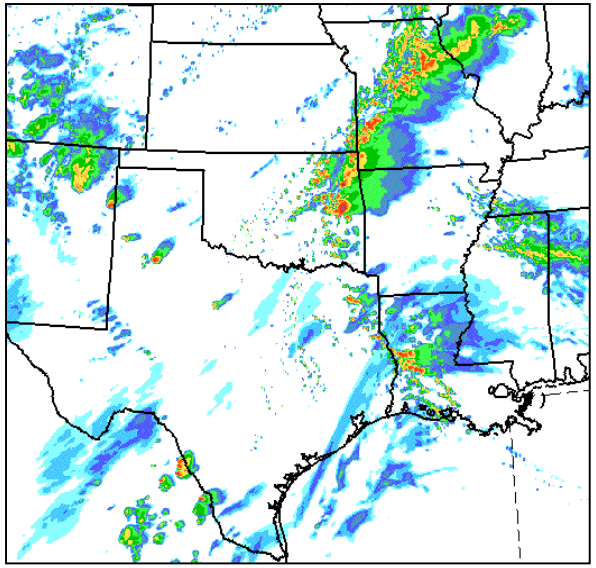




3 km ARW
COLD (KF)

3 km ARW
cycled (KF)





3 km ARW
cycled (BMJ)

Summary:

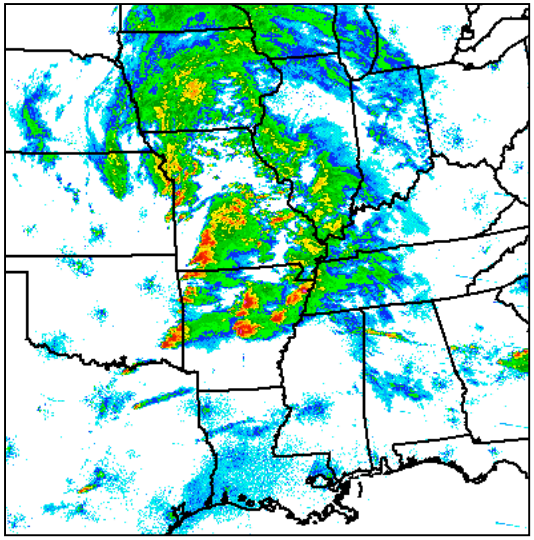
*WRF-3DVAR cycling ran successfully at 9 km resolution in realtime over a large domain.

*Impact on short-term (0-6 h) convective forecasts mixed……issues with spurious explicit precipitation from 9 km domain….sensitivity to cumulus parameterization on 9 km grid

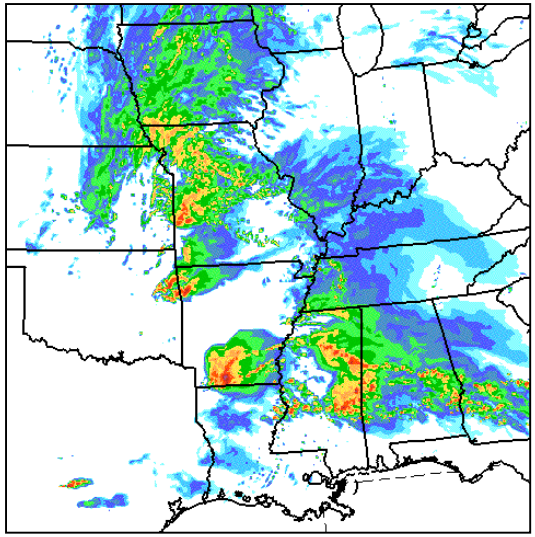
*Impact on longer-term (24-36h) forecasts inconclusive

So,was 12 hours of cycling worth the effort??

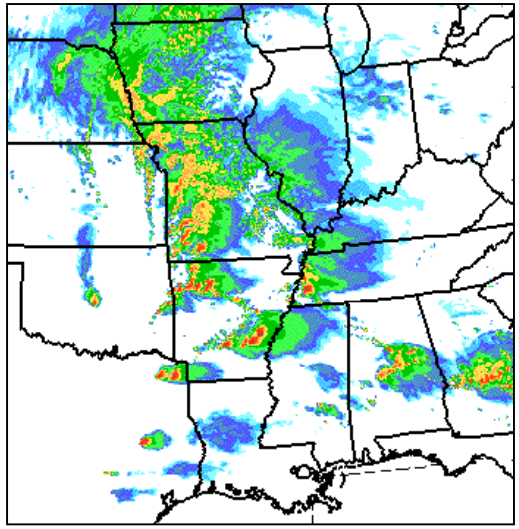
NEXRAD



3 km ARW (cycled)

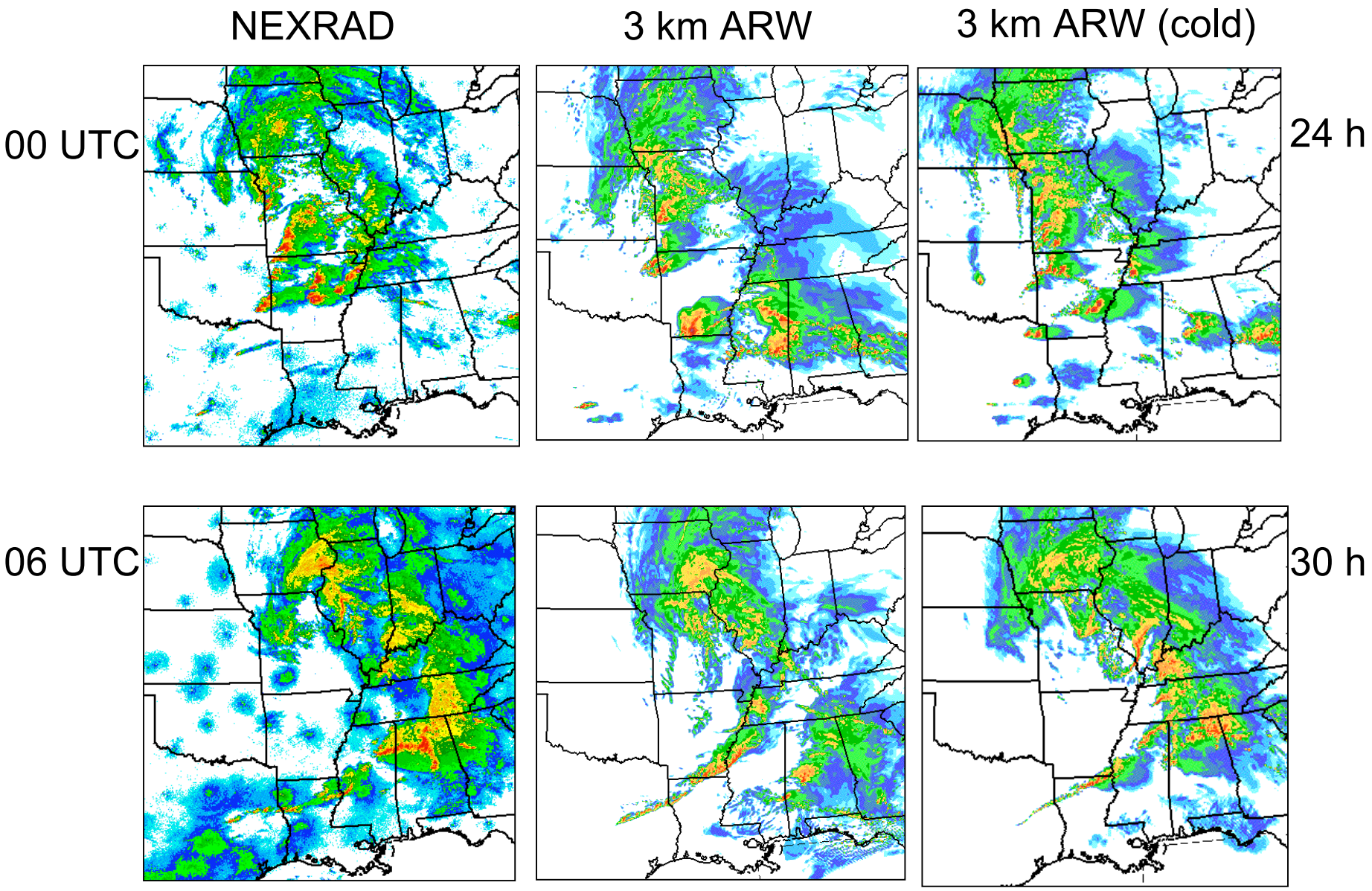


3 km ARW (cold)



24 h Forecast: Valid 05/11/08 00 UTC

24-30 h Forecast: Valid 05/11/08



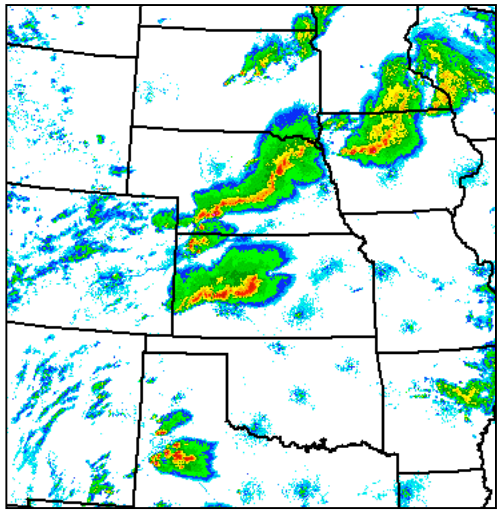
5/07/08

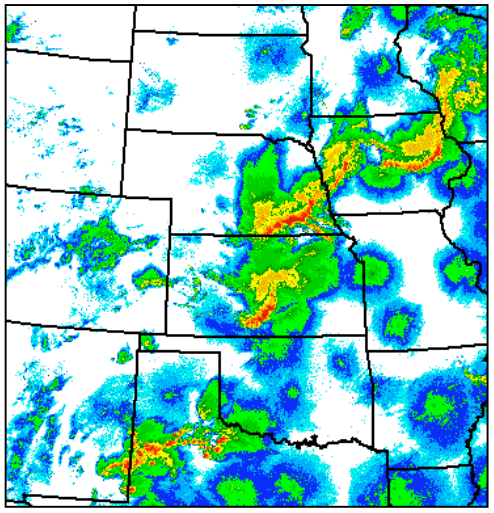
00 UTC

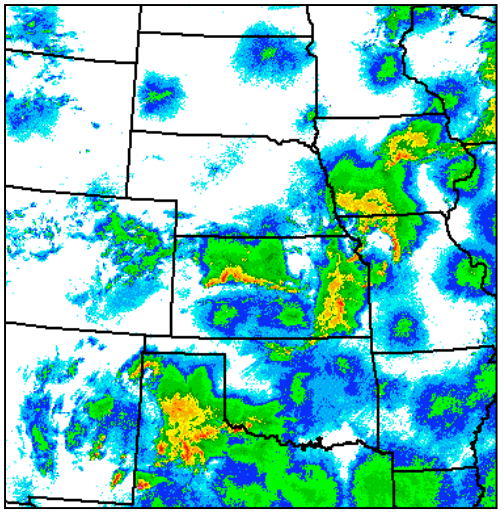
03 UTC

06 UTC

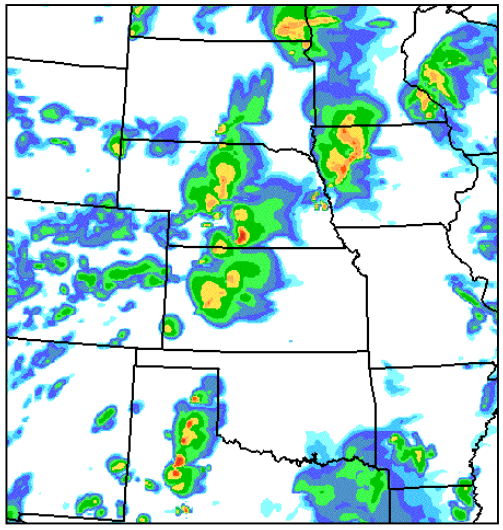
NEXRAD

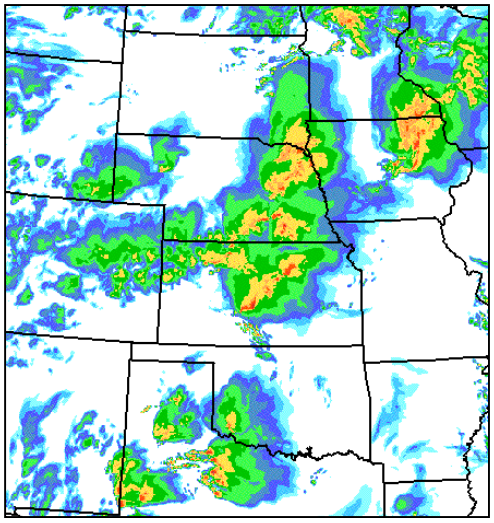


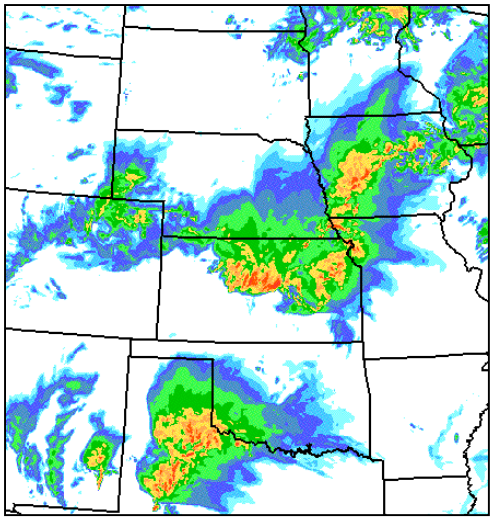




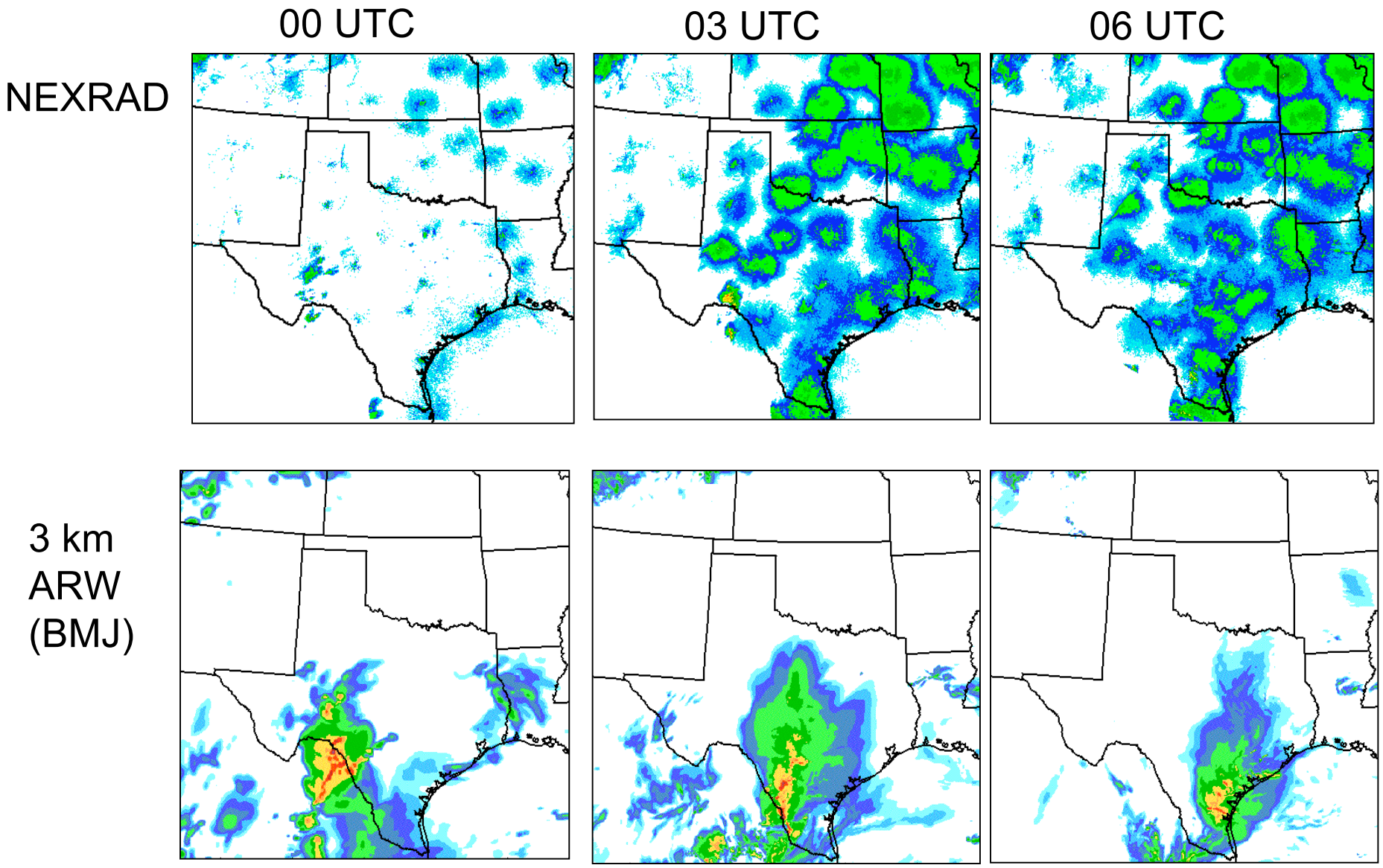
3 km
ARW
(BMJ)







5/13/08

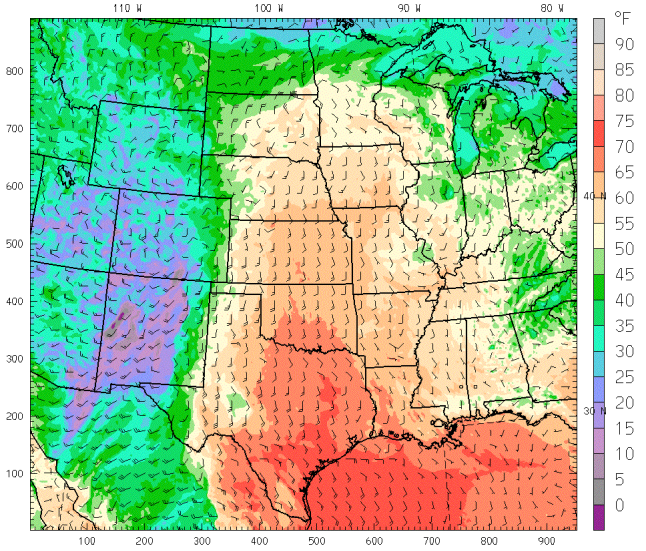


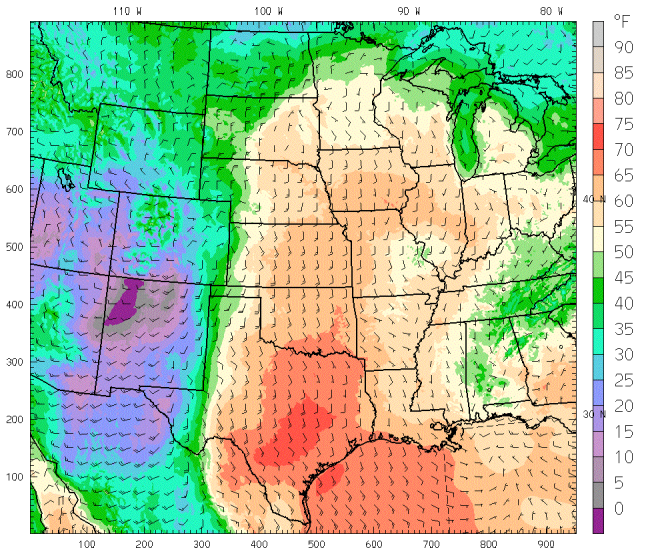
05/07/08 00 UTC

GFS 12 h Cycle

GFS COLD

Surface Dew Point





Surface Theta-E