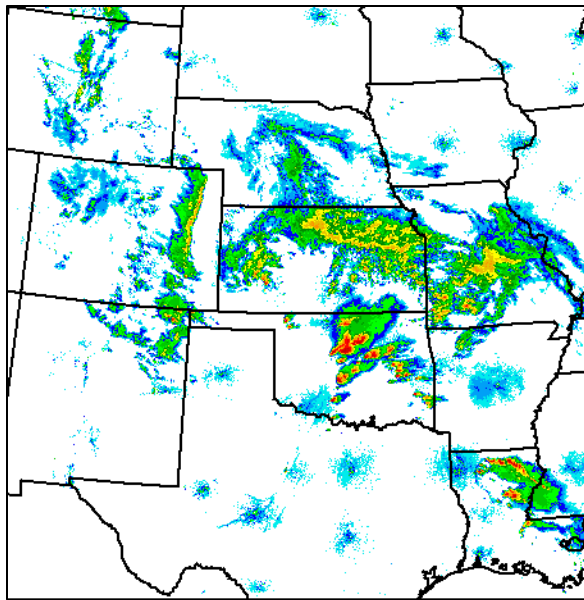
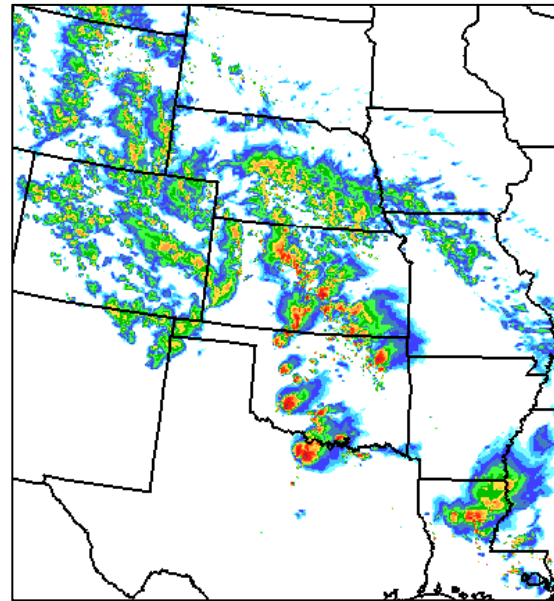


# Realtime Explicit Convective Forecasts in Support of VORTEX-2 and the SPC/NSSL Spring Program:

Radar 00  
UTC  
05/20/10



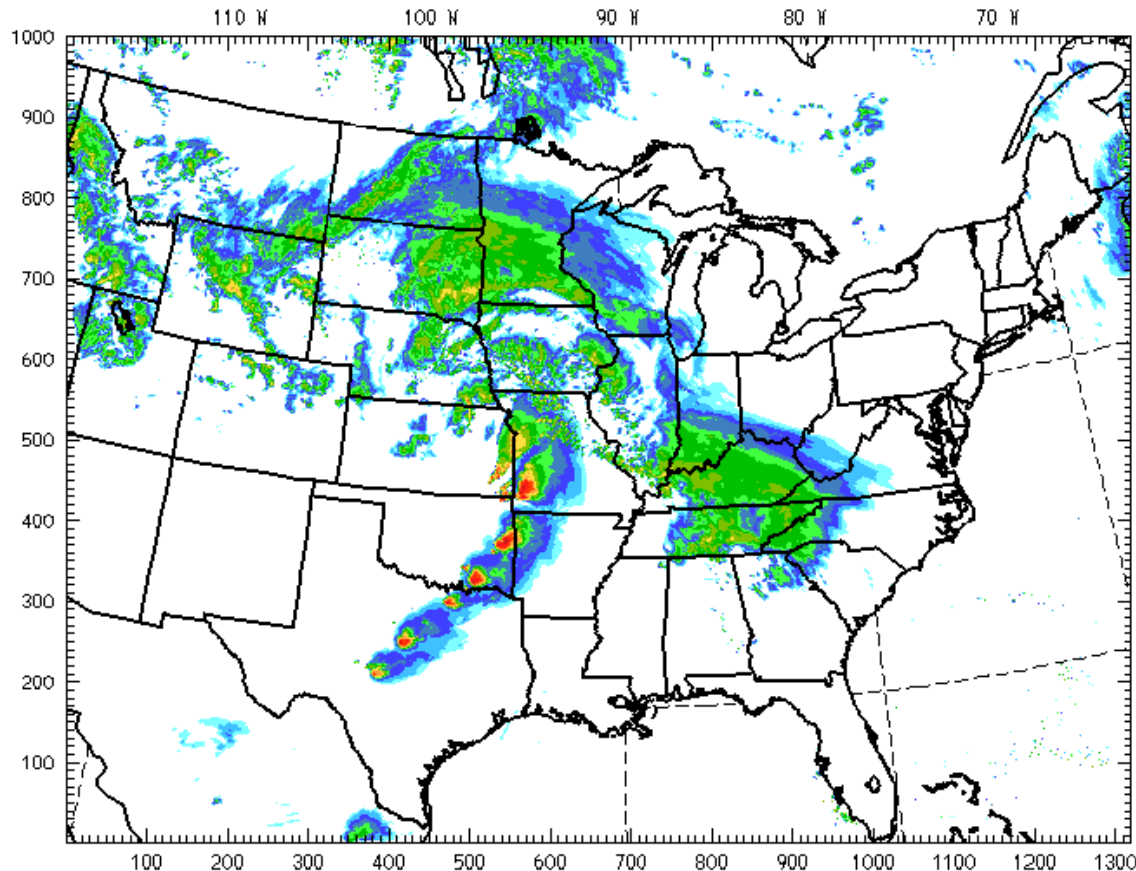
3 km ARW  
48 h  
Forecast:



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

(11th WRF User's Workshop: June 21-24 2010)

## 2010 Domain: 3 km (1 May - 18 June)



3 km domain:

....initialized at 00,12 UTC

.... RUC 13 km DDFI\* analysis

....48 h (is there predictability?)

....MYJ PBL

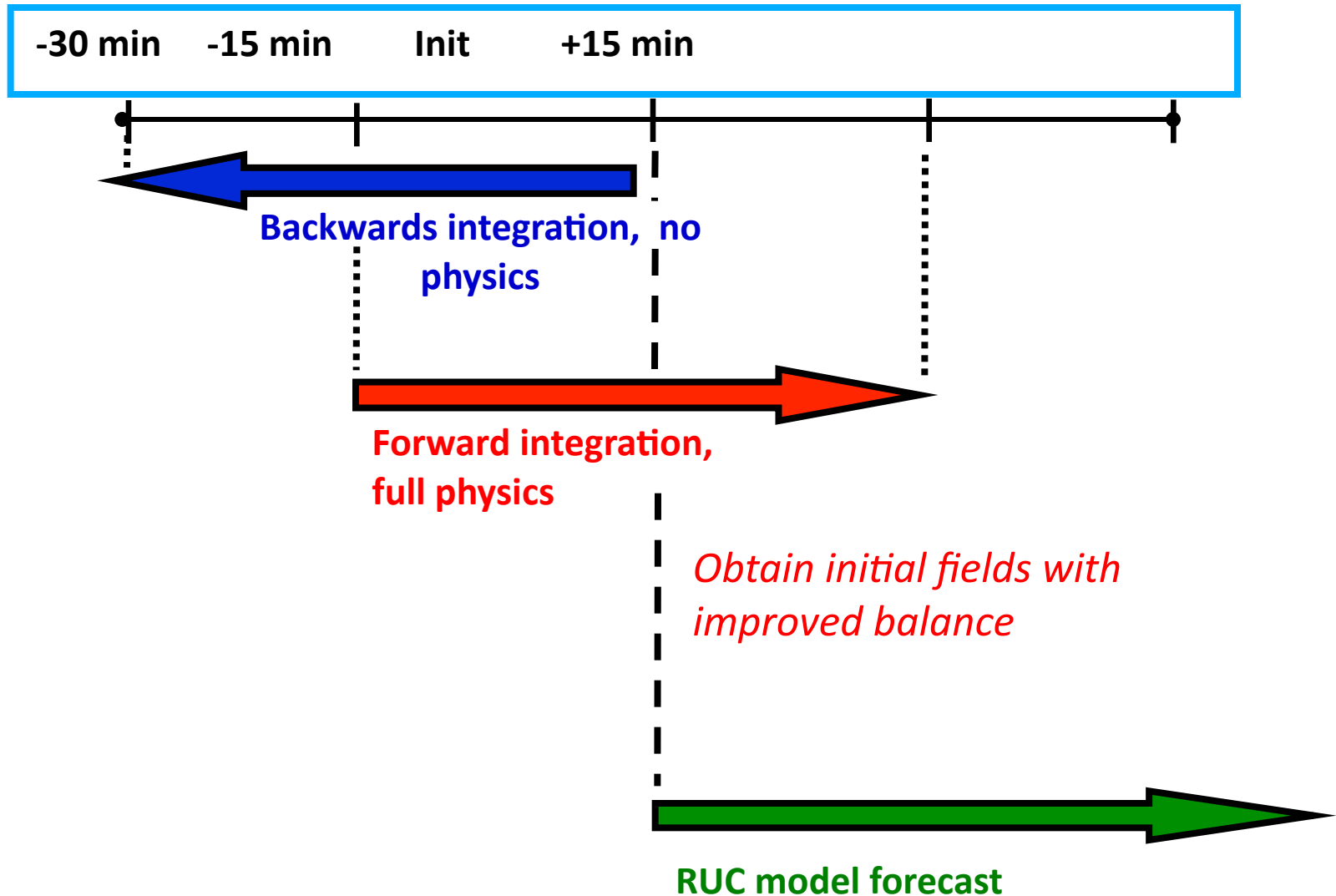
.... GFS BC

....Thompson Microphysics

\*(new 2-Moment rain)\*

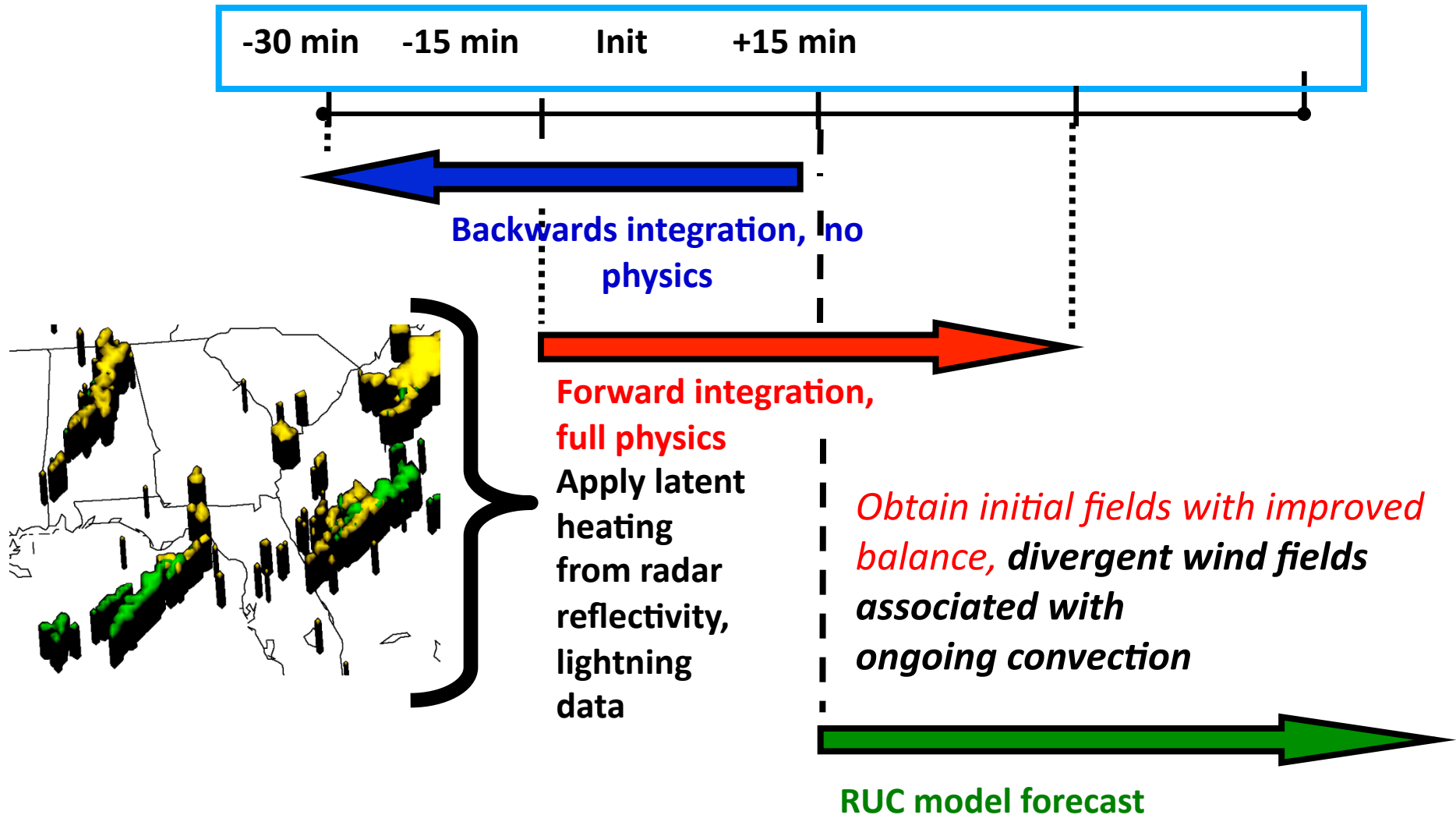
\*2009: Used RUC 13 km DDFI analysis.....at least that's what we thought at the time.....

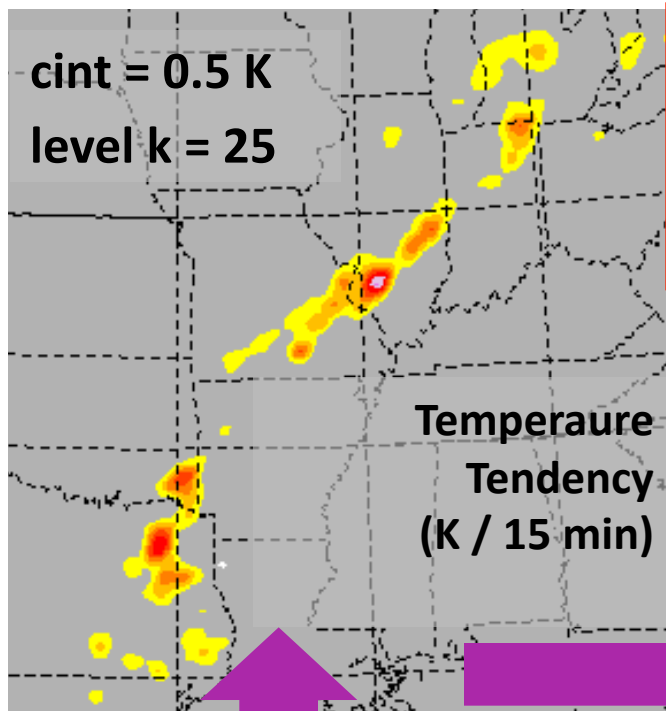
# Diabatic Digital Filter Initialization (DDFI)



# Diabatic Digital Filter Initialization (DDFI)

add assimilation of radar data

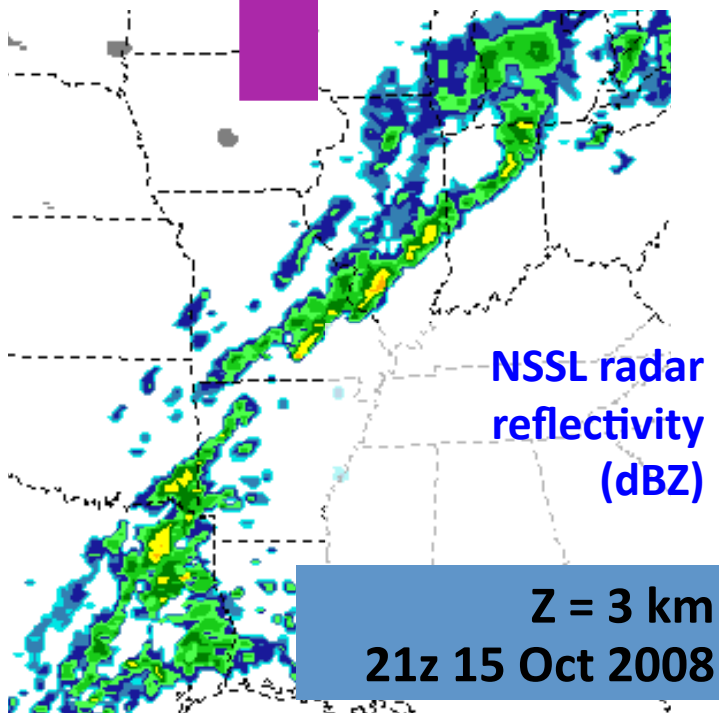
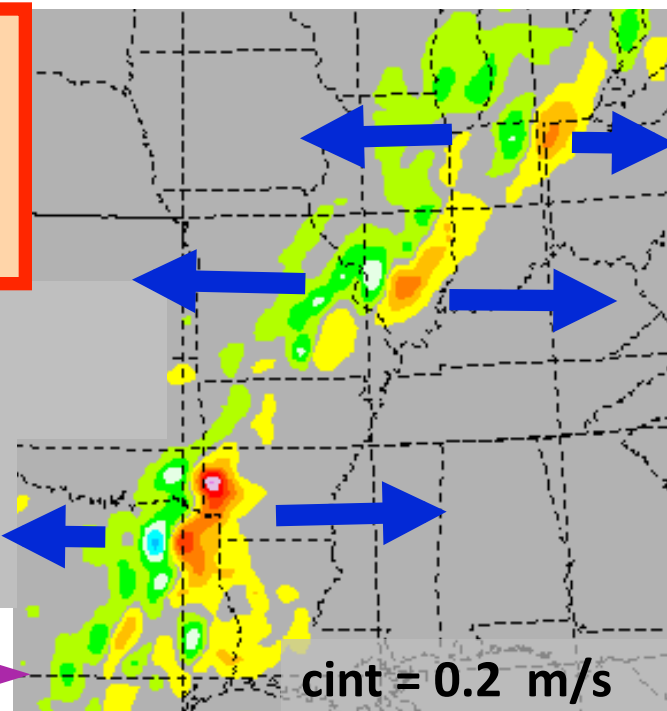




**RUC radar  
assimilation  
(one cycle)**

K=35 U-comp. diff  
(radar - norad)

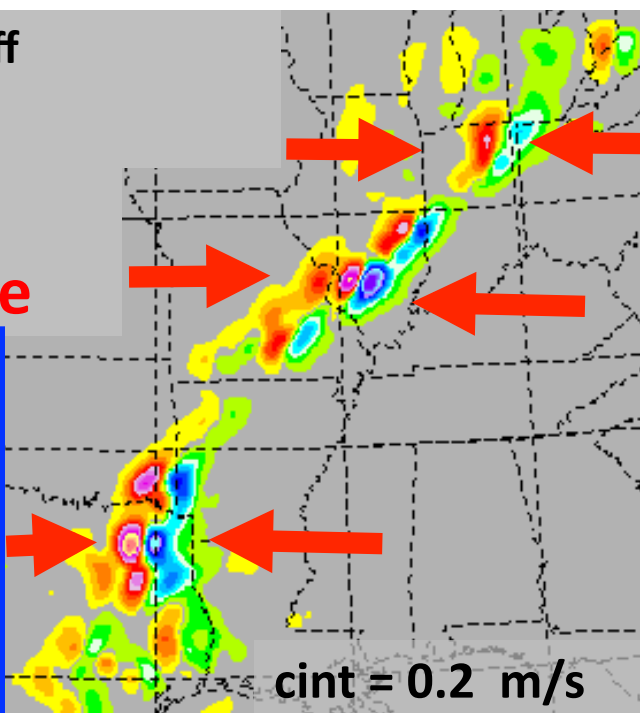
**Upper-level  
Divergence**



K=15 U-comp. diff  
(radar - norad)

**Low-level  
Convergence**

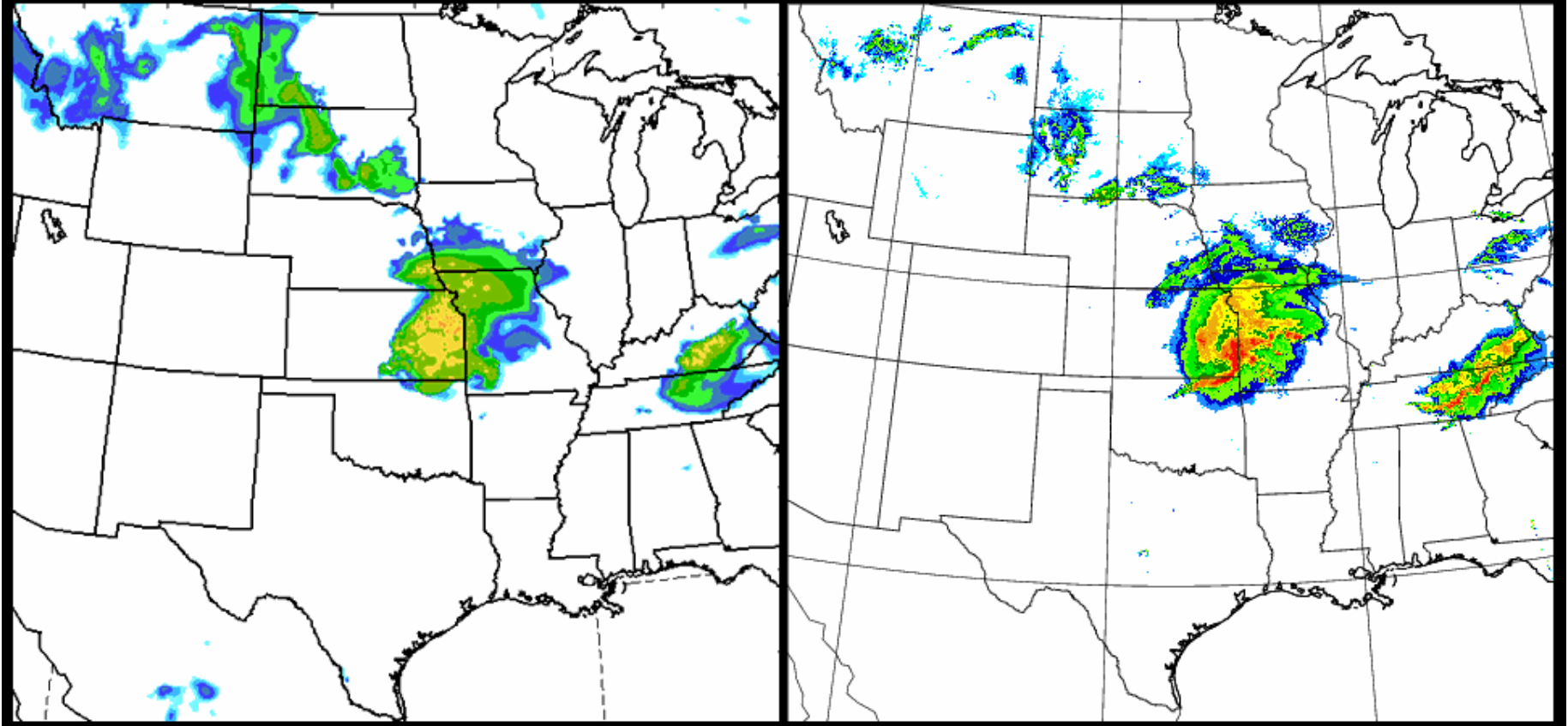
**Radar assimilation  
applied each hour**  
**Difference is radar  
impact from one  
update in cycle with  
radar assimilation**



08 May 2009 12 UTC

“RUC 13 km DFI”

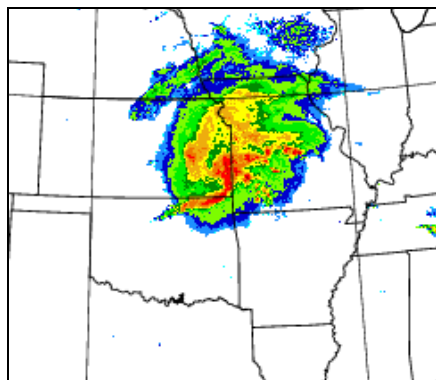
00 h forecast 12 UTC 08 May 2009



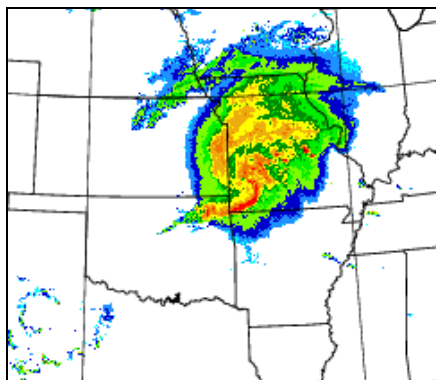
WRF-ARW Reflectivity

Composite Radar

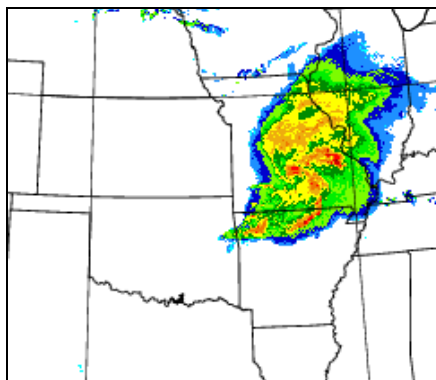
05/08/09 12 UTC



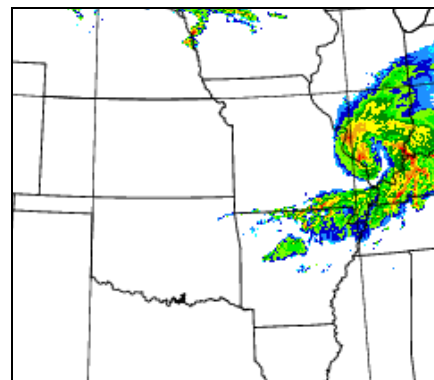
13 UTC



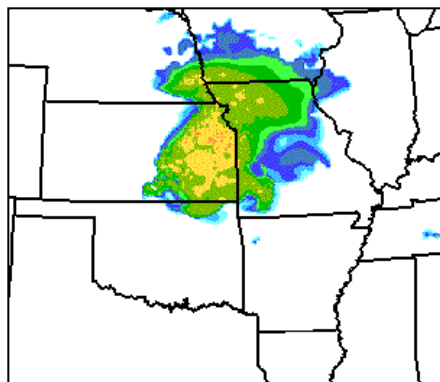
15 UTC



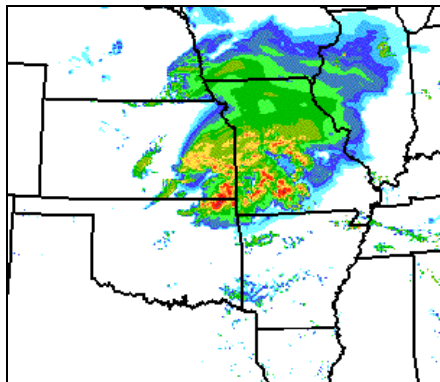
18 UTC



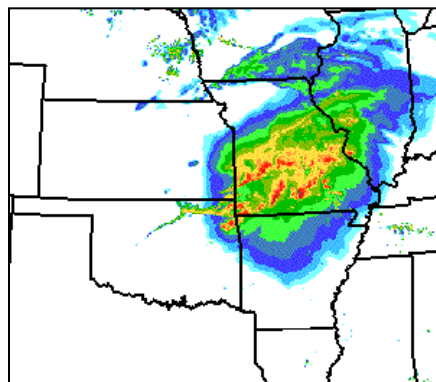
RUC/DFI 00h



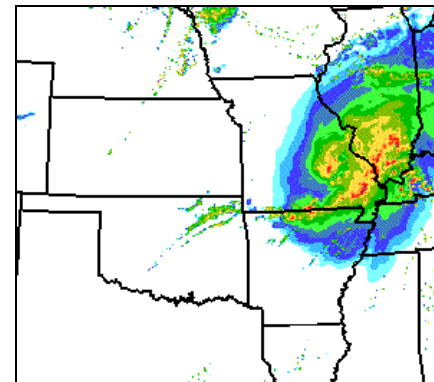
RUC/DFI 1h



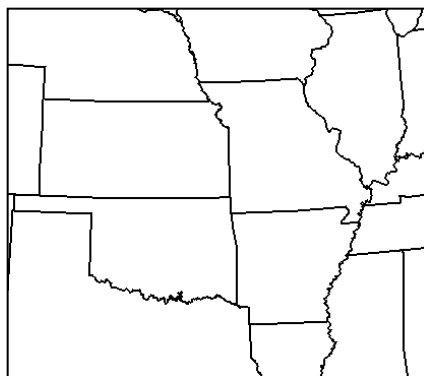
RUC/DFI 3h



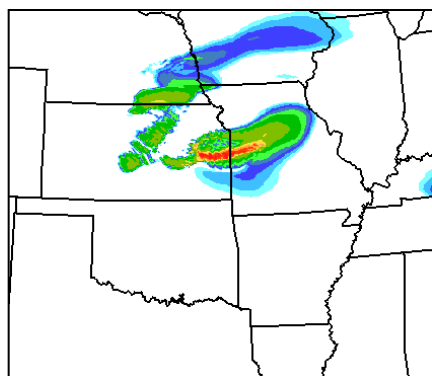
RUC/DFI 6h



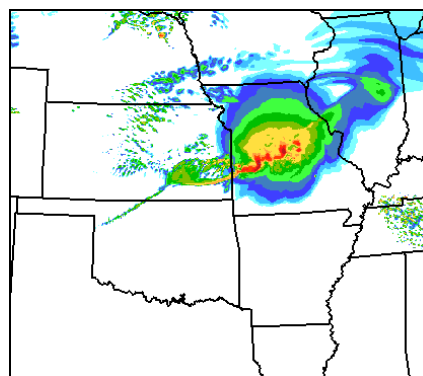
GFS-COLD 00h



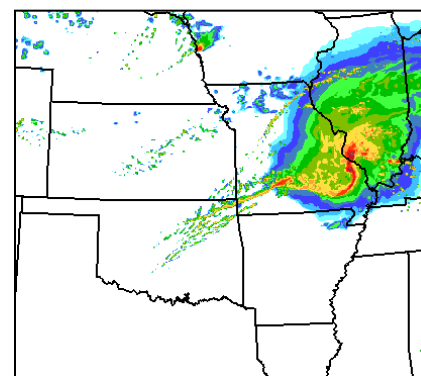
GFS-COLD 1h



GFS-COLD 3h



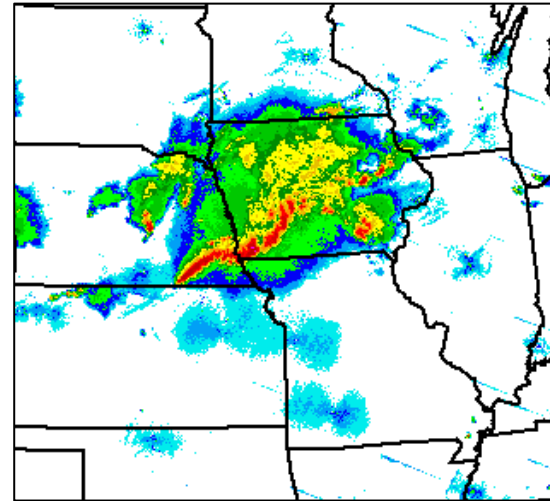
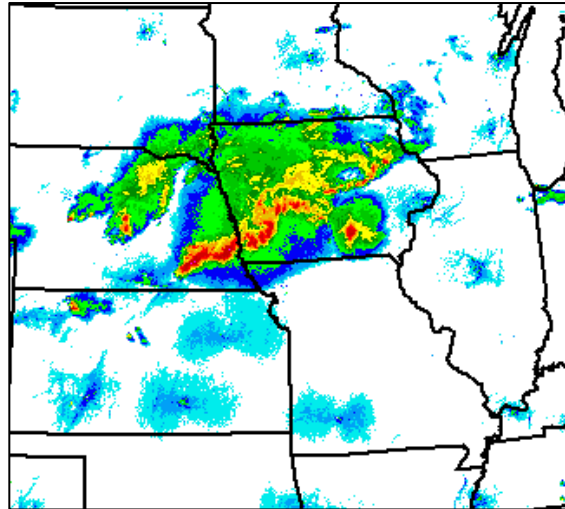
GFS-COLD 6h



06/02/10 00 UTC

06/02/10 01 UTC

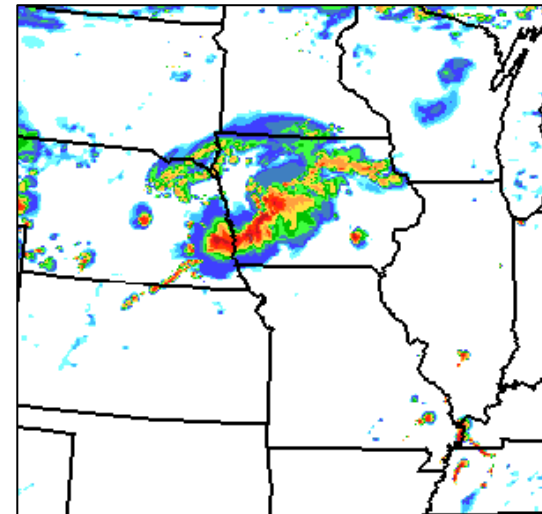
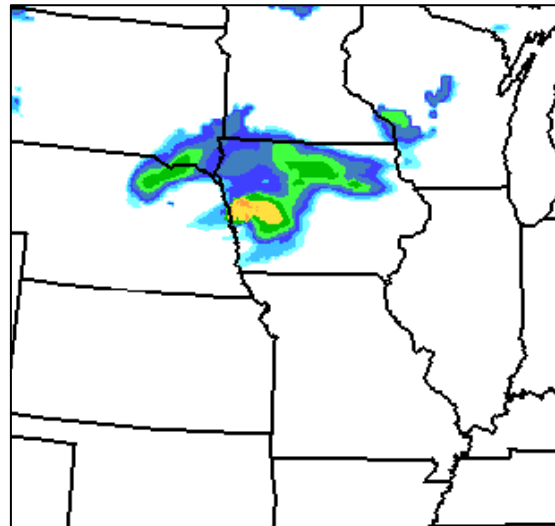
Radar



RUC/DDFI 00h

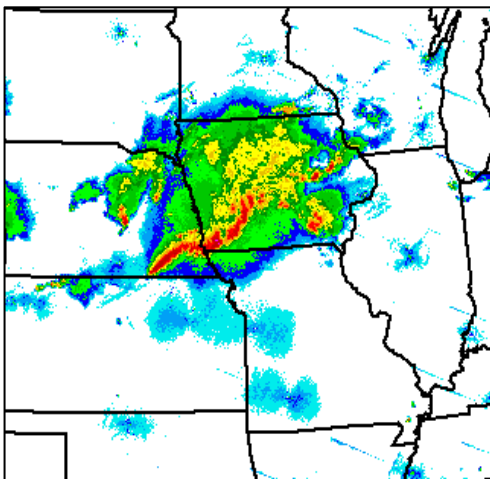
RUC/DDFI 01h

RUC/DDFI

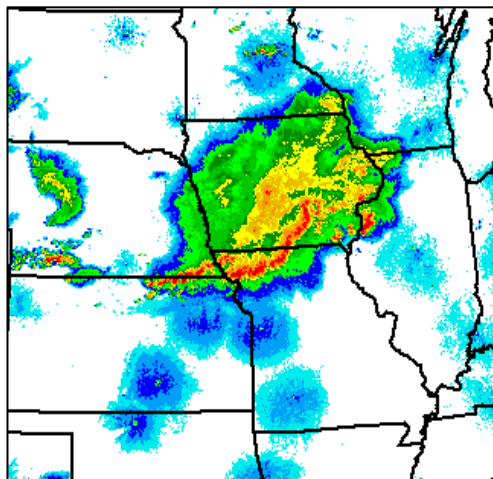


Radar

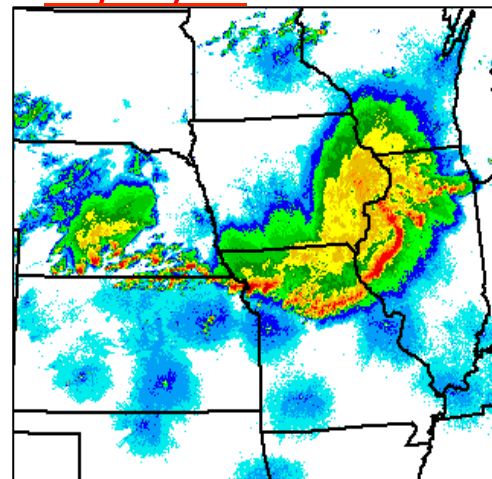
06/02/10 01 UTC



06/02/10 03 UTC

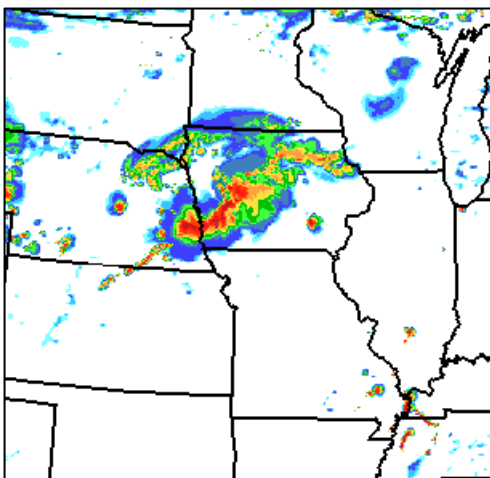


06/02/10 06 UTC

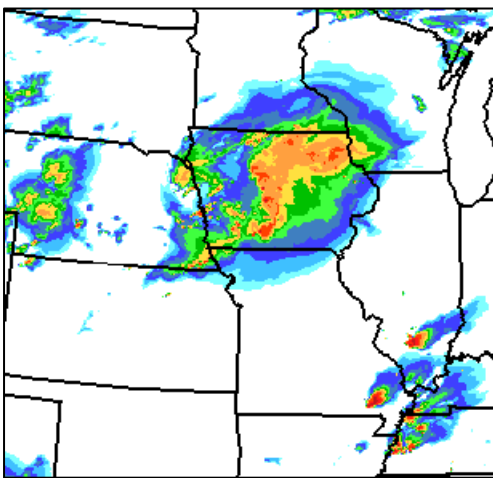


RUC/DDFI

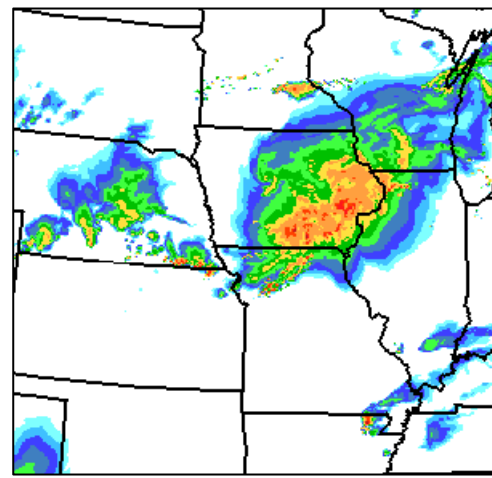
RUC/DDFI 01h



RUC/DDFI 02h



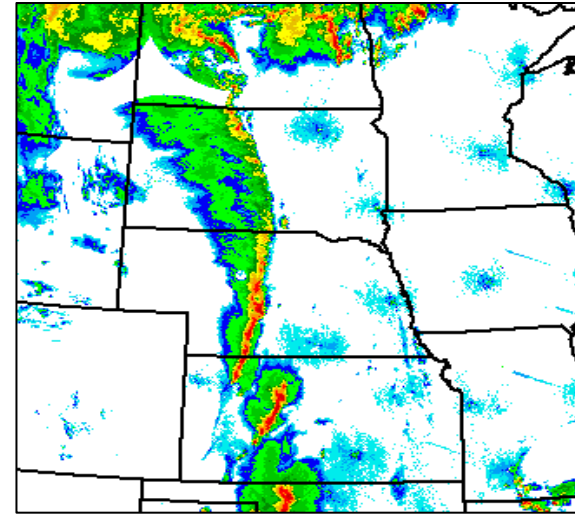
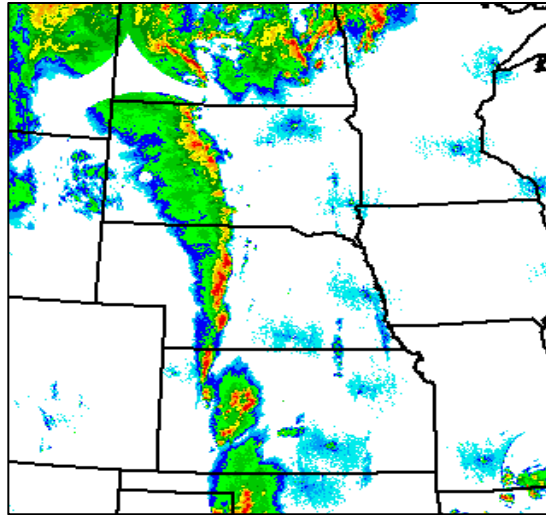
RUC/DDFI 03h



05/25/10 00 UTC

05/25/10 00 UTC

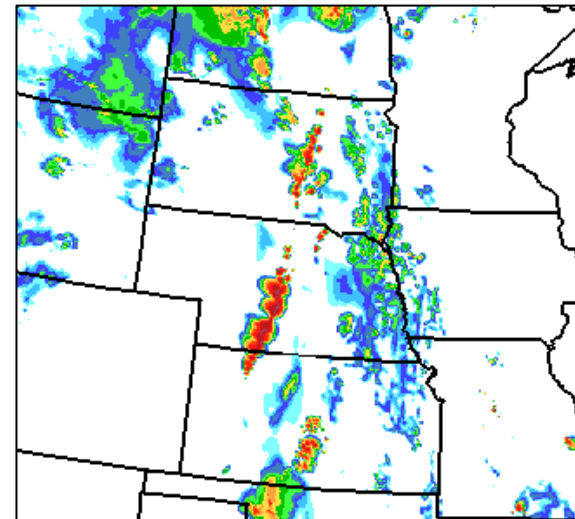
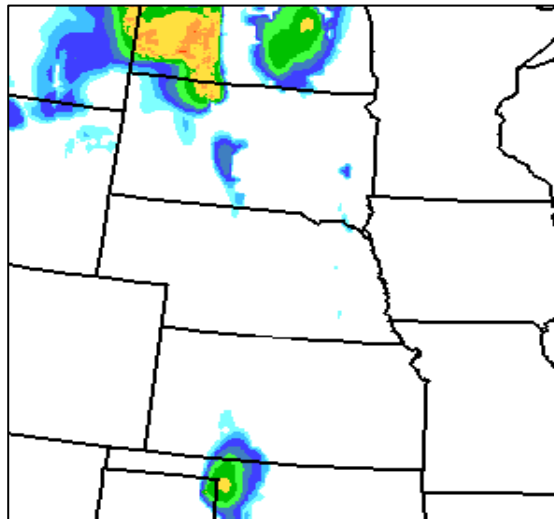
Radar



RUC/DDFI 00h

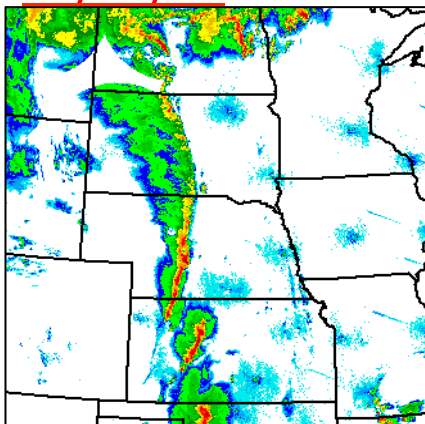
RUC/DDFI 01h

RUC/DDFI

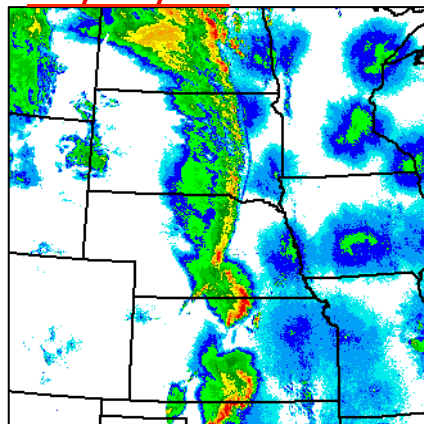


Radar

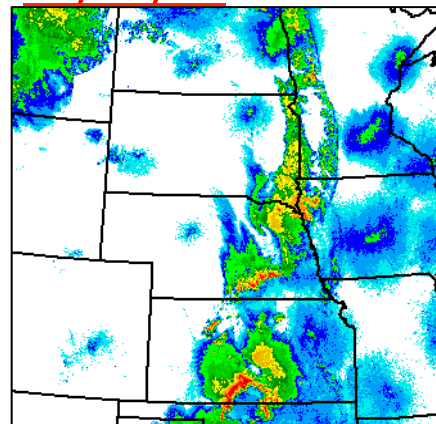
05/25/10 01 UTC



05/25/10 03 UTC

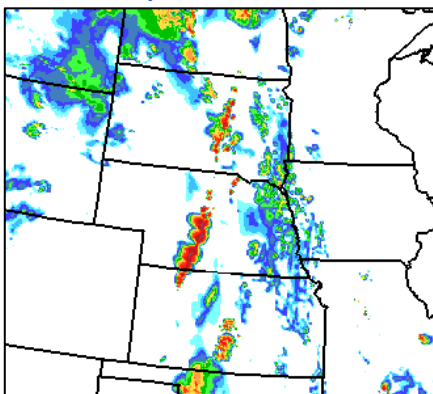


05/25/10 06 UTC

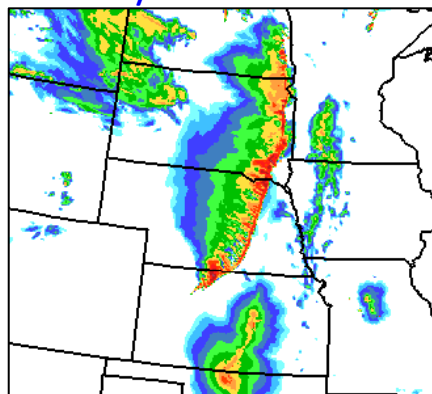


RUC/DDFI

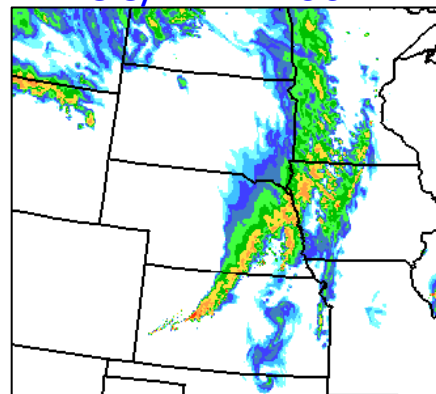
RUC/DDFI 01h



RUC/DDFI 03h

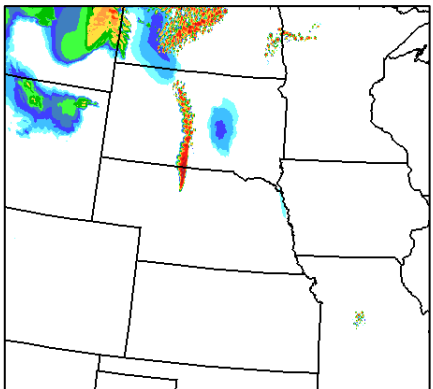


RUC/DDFI 06h

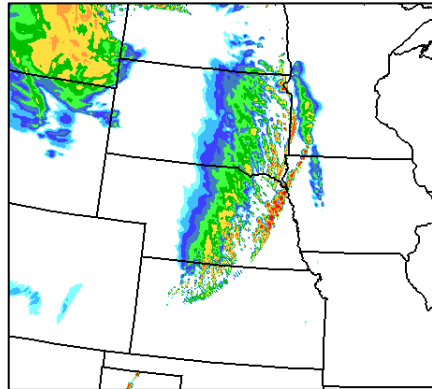


GFS-COLD

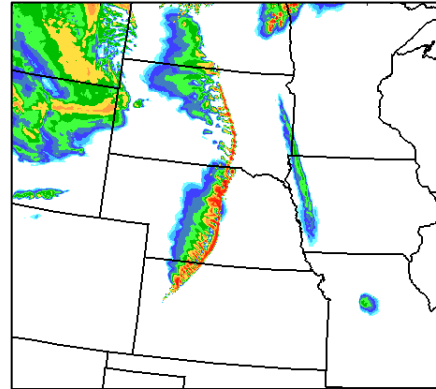
GFS-COLD 1h



GFS-COLD 3h

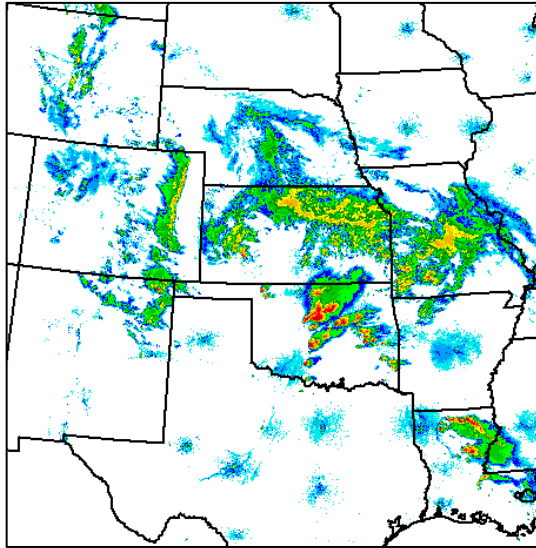


GFS-COLD 6h

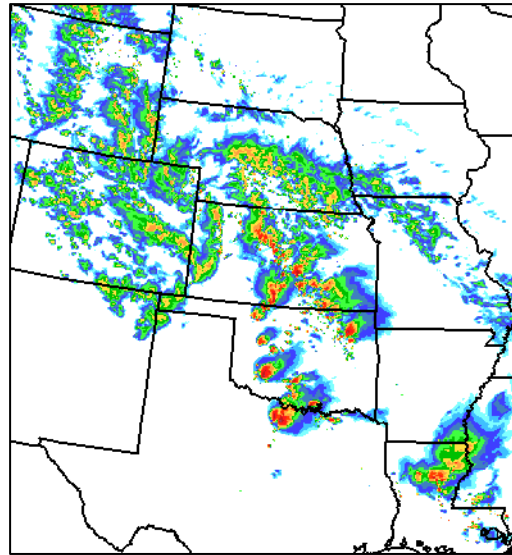


## 0 – 48 h Predictability ??

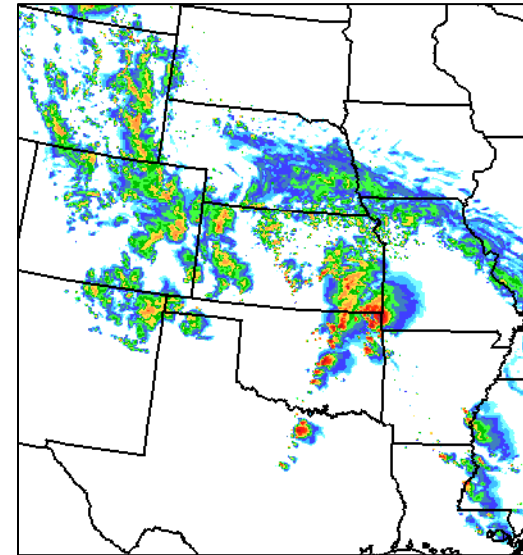
Radar 05/20 00 UTC



ARW 3 km Forecasts:

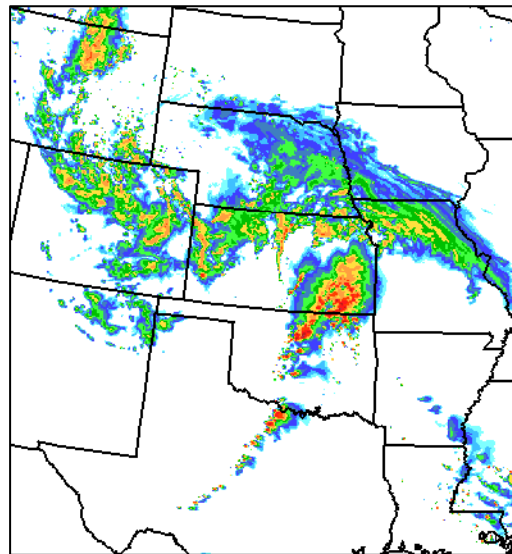


48 h

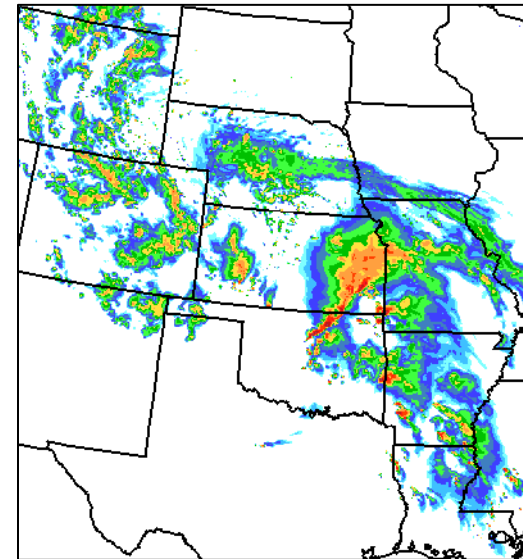


36 h

**\*\*On most days,  
forecast consistency  
was good through 48  
hours.....**



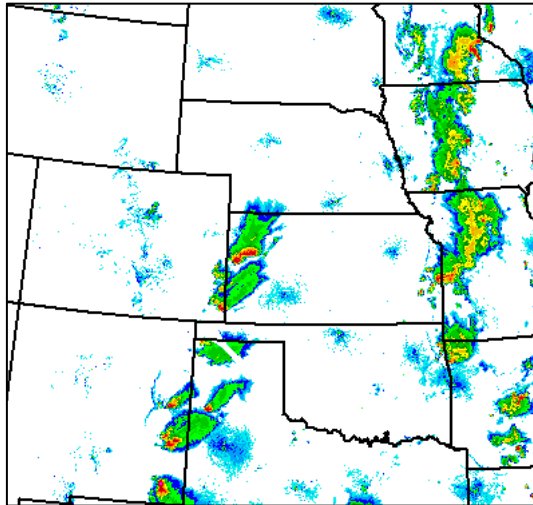
24 h



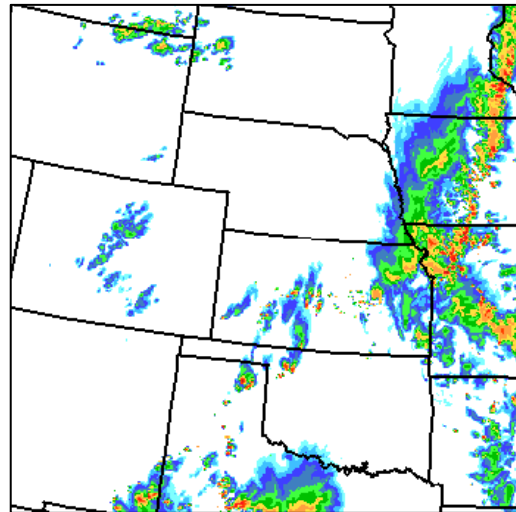
12 h

## 0 – 48 h Predictability ??

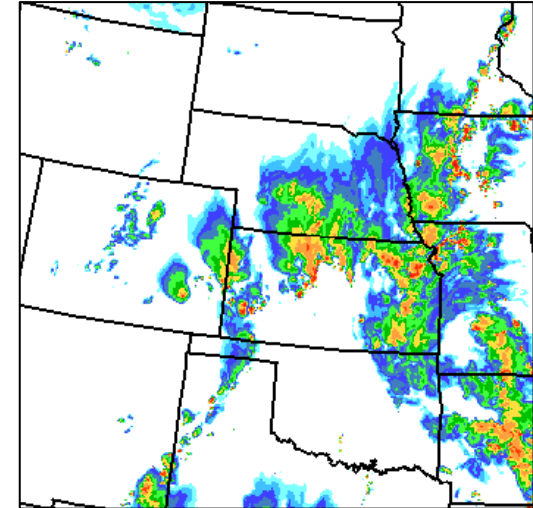
Radar 05/26 00 UTC



ARW 3 km Forecasts:

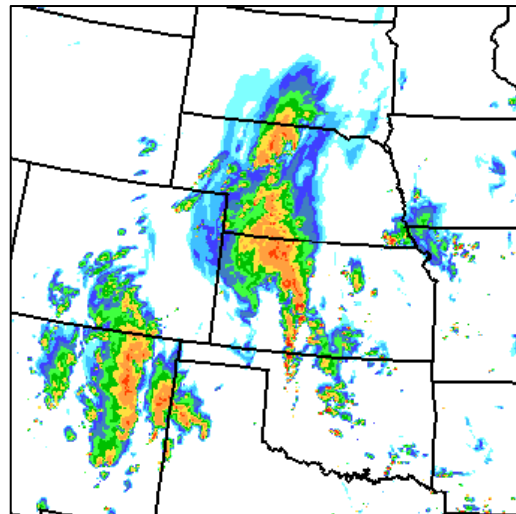


48 h

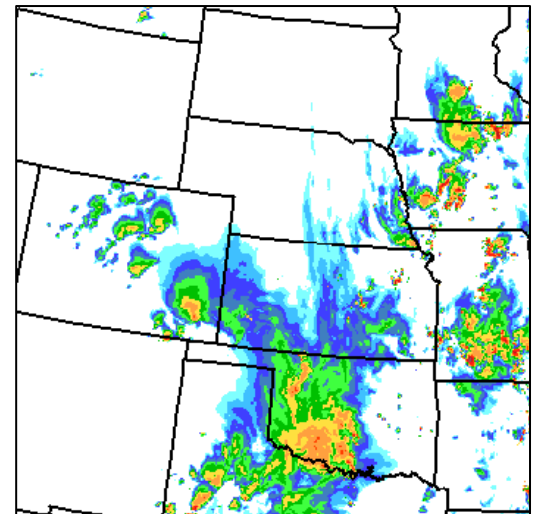


36 h

**\*\*On a few days,  
forecast consistency  
was..... absent...**



24 h



12 h

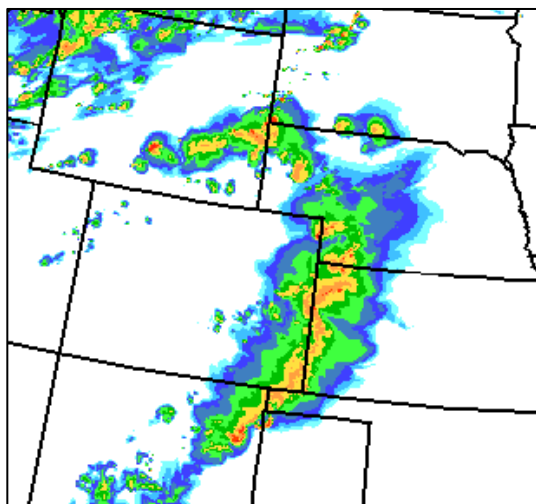
# CAUTION!!

\* There may be a  
“problem” with the latest  
version of the Thompson  
microphysics.....

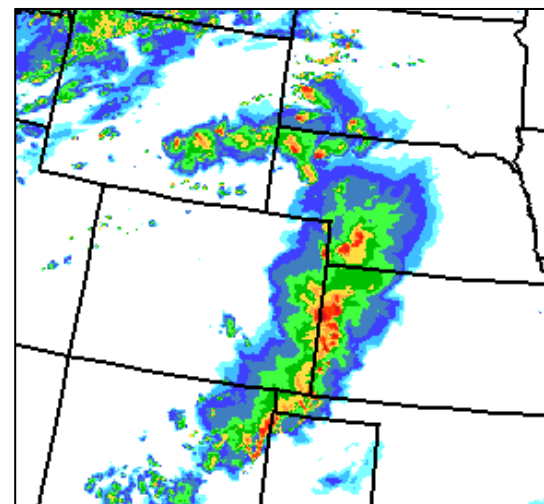
.....tends to lose leading-line  
convective system structure,  
producing too much stratiform  
precipitation.....

....still under investigation

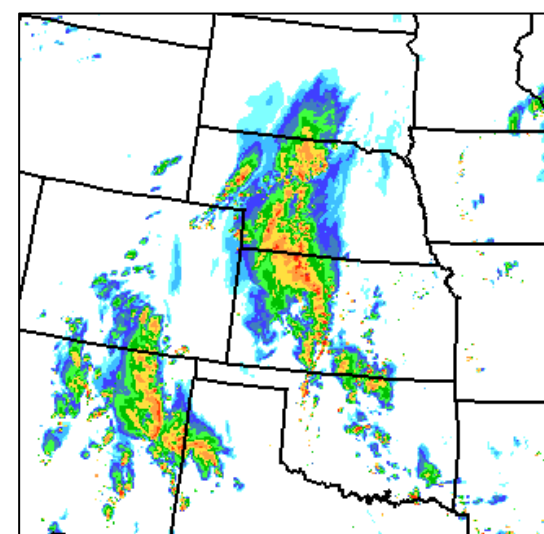
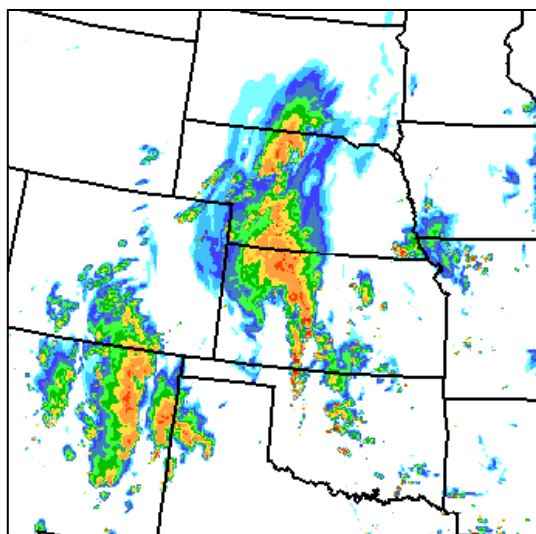
New Thompson



Old Thompson



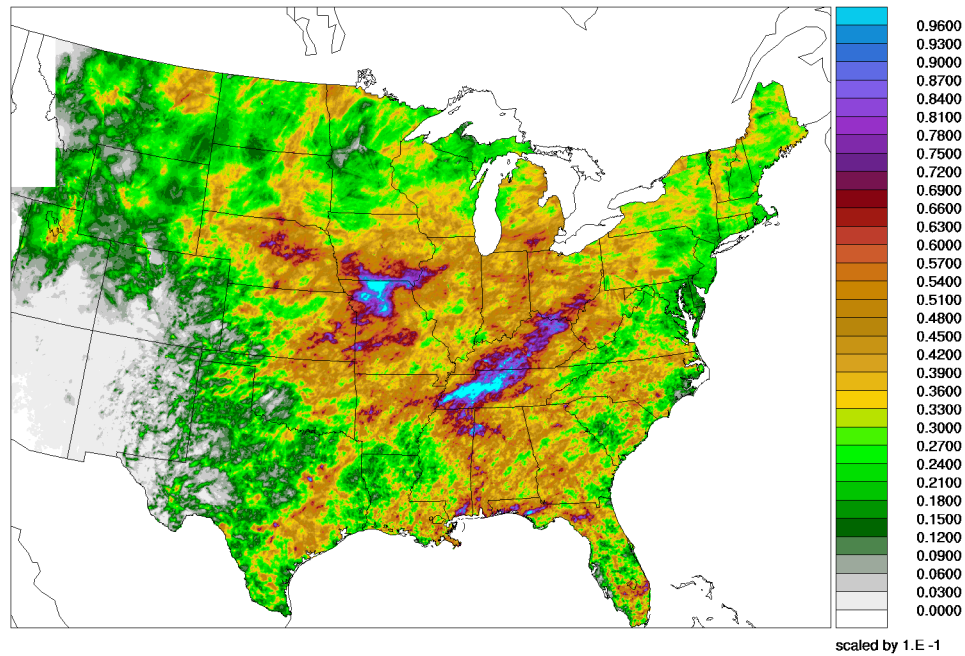
06/07 00 UTC (24h)



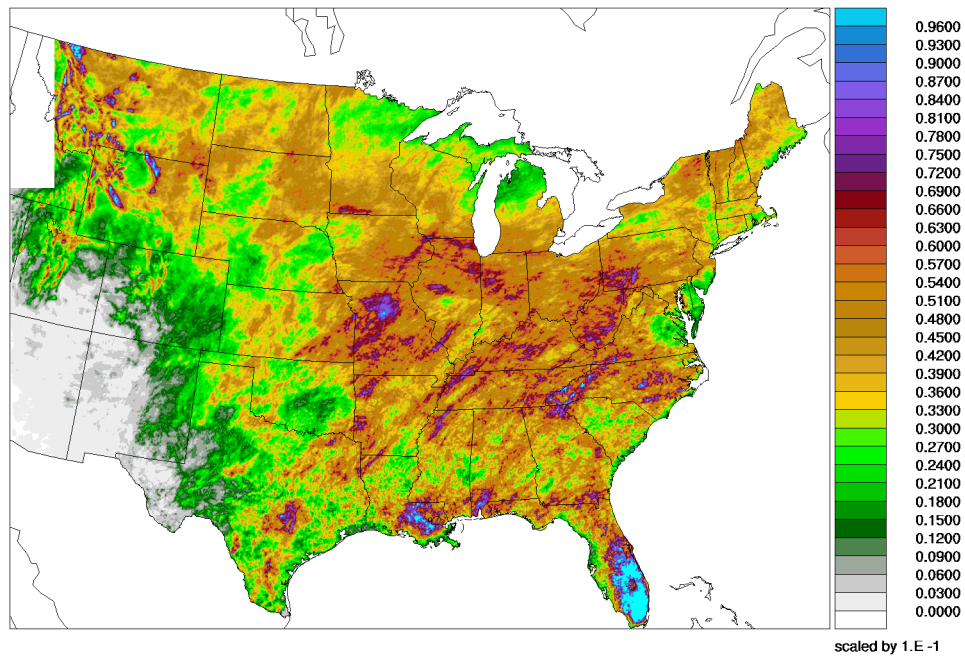
05/26 00 UTC (24h)

## 2010 Season:

ST4 24 h  
Average  
Precipitation



3 km ARW  
12-36 h  
Average  
Precipitation



## Summary:

...The use of the 13 km RUC analyses along with DDFI significantly improves model spin-up with minimal spurious effects.

....still questionable for short-term storm-scale forecasting

....improvements beyond 6 h even less clear

...Useful convective forecasts may be obtainable through 48 h

...New Thompson microphysics should be used with “caution” for convective applications