



# Forecasting for PLOWS

*Experiences from Spring 2009*

# Forecasting: PLOWS 2009

- General comments:
  - Spring 2009 was a difficult one for forecasting
    - many cyclones deepened to our north or east
    - phasing issues between northern, southern branch
  - No reason to expect this winter to be any easier
  - Long range forecasts, ensembles were of limited value
    - contributed to *operational* uncertainty!
    - sometimes helped identify potential events  
... +/- 2 days and 2 states.

# Forecasting

- Successes:
  - Online briefings went fairly well.
    - Discussion for later: how might they be improved?
  - Teams of students + staff handled forecasting well.

# Forecasting

- **Challenges:**
  - Need to consider particular forecast priorities at different forecast ranges
    - Decision on day vs. night mission
    - Time for personnel to depart for:
      - deployment site (U. Mo., UAH, UI)
      - C-130 airport at PIA
  - Need to make better use of forecast data
    - presentation of ensembles
    - instantaneous in addition to integrated forecasts
  - Need clear shift staffing plans for **evening forecasts** (as needed for IOPs)

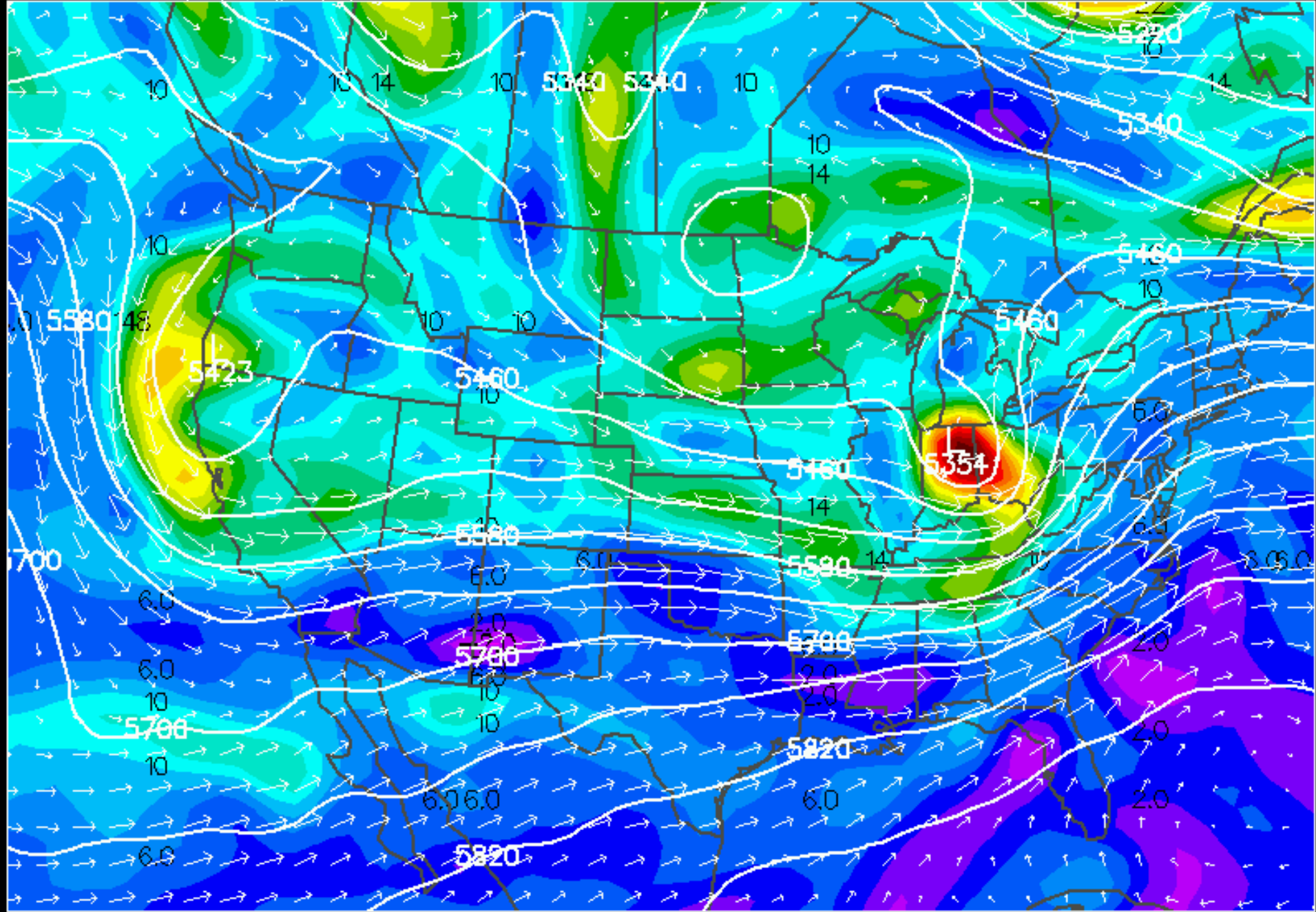
# Forecasting

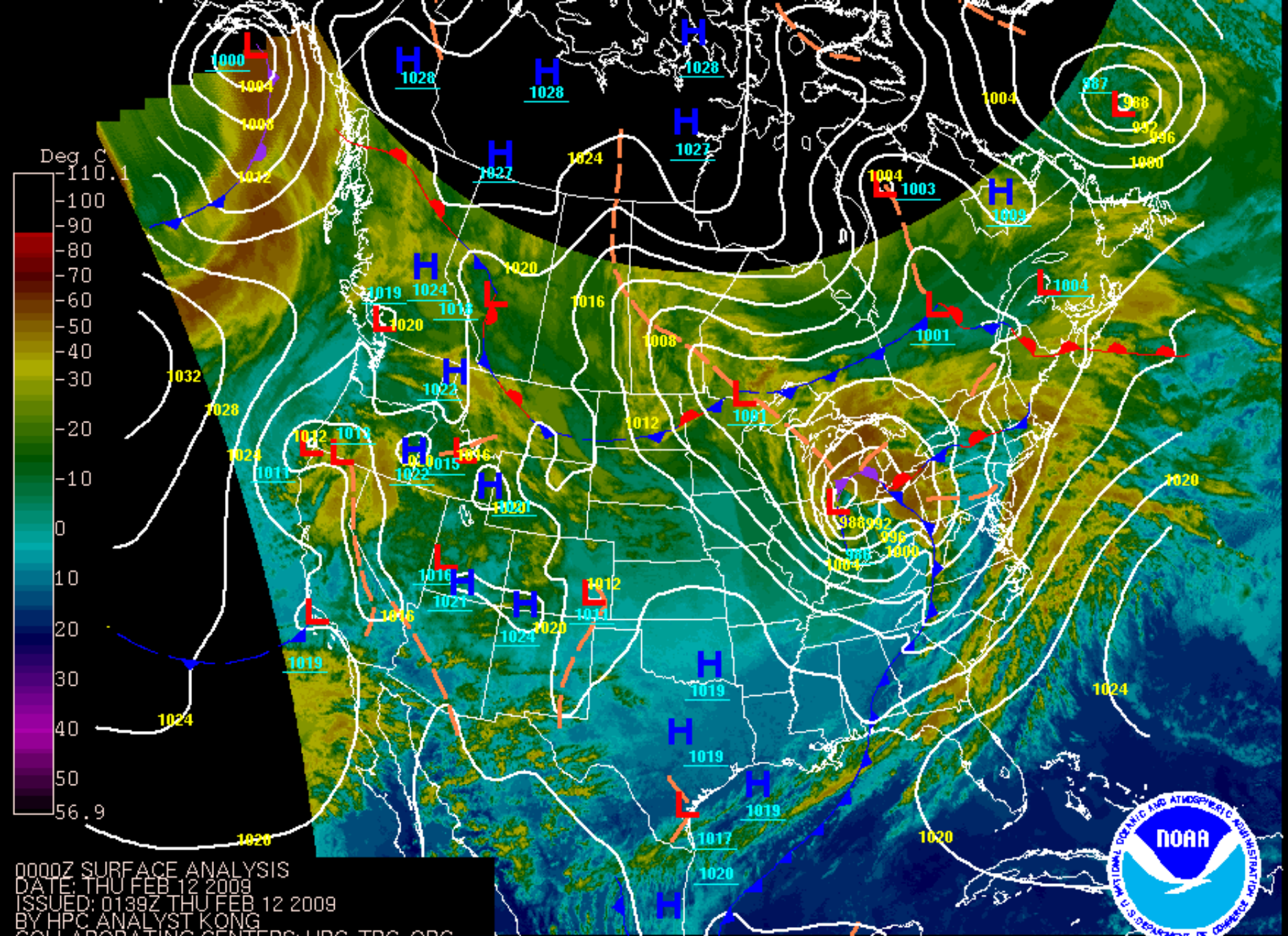
- This year - additional responsibilities
  - aircraft support:
    - During mission: adjustments to the dropsonde track
    - PIA base weather conditions
    - Alternate airport weather conditions
    - *Advance notice of switch from day $\rightleftharpoons$ night ops*
  - earlier notice for distant deployment site

# Forecasting for IOP-1

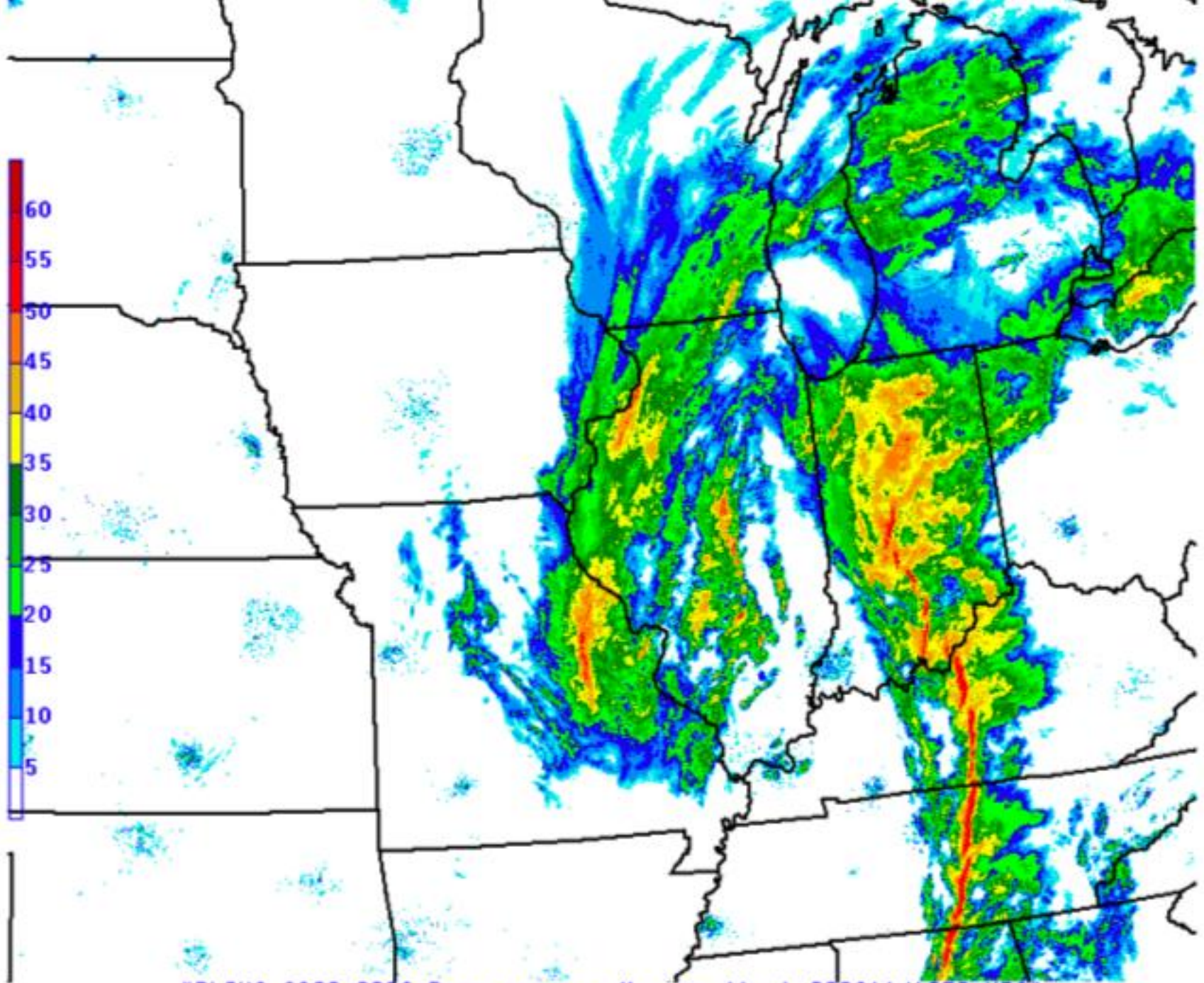
500mb Avort (/s) Height (m)

ETA48 analysis for 0000Z 12 FEB 09









"PLOWs 2008-2009 Reflectivity Mosaic (1km) 090211/1858 UTC"

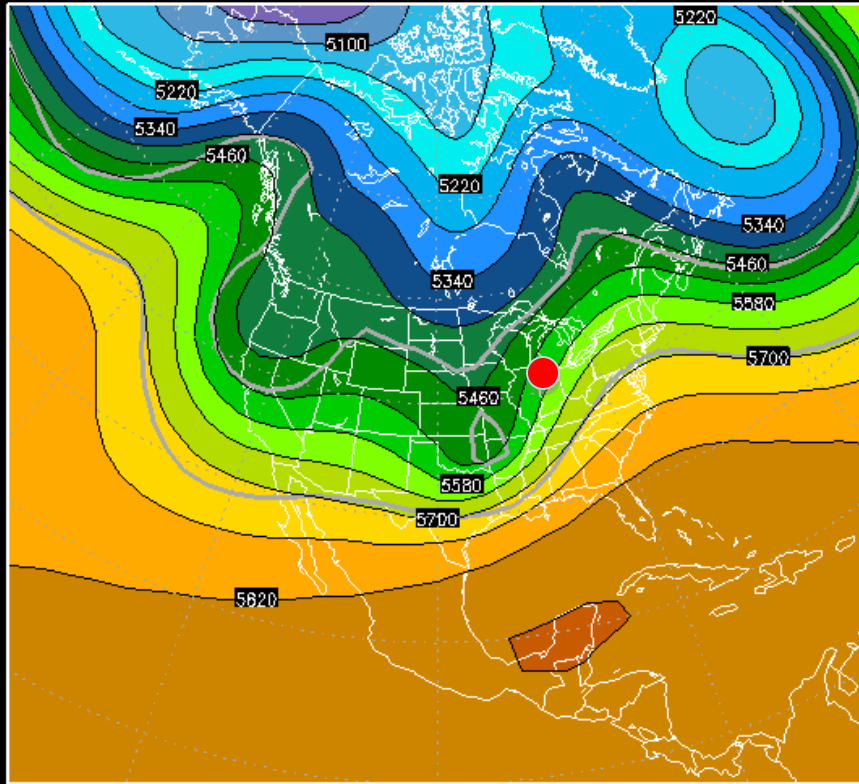
D-5

# Overview

- Possibility of operations in next 48h: *none*
- Next chance for operations: *next Wed-Thu*
- Teams and equipment: *no one deployed*

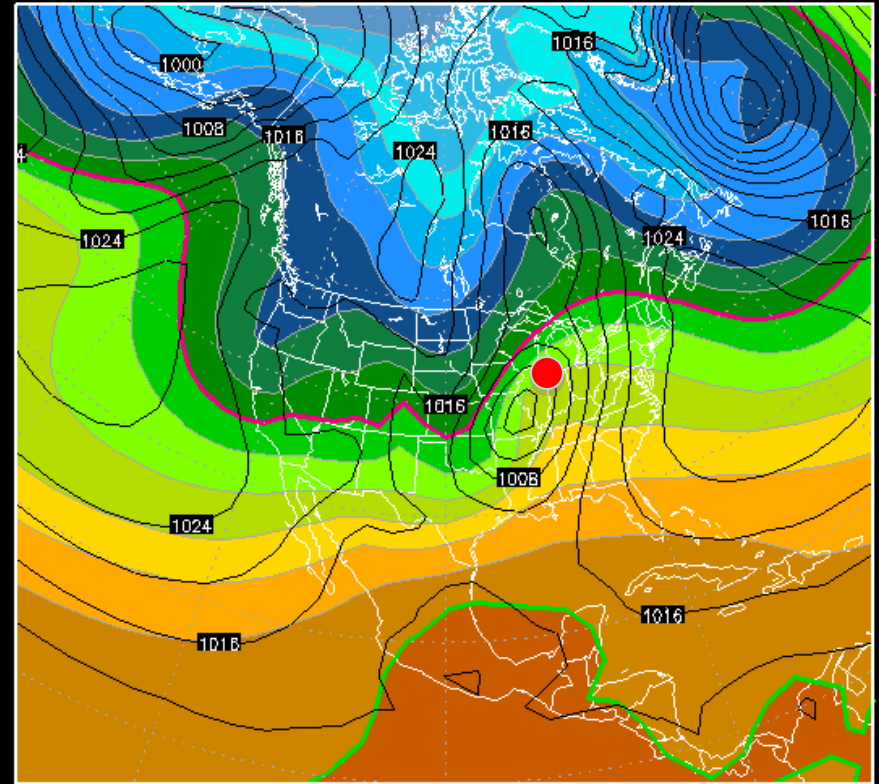
### NCEP ENSEMBLE MEAN - 500mb Z (m)

144H Forecast from: 00Z Fri FEB,06 2009  
Valid time: 00Z Thu FEB,12 2009

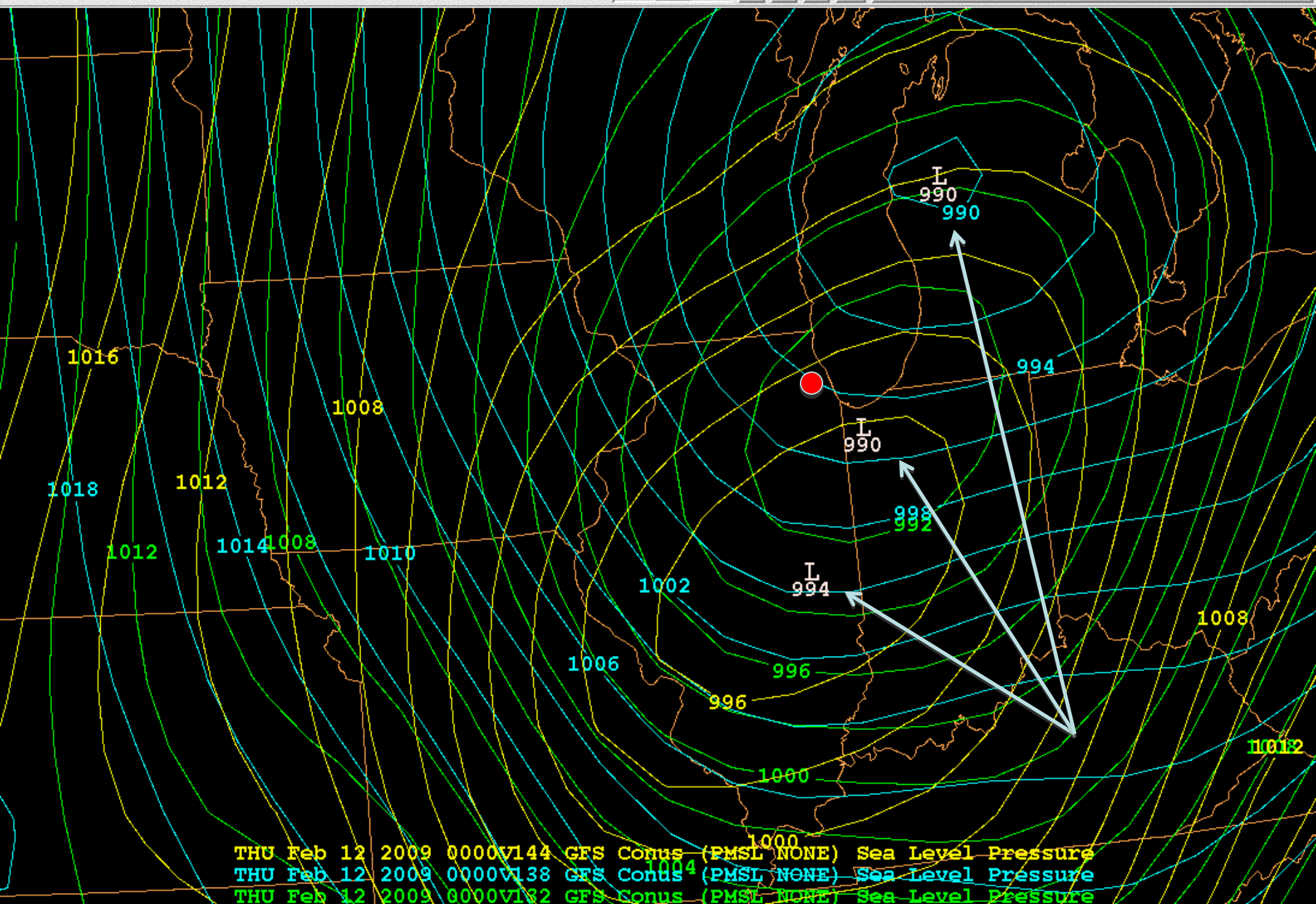


### NCEP ENS MEAN:MSLP(mb)/1000:500mb THK(m)

144H Forecast from: 00Z Fri FEB,06 2009  
Valid time: 00Z Thu FEB,12 2009



Might this look like a night mission??

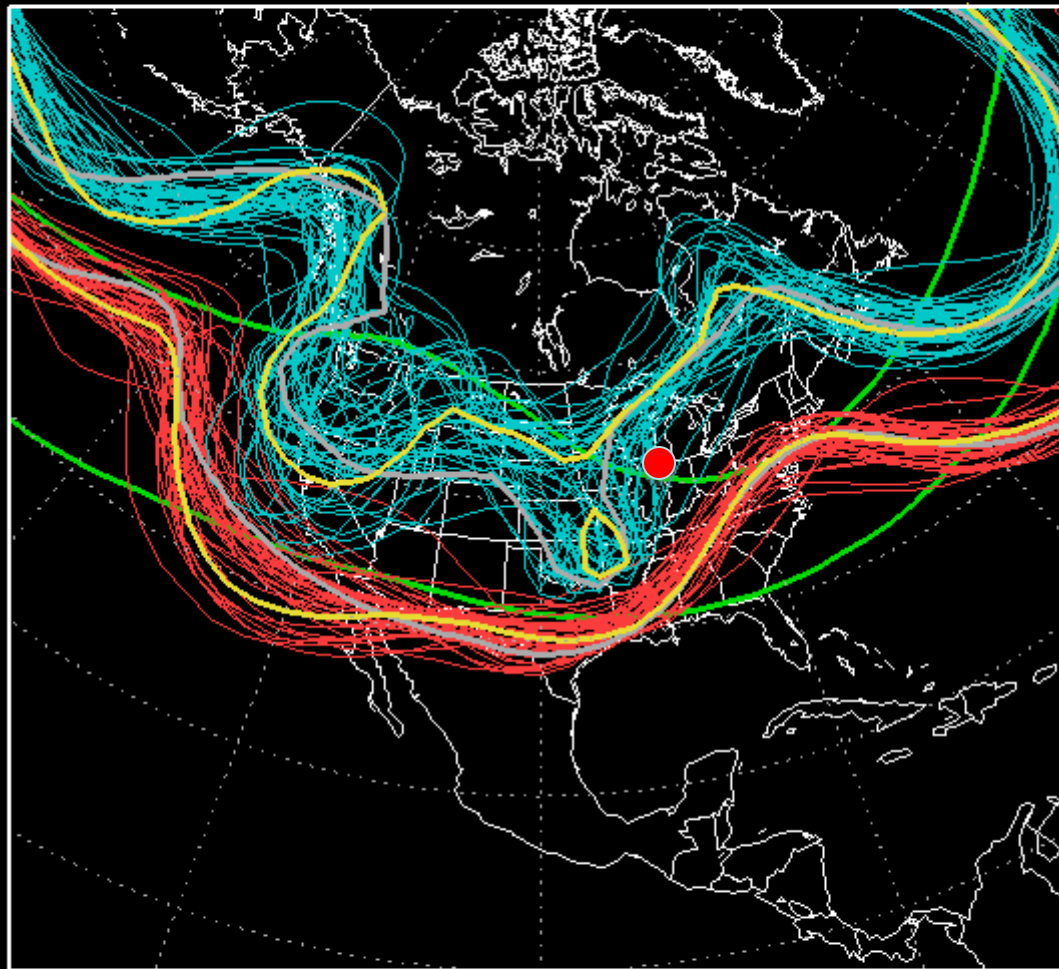


Variability in 3 GFS forecasts over just 12 hours.

# NCEP ENSEMBLE 500mb Z

144H Forecast from: 00Z Fri FEB,06 2009

Valid time: 00Z Thu FEB,12 2009

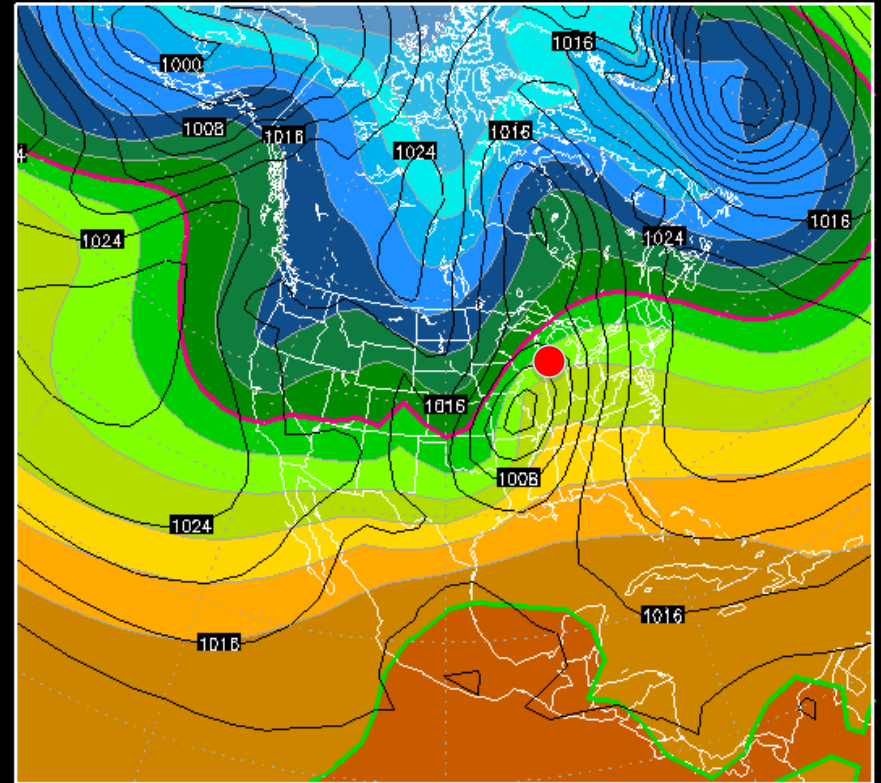
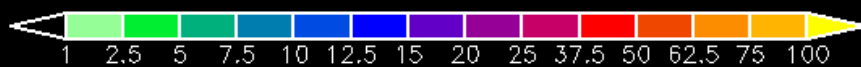
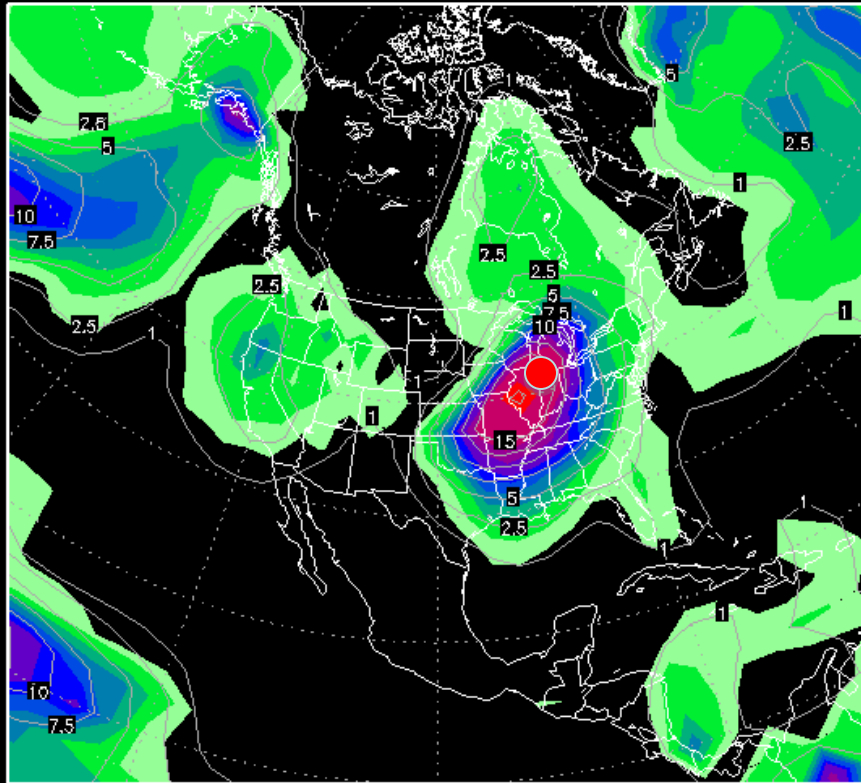


00z Runs:(21)

12z Runs:(21)

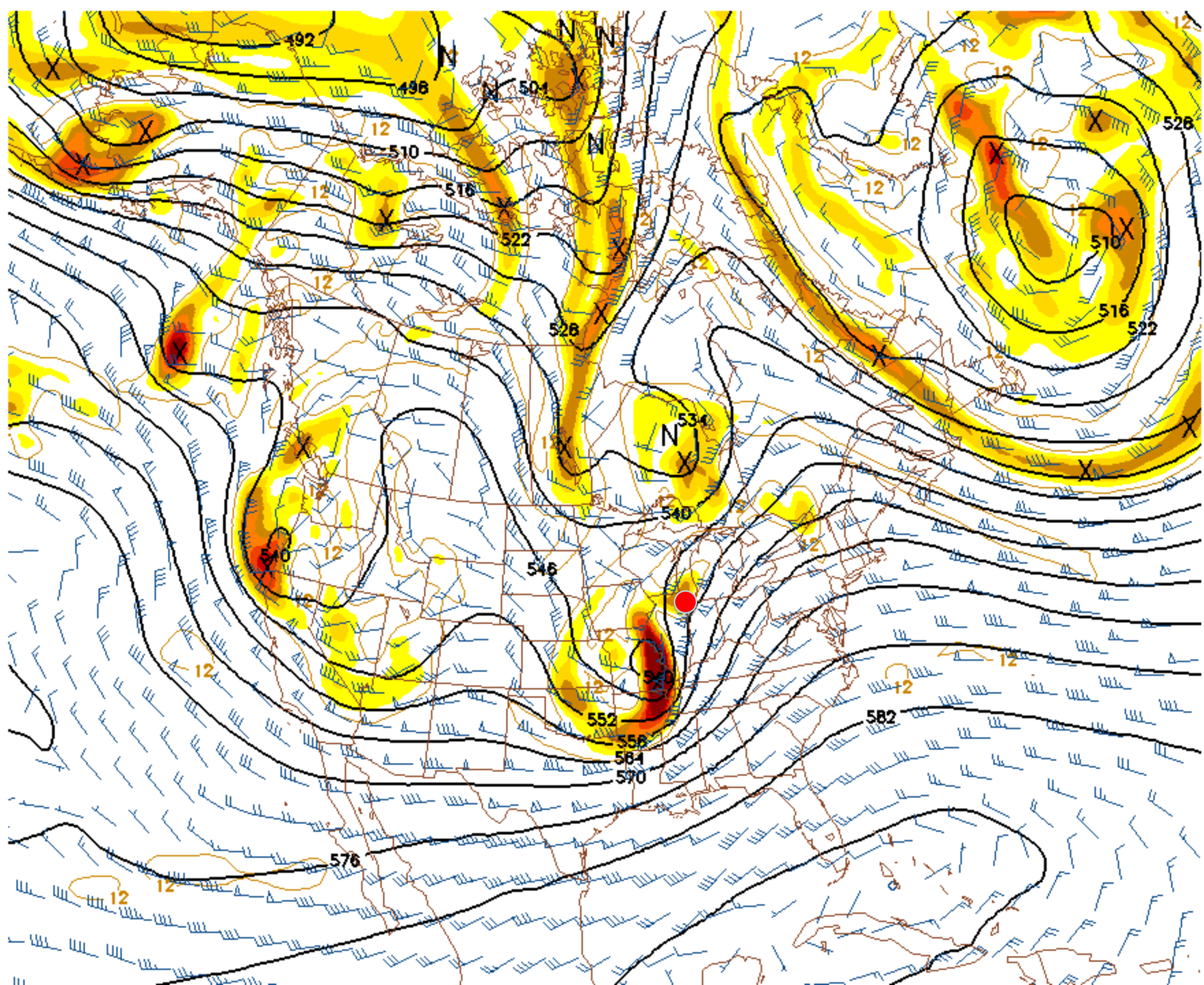
— 5460m — 5700m — Cntrl 00z — Cntrl 12z — CLIM

NCEP ENS MEAN PREC(color) and Std Dev(contour) NCEP ENS MEAN:MSLP(mb)/1000:500mb THK(m)  
 144H Forecast from: 00Z Fri FEB,06 2009 144H Forecast from: 00Z Fri FEB,06 2009  
 Valid time: 00Z Thu FEB,12 2009 Valid time: 00Z Thu FEB,12 2009





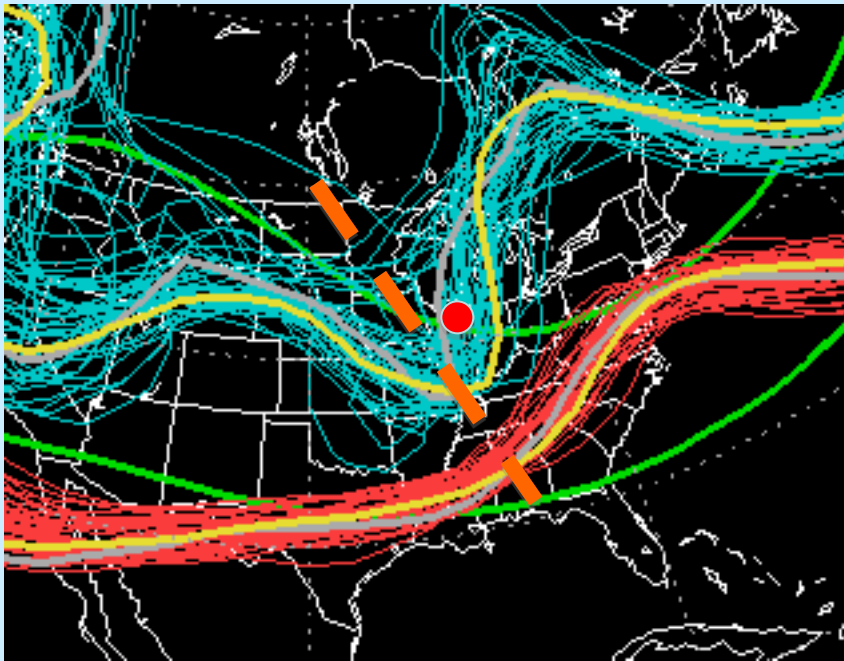




D-4

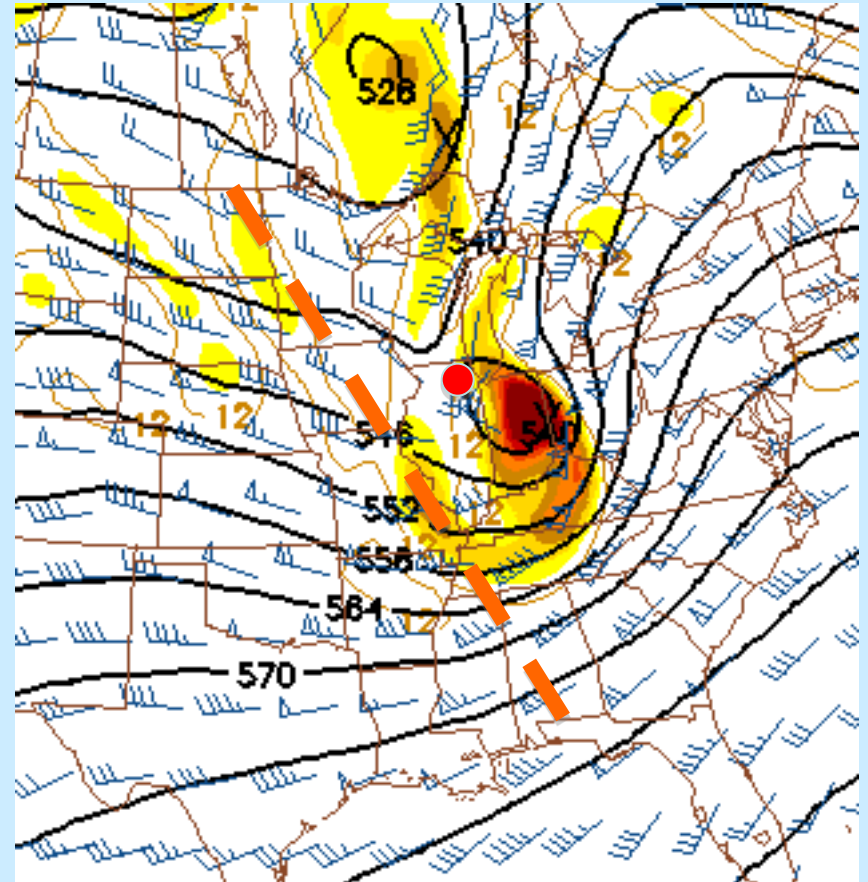
# Overview

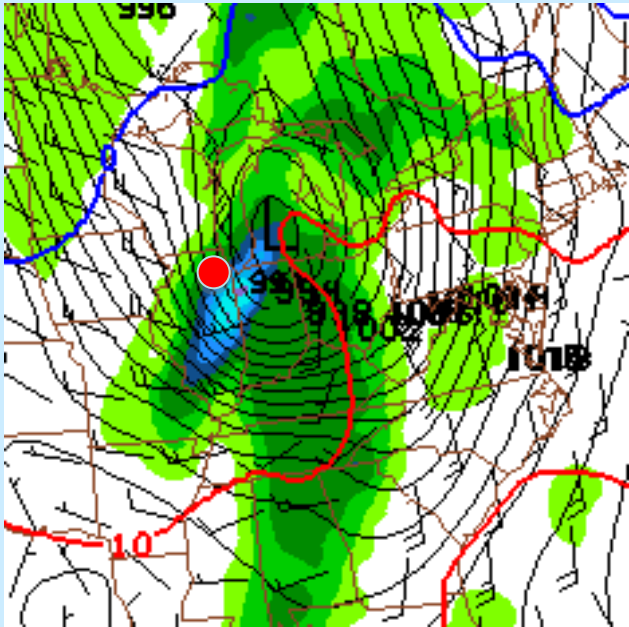
- Possibility of operations in next 48h: *none*
- Next chance for operations: *next Wed.*
- Teams and equipment: *no one deployed*



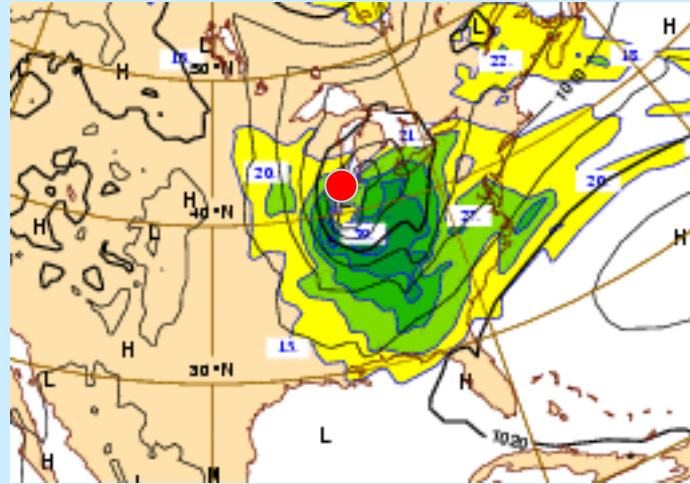
NCEP 00z ensemble  
Valid 00z Thu Feb 12

NCEP 12z GFS  
Valid 00z Thu Feb 12

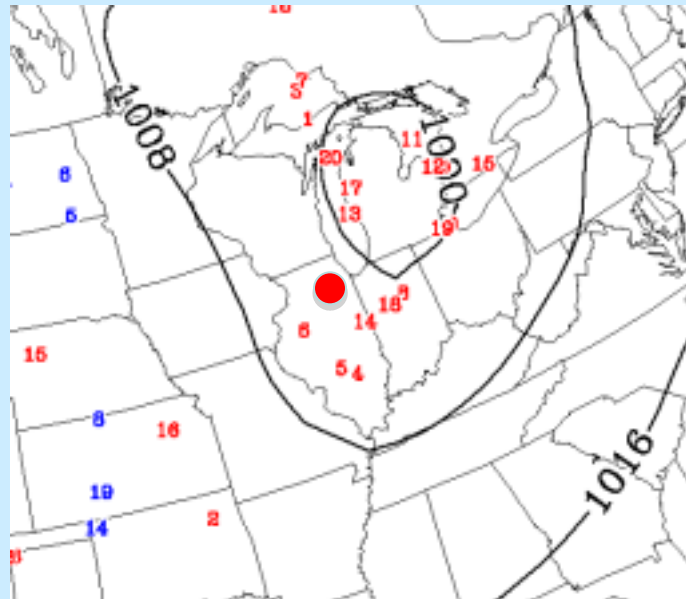




108h GFS

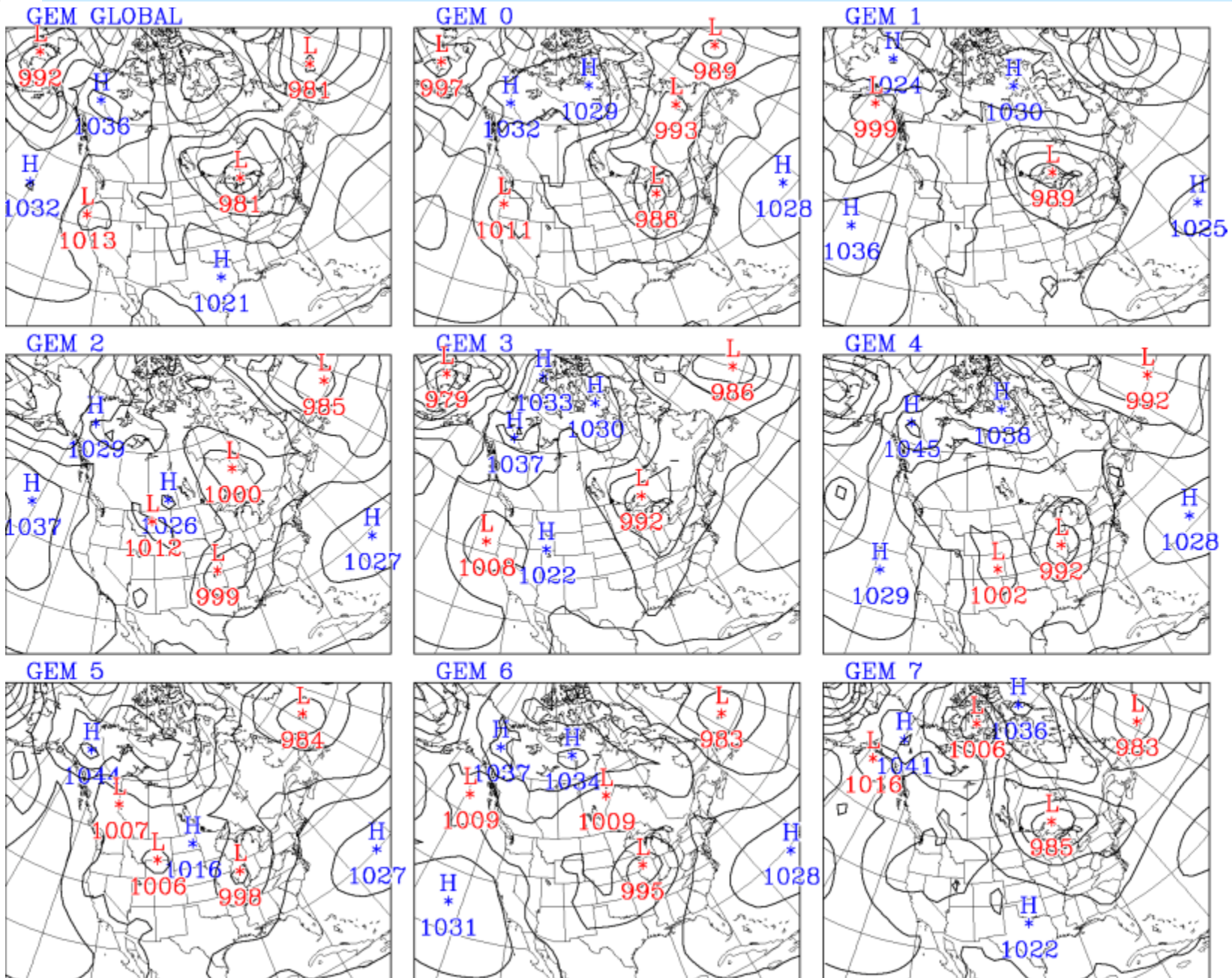
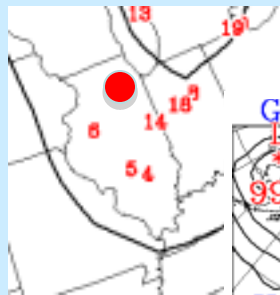


120h ECMWF

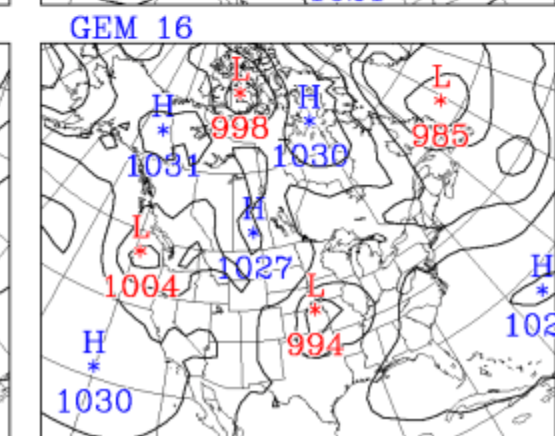
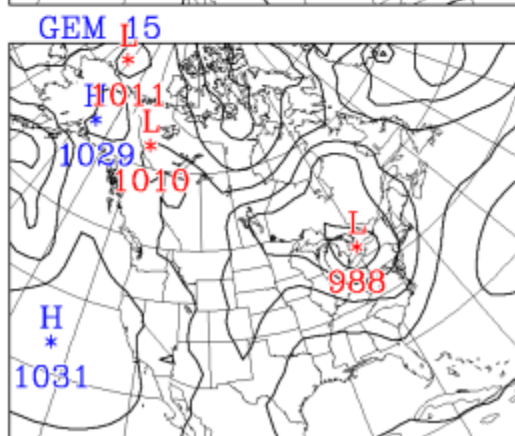
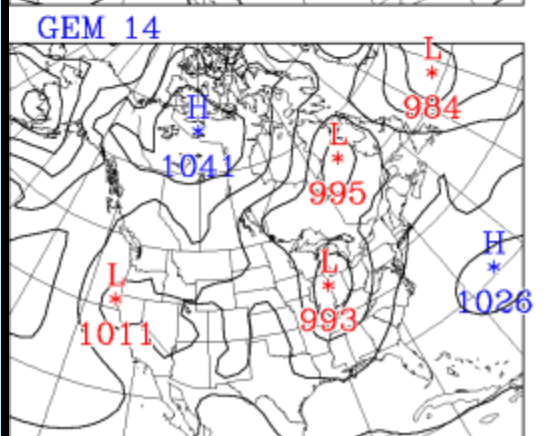
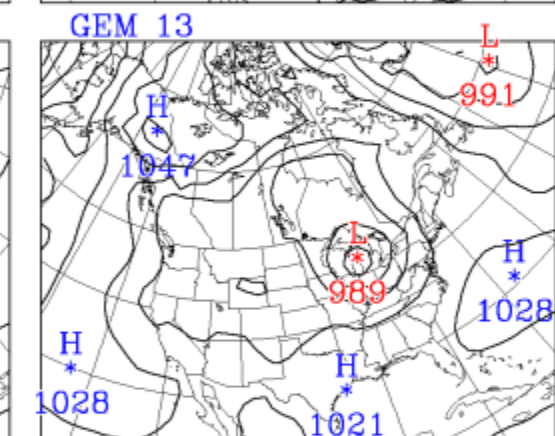
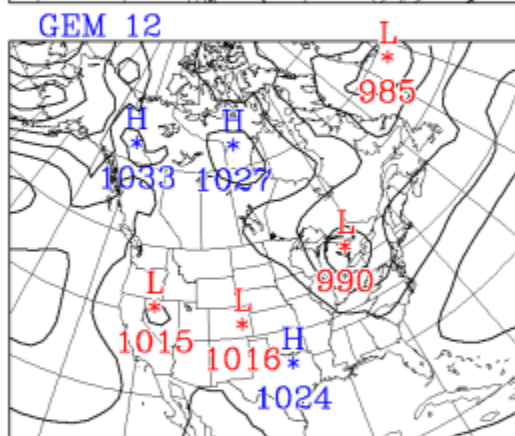
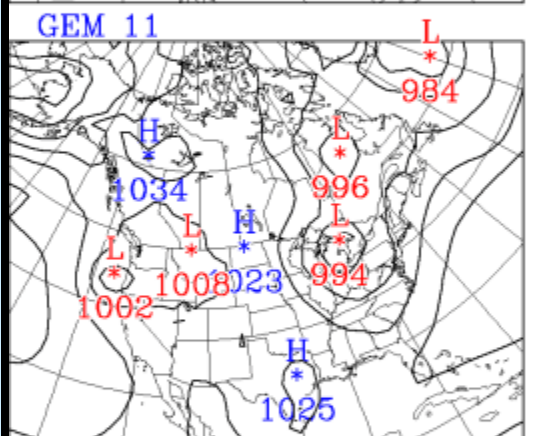
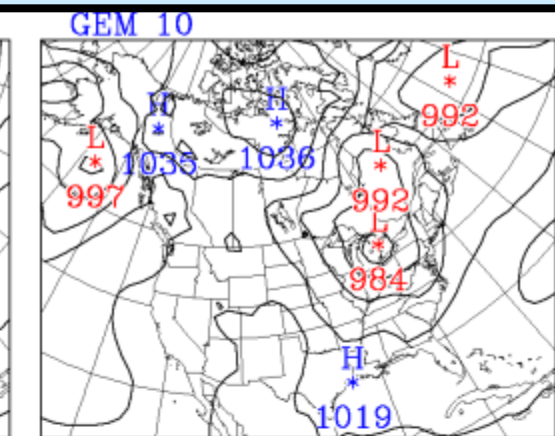
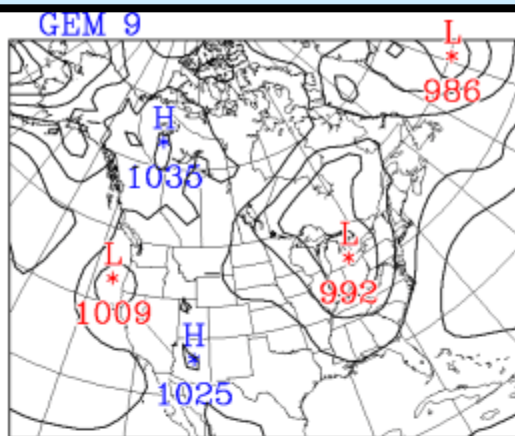
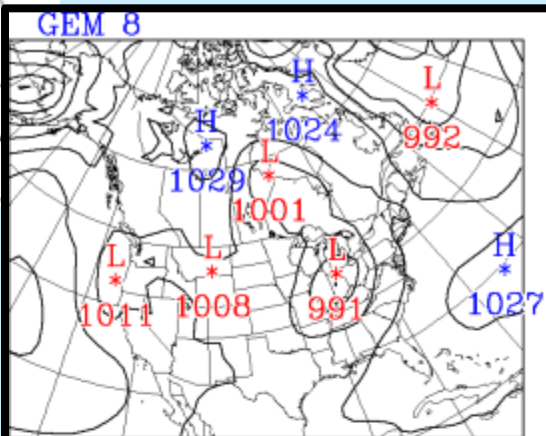
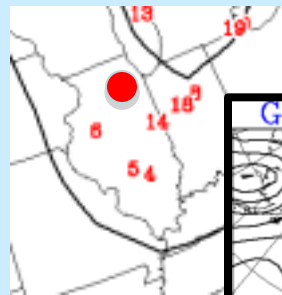


108h  
Canadian  
Ensemble mean

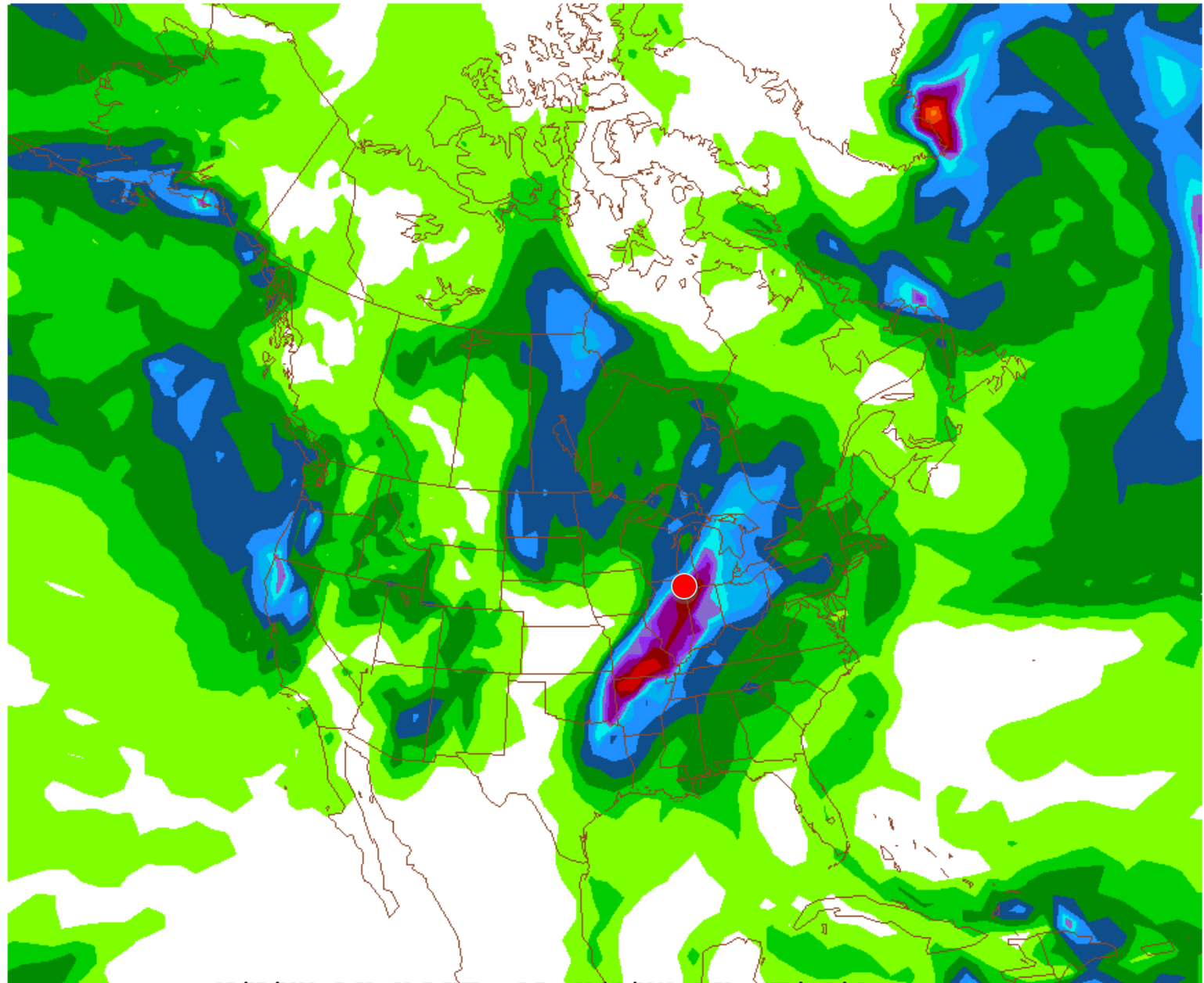
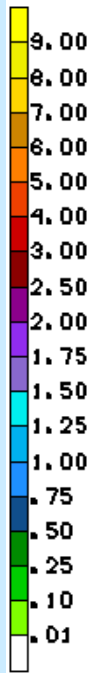
# Canadian ensemble forecasts: members 0-7 + global



# Canadian ensemble forecasts: members 8-16



090212/1200V120 GFS 60-HR TOTAL PCPN



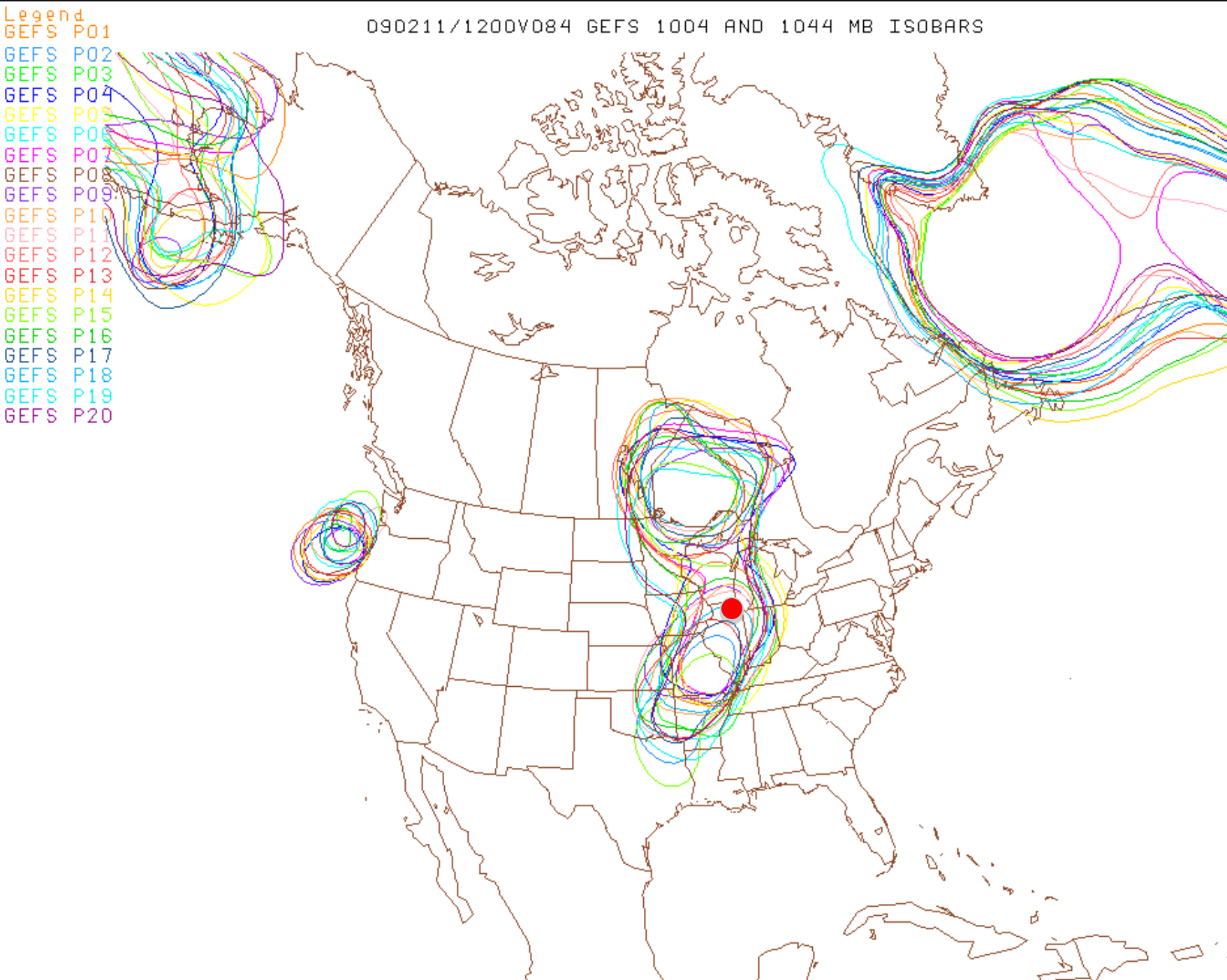
02/07/2009 12UTC 120HR FCST VALID THU 02/12/2009 12UTC NCEP/NWS/NOAA



D-3

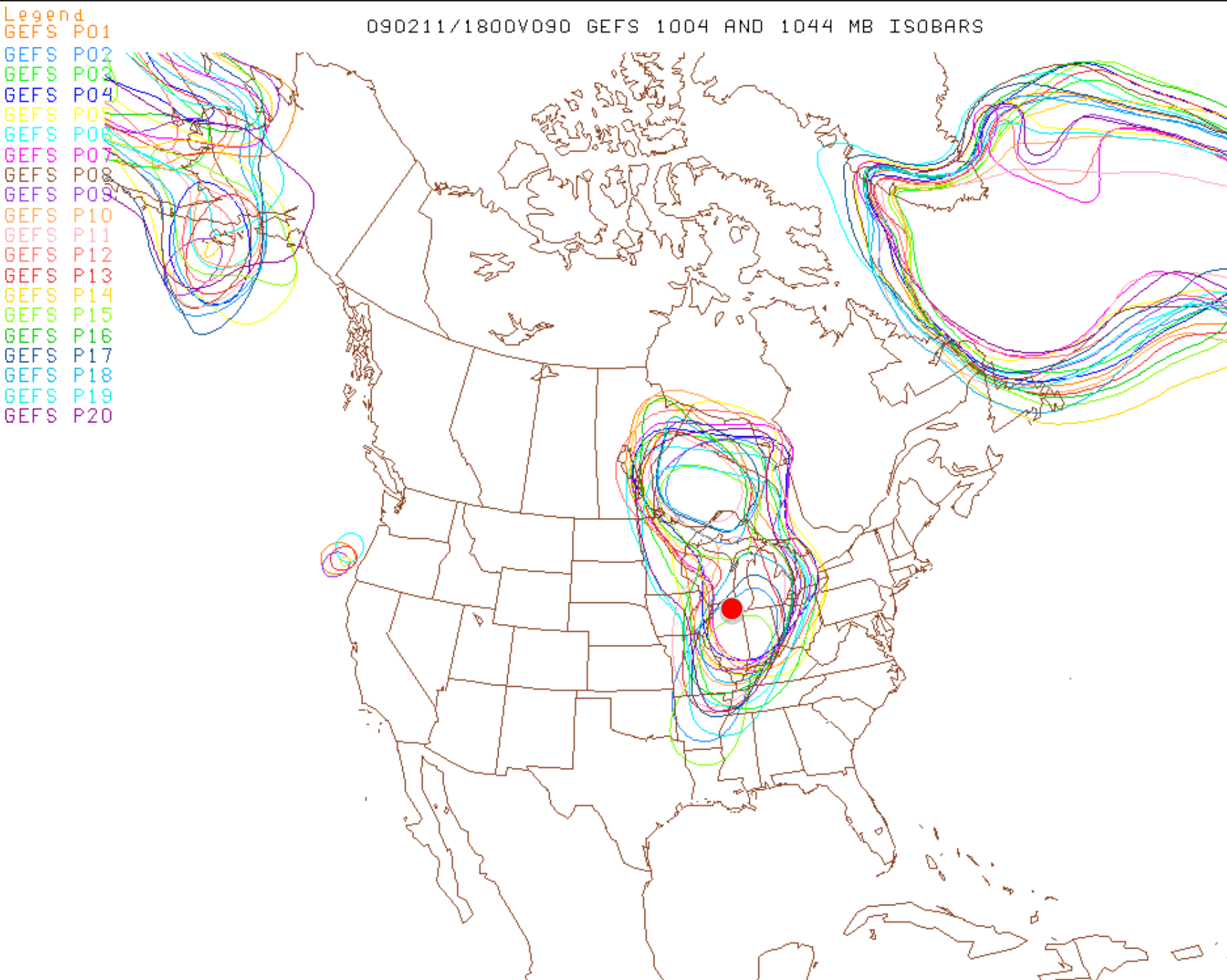
# Overview

- Possibility of operations in next 48h: *none*
- Next chance for operations: *next Wed.*
- Teams and equipment: *no one deployed*



- Legend
- GEFS P01
- GEFS P02
- GEFS P03
- GEFS P04
- GEFS P05
- GEFS P06
- GEFS P07
- GEFS P08
- GEFS P09
- GEFS P10
- GEFS P11
- GEFS P12
- GEFS P13
- GEFS P14
- GEFS P15
- GEFS P16
- GEFS P17
- GEFS P18
- GEFS P19
- GEFS P20

090211/1800V090 GEF5 1004 AND 1044 MB ISOBARS

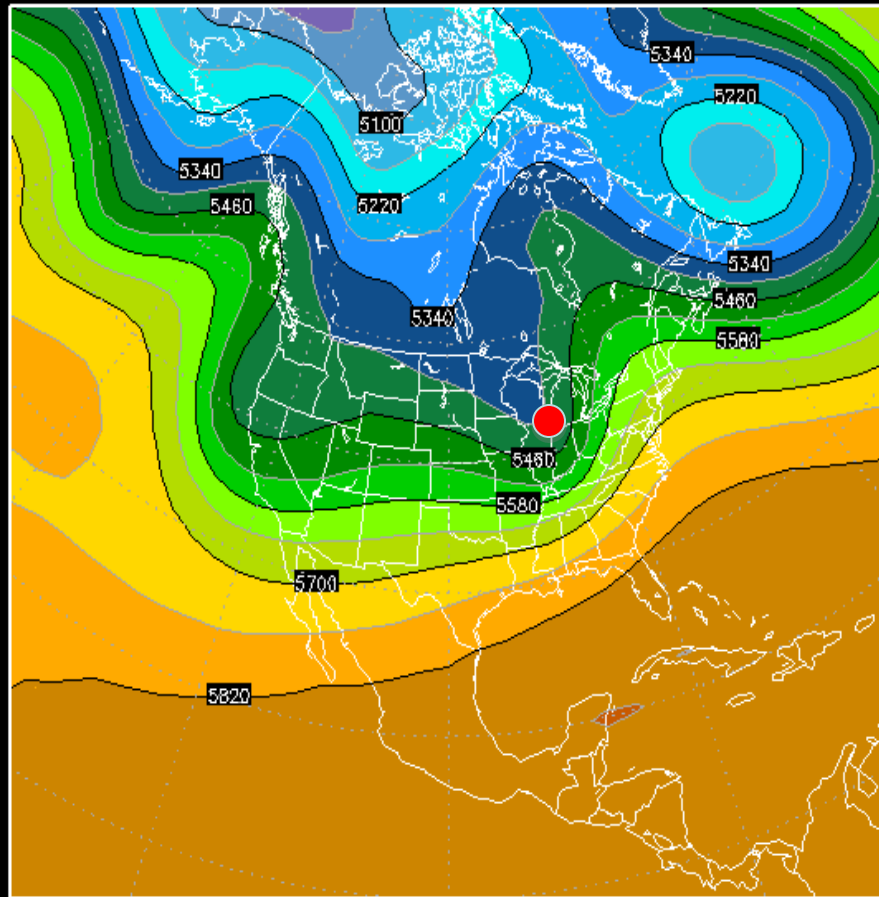




# NCEP ENSEMBLE MEAN - 500mb Z (m)

096H Forecast from: 00Z Sun FEB,08 2009

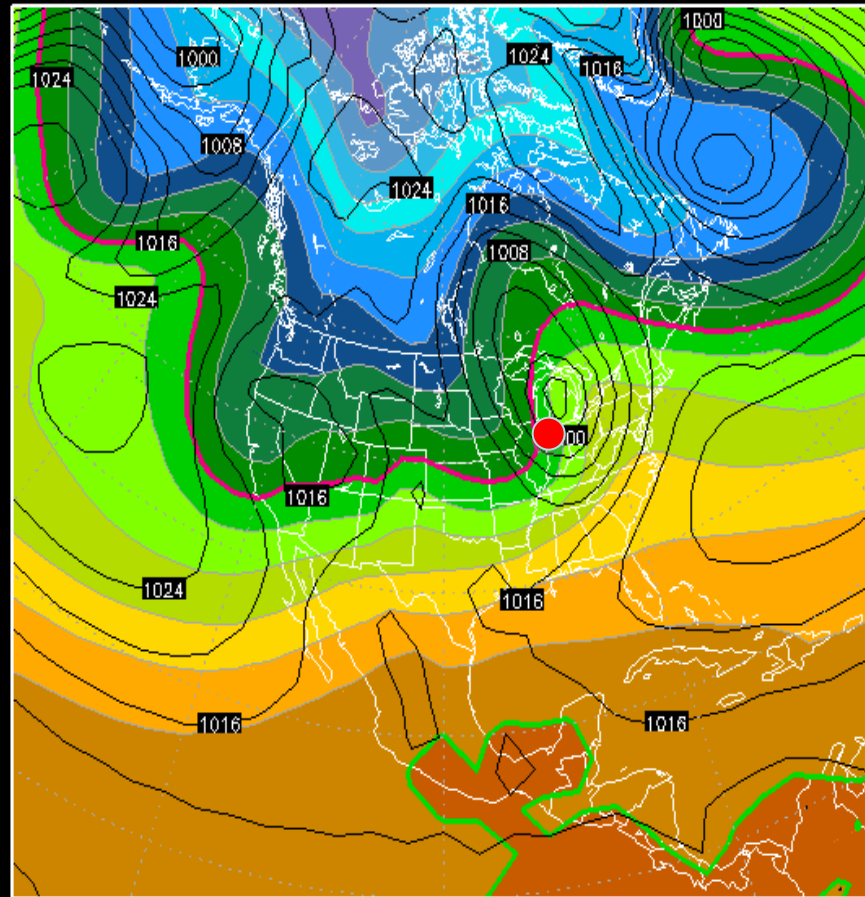
Valid time: 00Z Thu FEB,12 2009

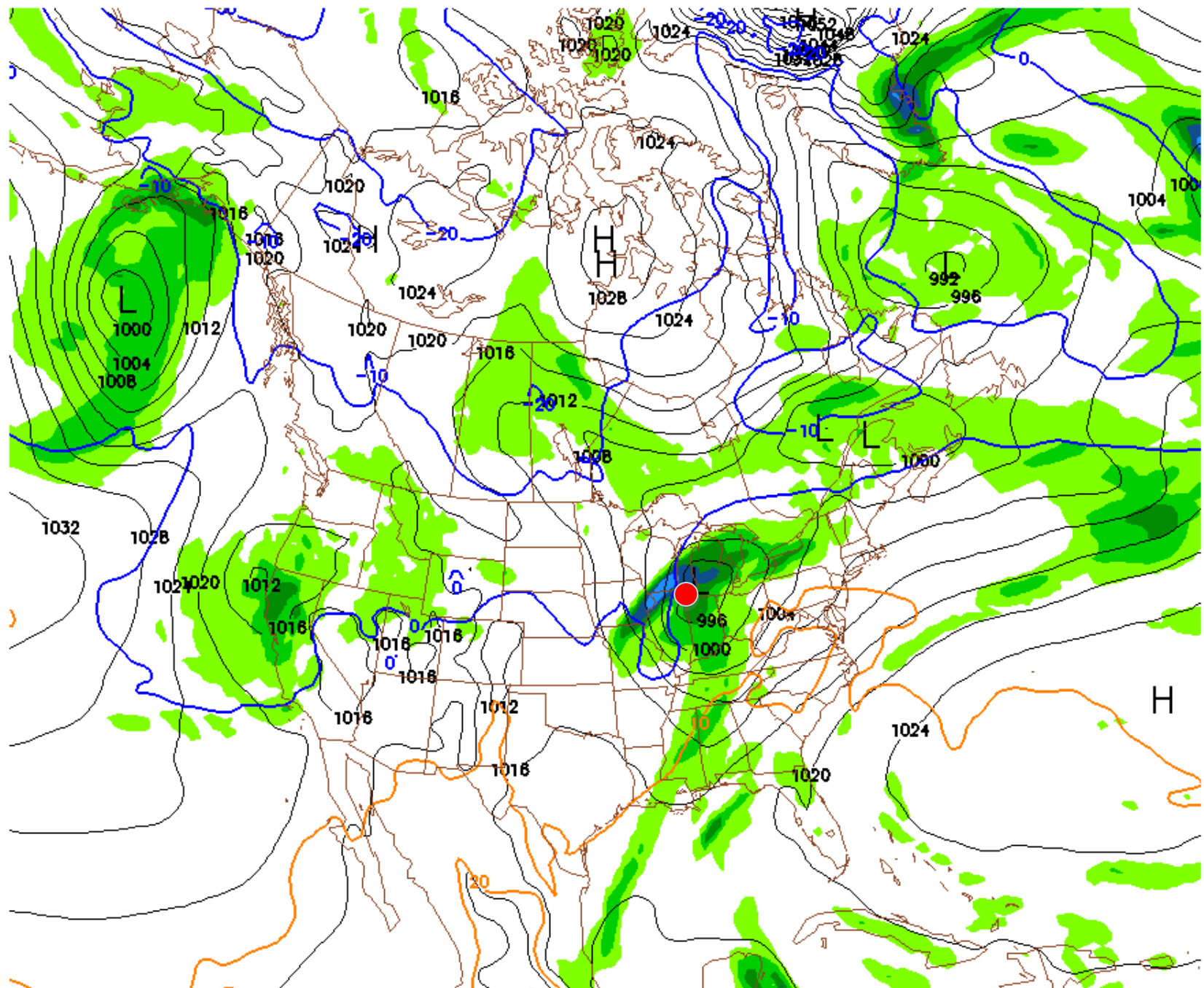
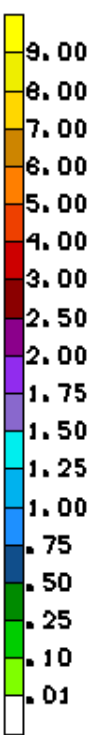


# NCEP ENS MEAN:MSLP(mb)/1000:500mb THK(m)

096H Forecast from: 00Z Sun FEB,08 2009

Valid time: 00Z Thu FEB,12 2009





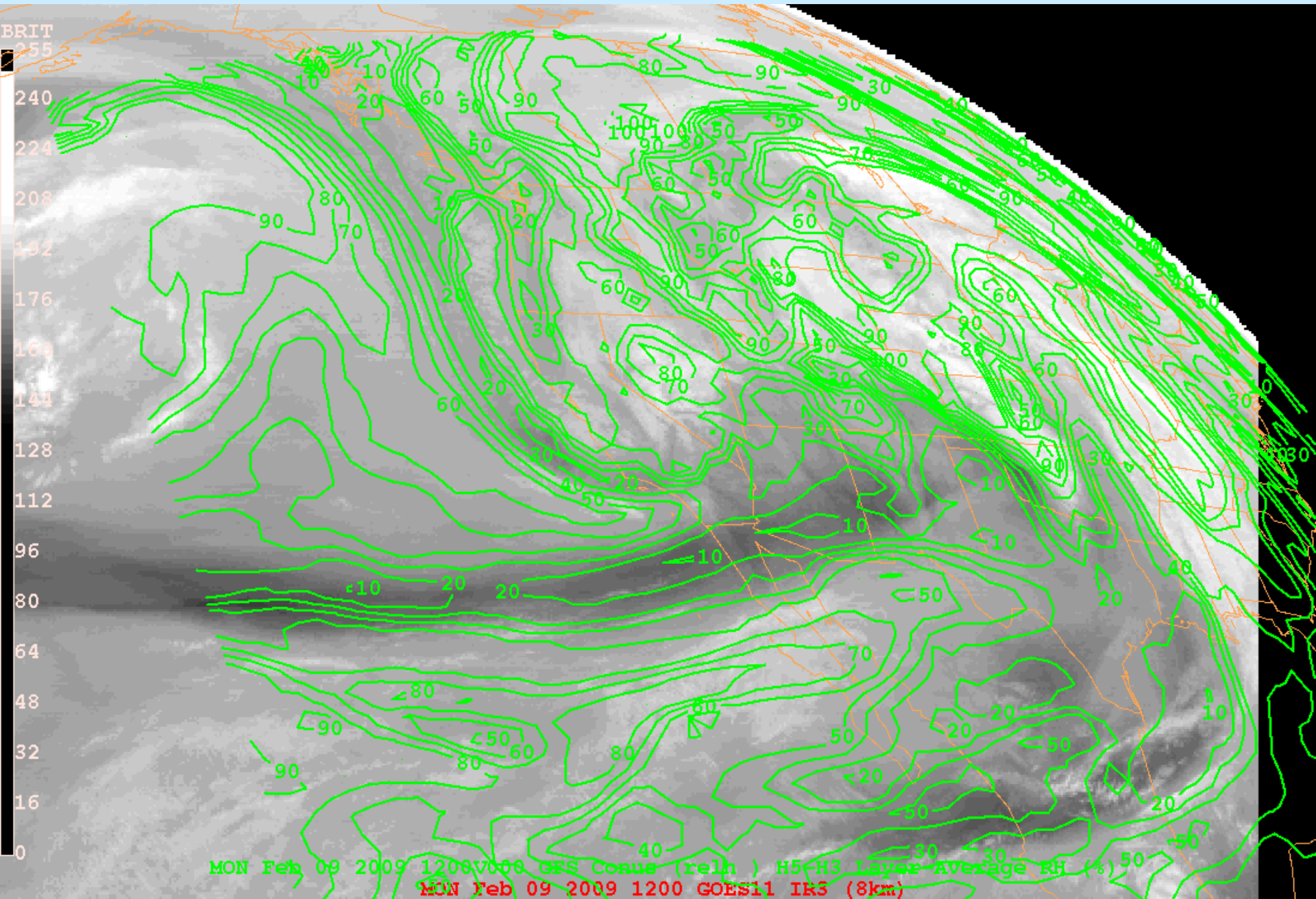
D-2



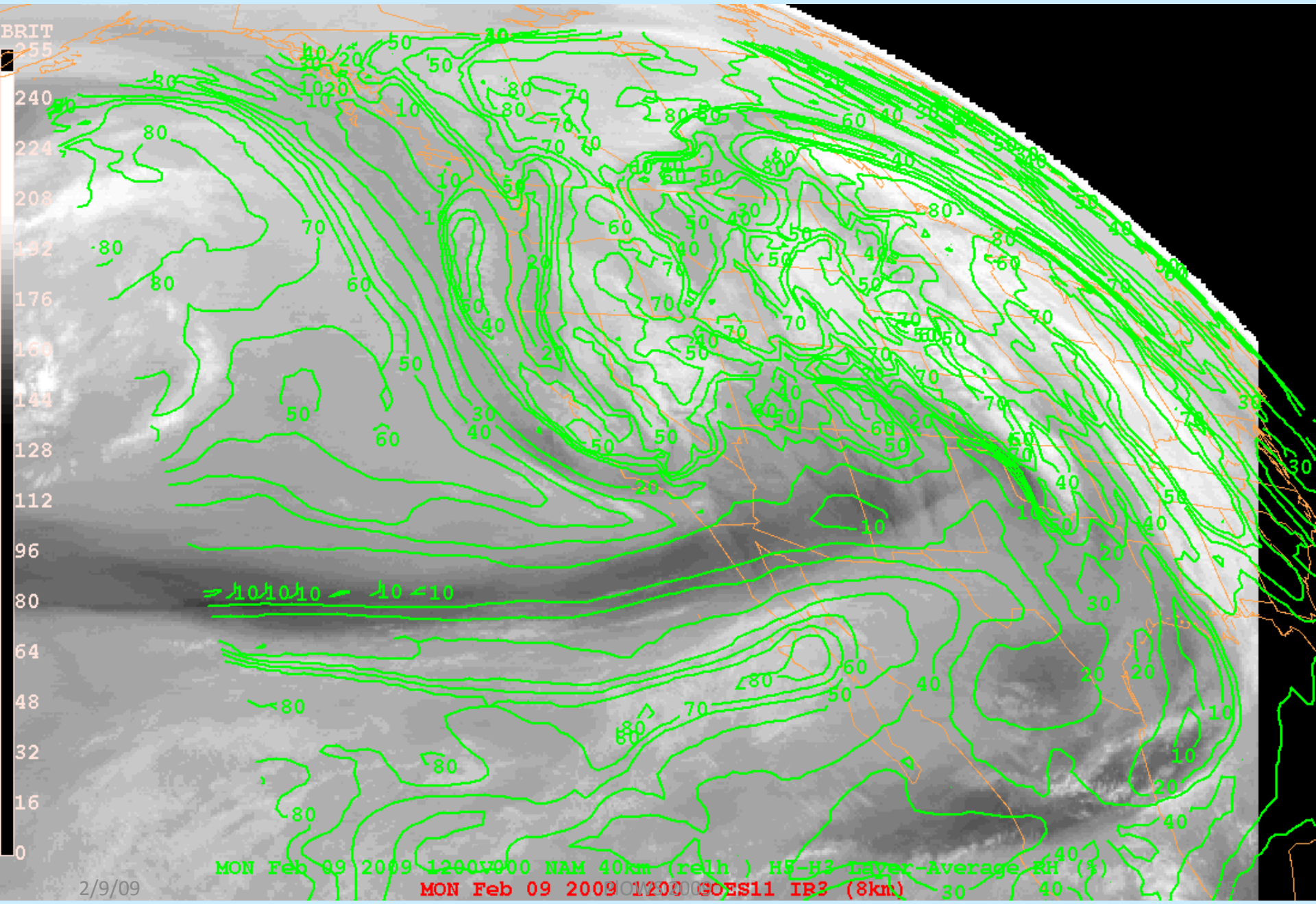
# Overview

- Possibility of operations in next 48h: *high*
- Next chance for operations: *Tue-Thu*
- Teams and equipment: *no one deployed*

# GFS initialization: 12z water vapor vs. 00-hr 500-300mb RH

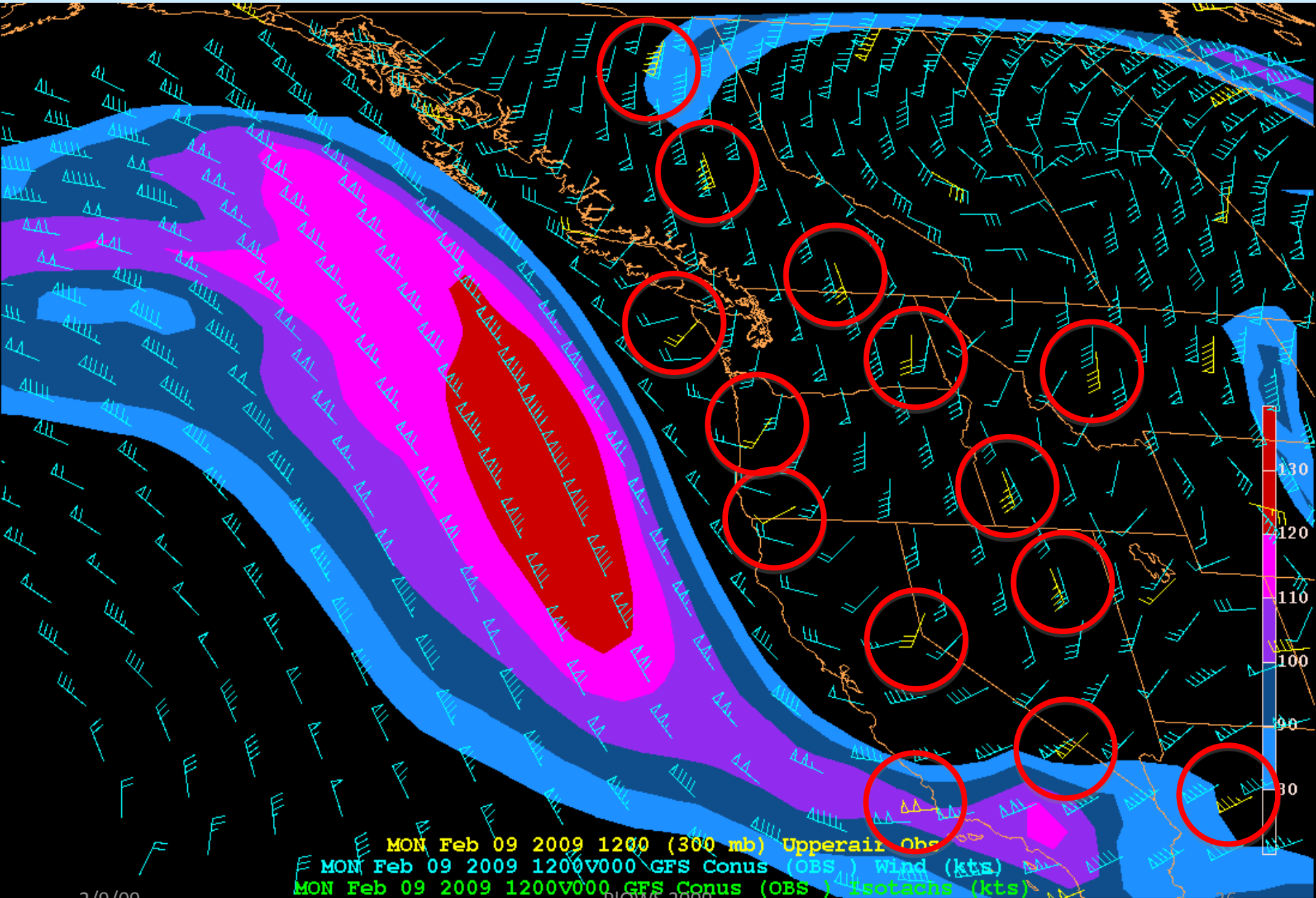


# NAM initialization: 12z water vapor vs. 00-hr 500-300mb RH



2/9/09

# GFS initialization: 12z 300mb winds vs. raobs



12z NAM is farther east with Low, farther north with warm air.

00z NAM:  
MSL pressure,  
55°F isotherm

1010

1006

L  
992

L  
993

12z NAM:  
MSL pressure,  
55°F isotherm

998

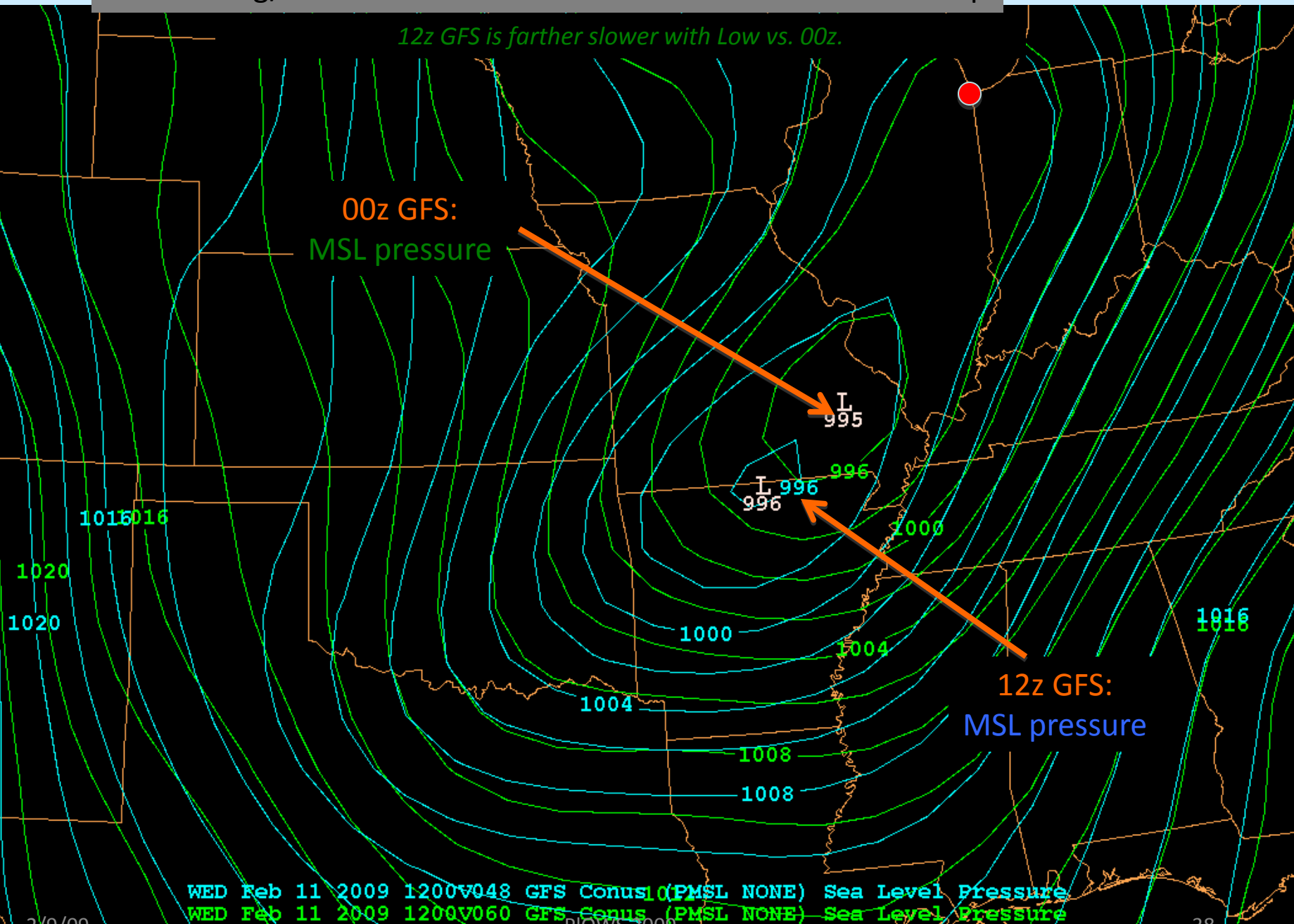
998

WED Feb 11 2009 1200V048 NAM 20km (TMPF ) Temperature (F)  
WED Feb 11 2009 1200V048 NAM 20km (PMSL NONE) Sea Level Pressure  
WED Feb 11 2009 00200V060 NAM 20km (TMPF ) Temperature (F)  
WED Feb 11 2009 1200V060 NAM 20km (PMSL NONE) Sea Level Pressure

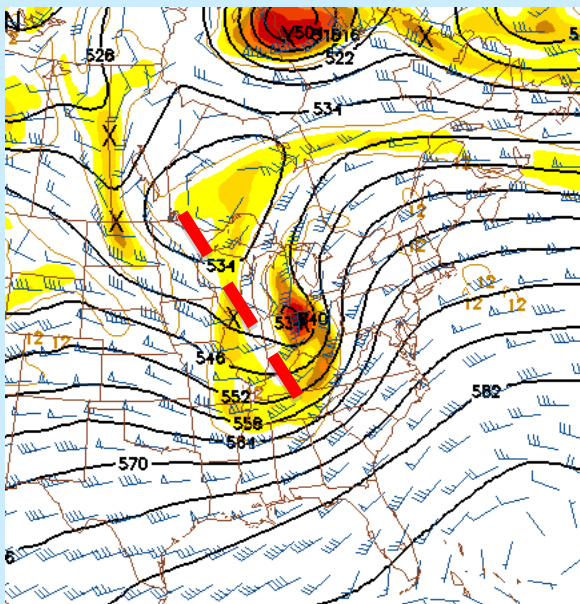
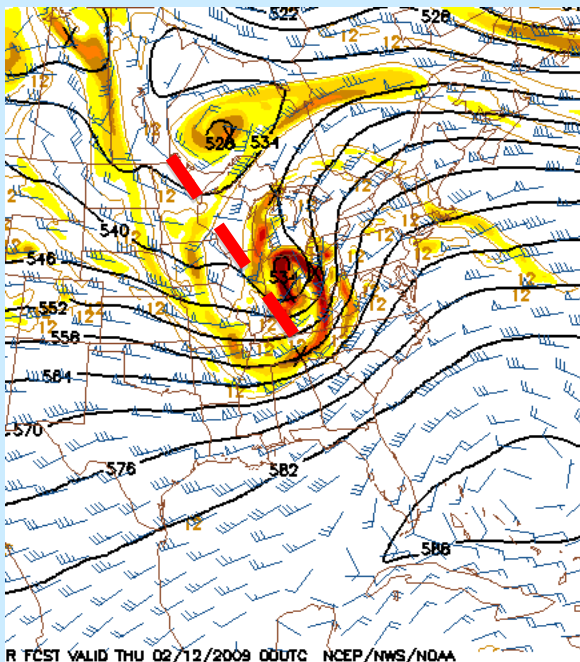
12z GFS is farther slower with Low vs. 00z.

00z GFS:  
MSLP pressure

12z GFS:  
MSLP pressure



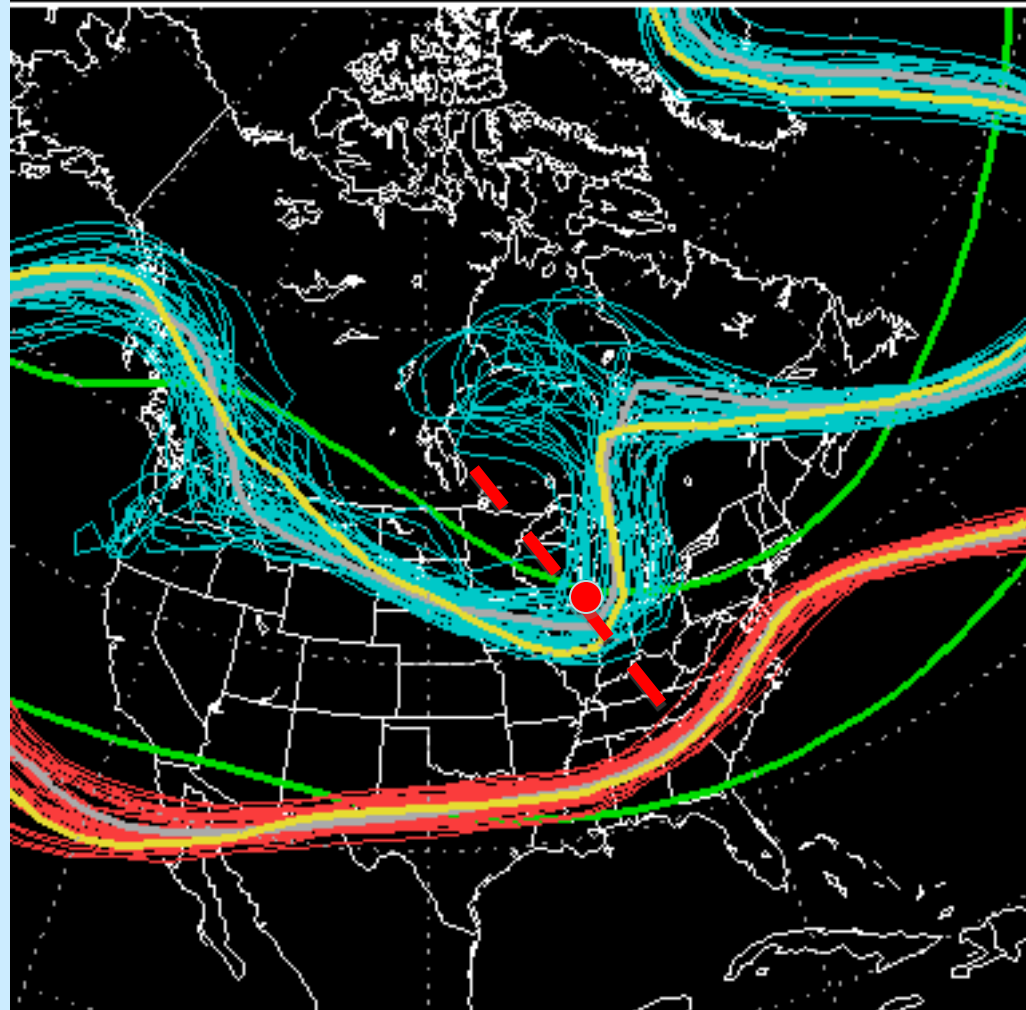
WED Feb 11 2009 1200V048 GFS Conus1 (PMSL NONE) Sea Level Pressure  
WED Feb 11 2009 1200V060 GFS Conus (PMSL NONE) Sea Level Pressure



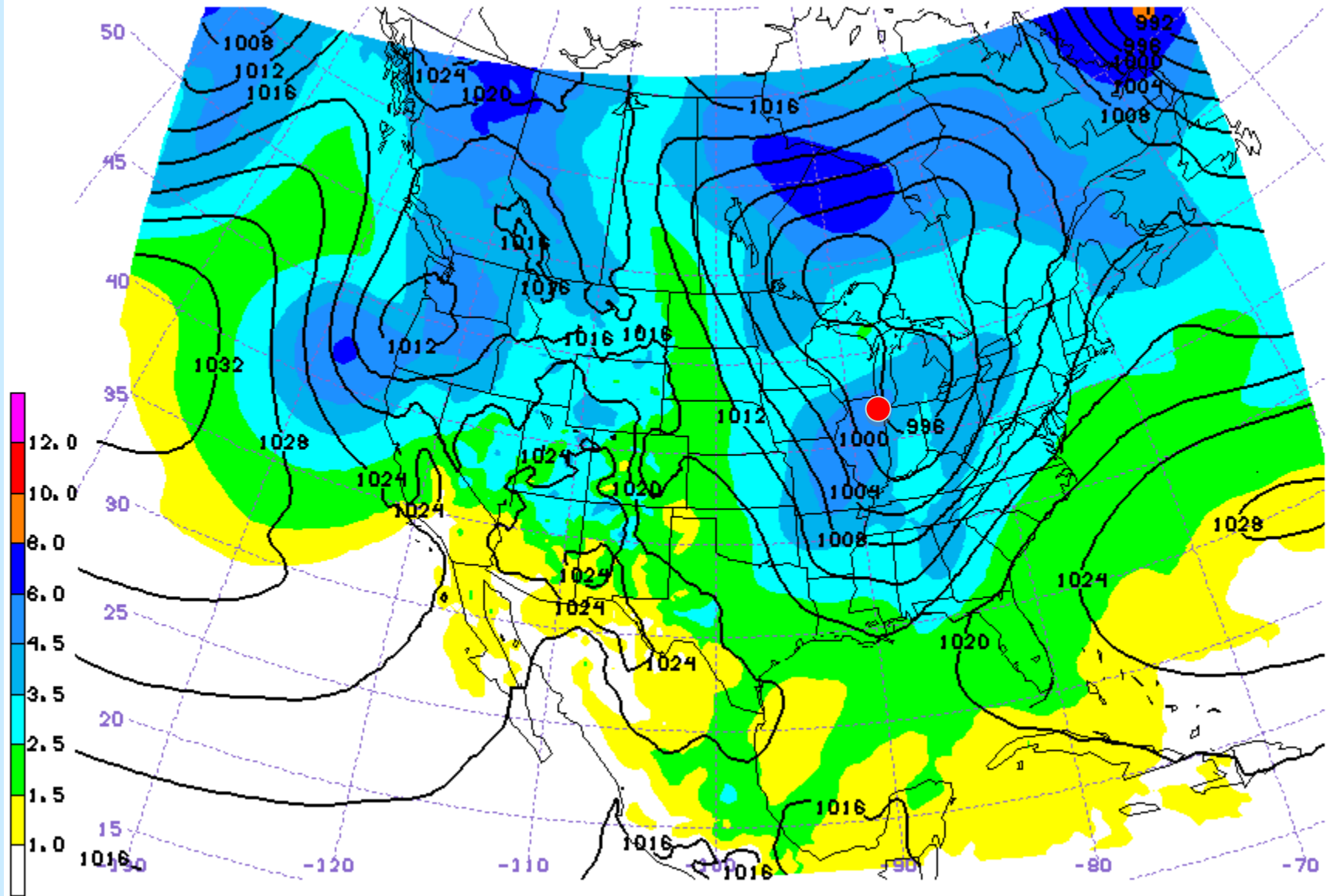
# NCEP ENSEMBLE 500mb Z

Forecast from: 00Z Mon FEB,09 2009

Valid time: 00Z Thu FEB,12 2009

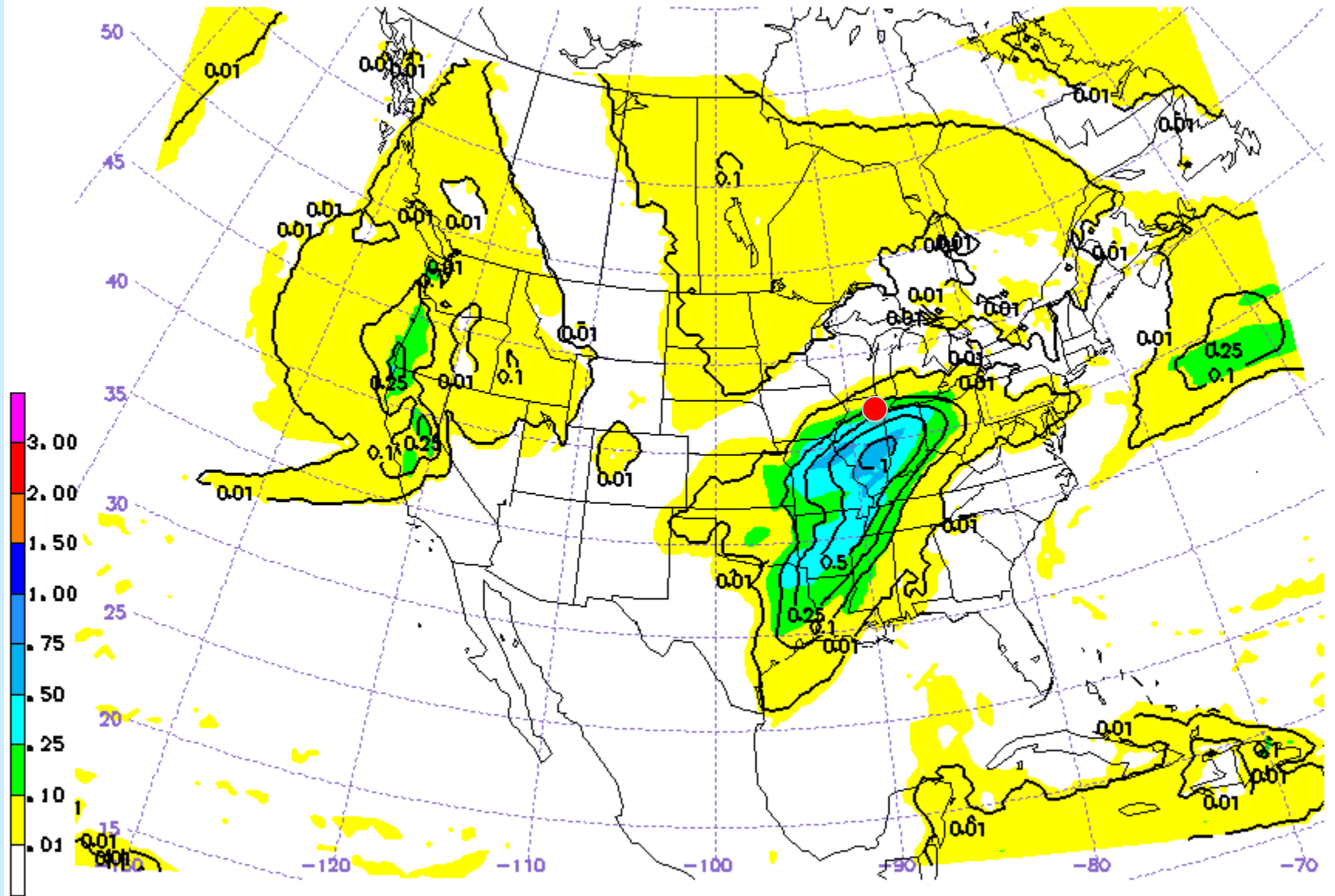


SHORT RANGE ENSEMBLE FORECAST  
MEAN SEA LEVEL PRS (CONTOURS) % SPREAD (COLOR FILL)



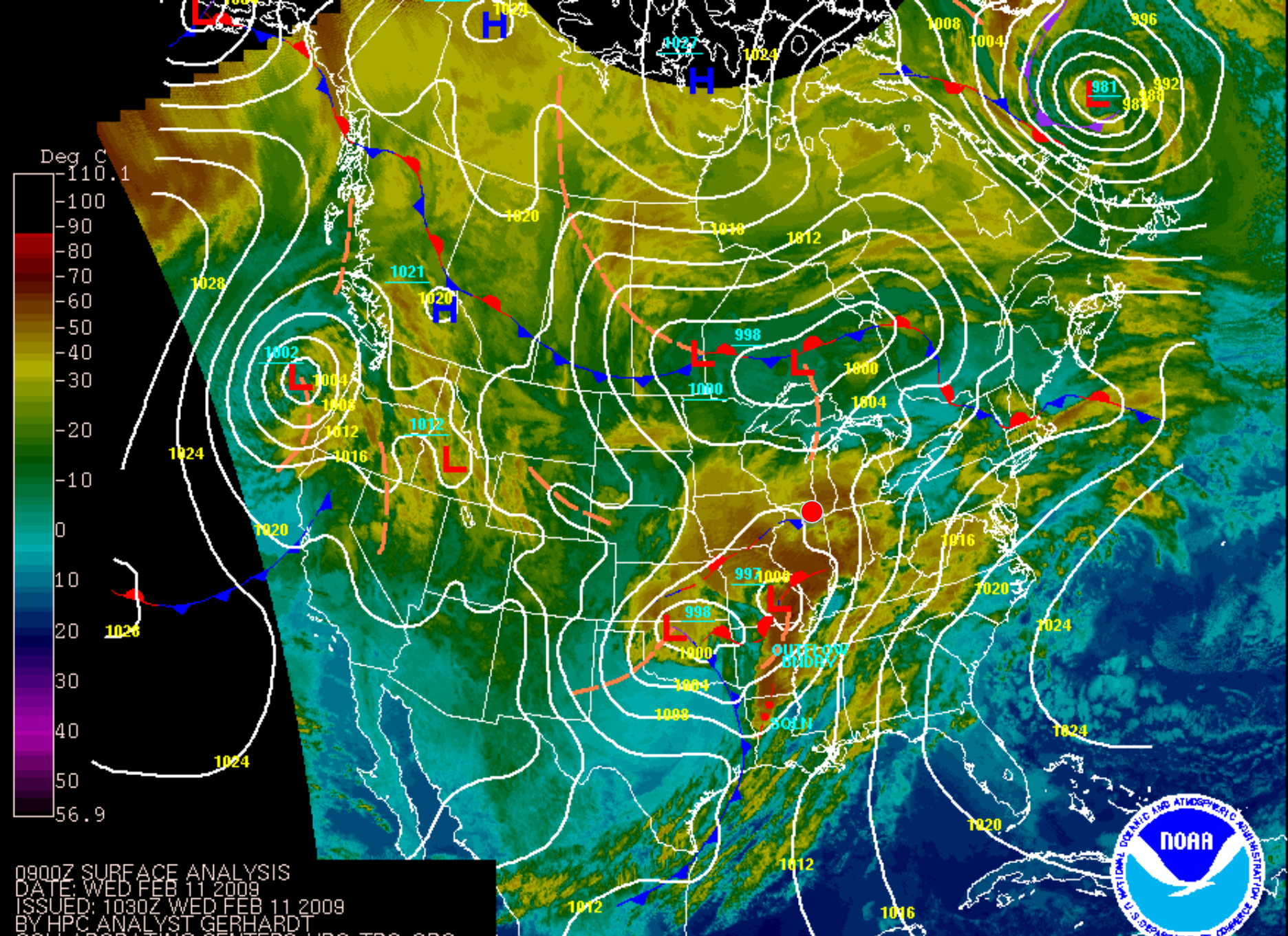


Short Range Ensemble Forecast  
Mean 6-hr Precip (Contours in hundredths of inches) Spread (color fill)

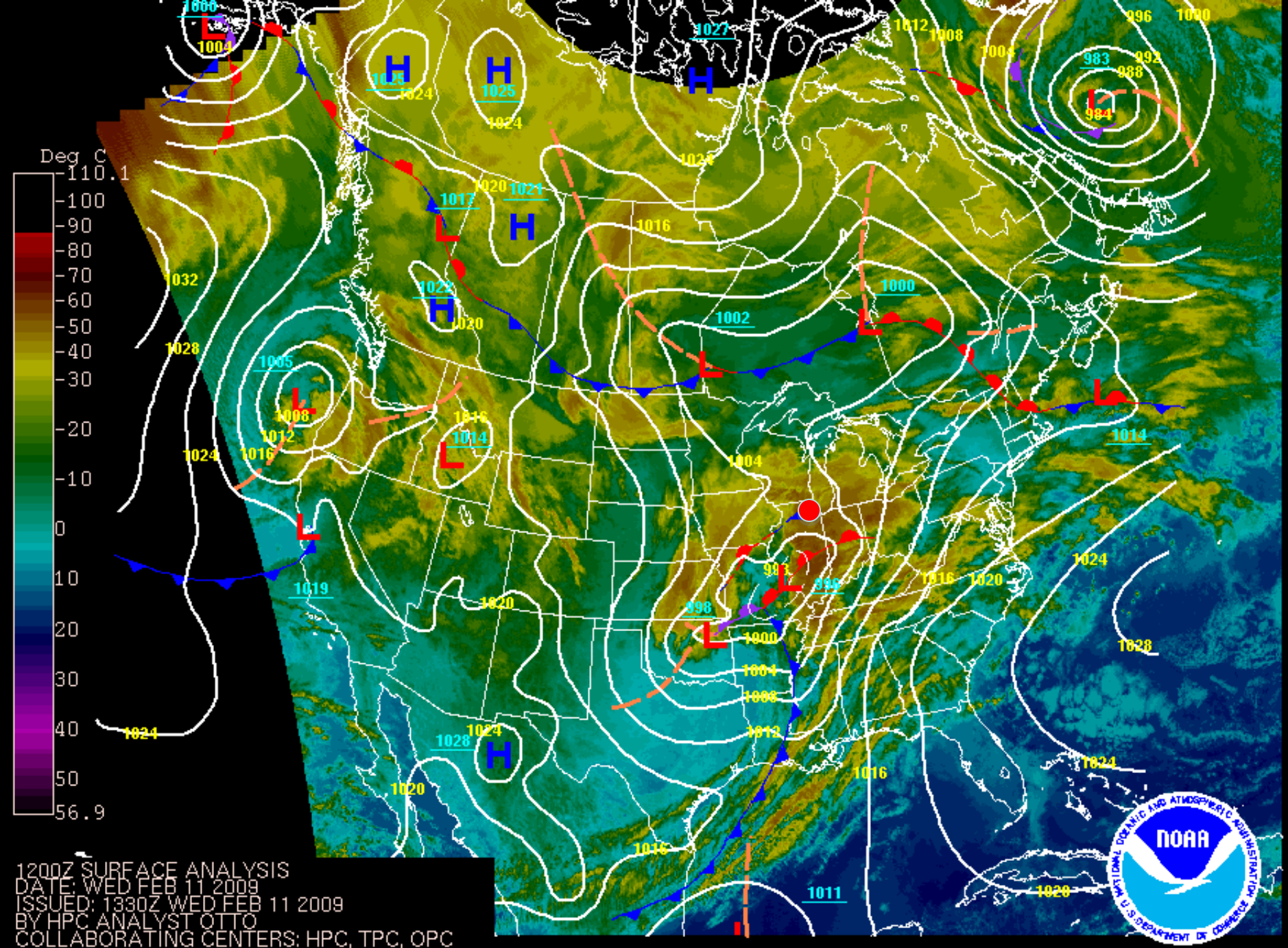


02/09/2009 09UTC 051HR FCST VALID WED 02/11/2009 12UTC NCEP/NWS/NOAA

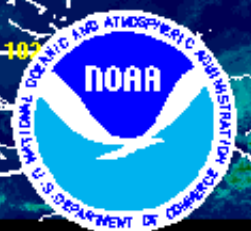
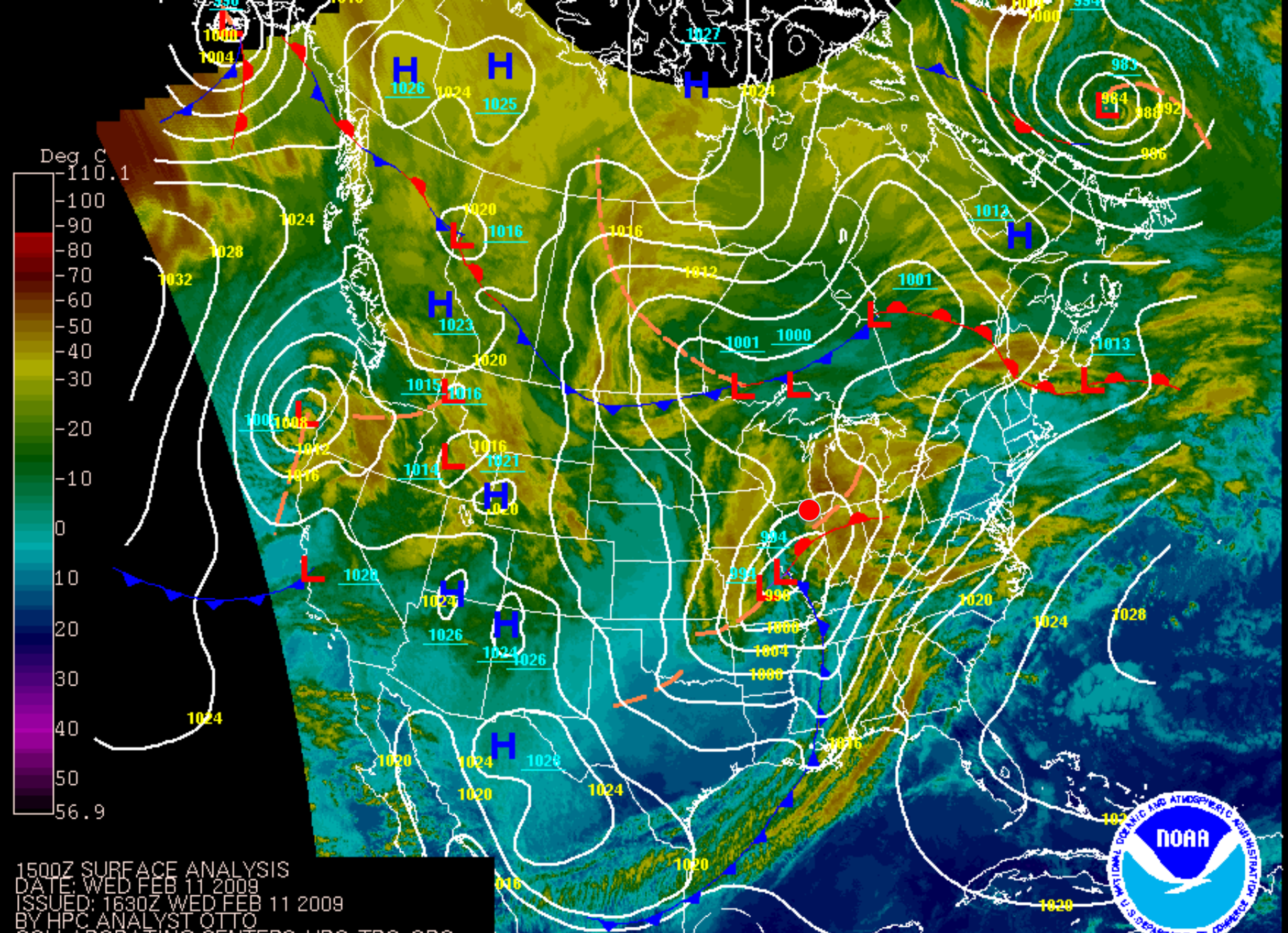
D-1

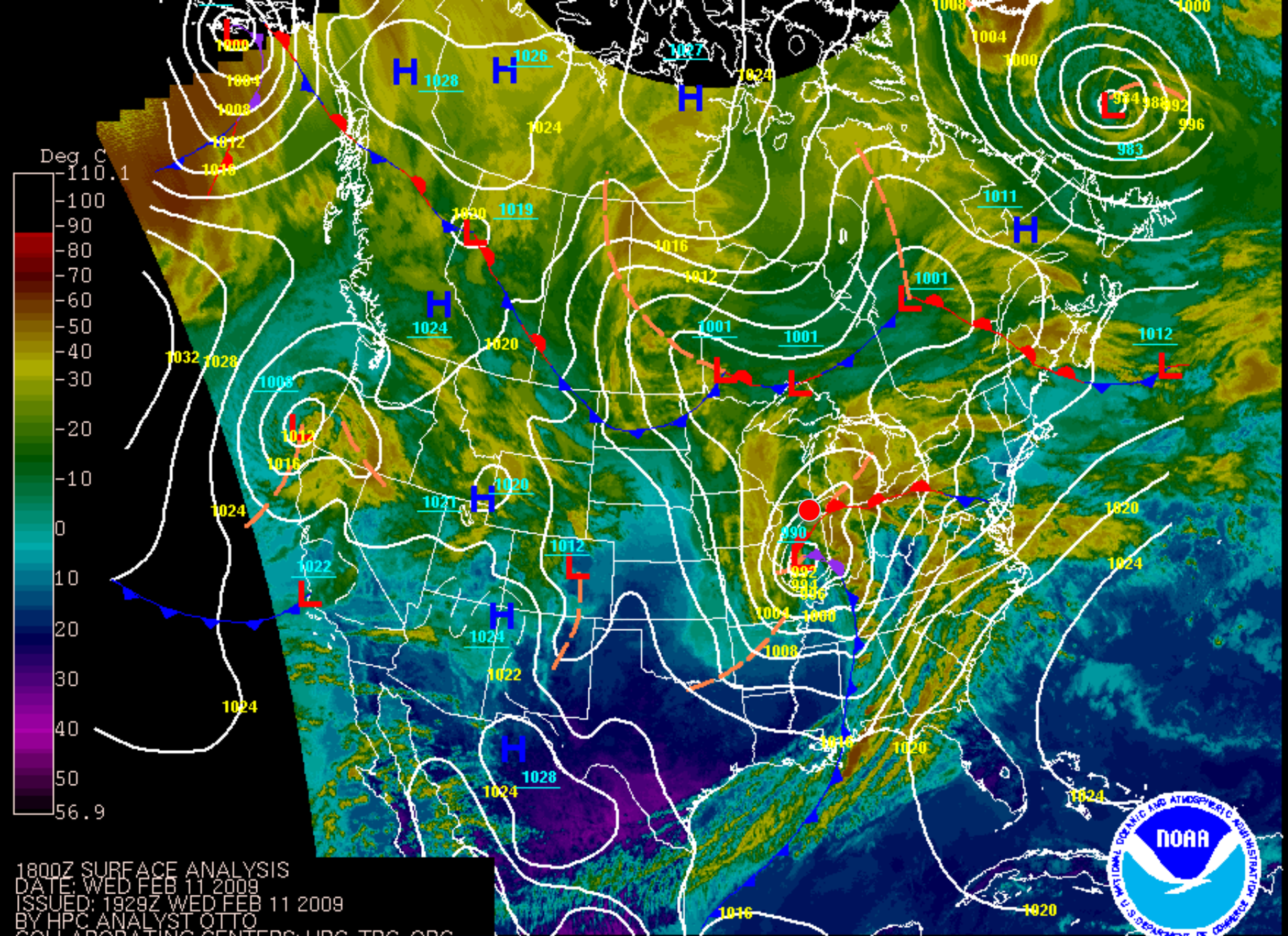


0900Z SURFACE ANALYSIS  
 DATE: WED FEB 11 2009  
 ISSUED: 1030Z WED FEB 11 2009  
 BY HPC ANALYST GERHARDT  
 COLLABORATING CENTERS: HPC, TPC, OPC

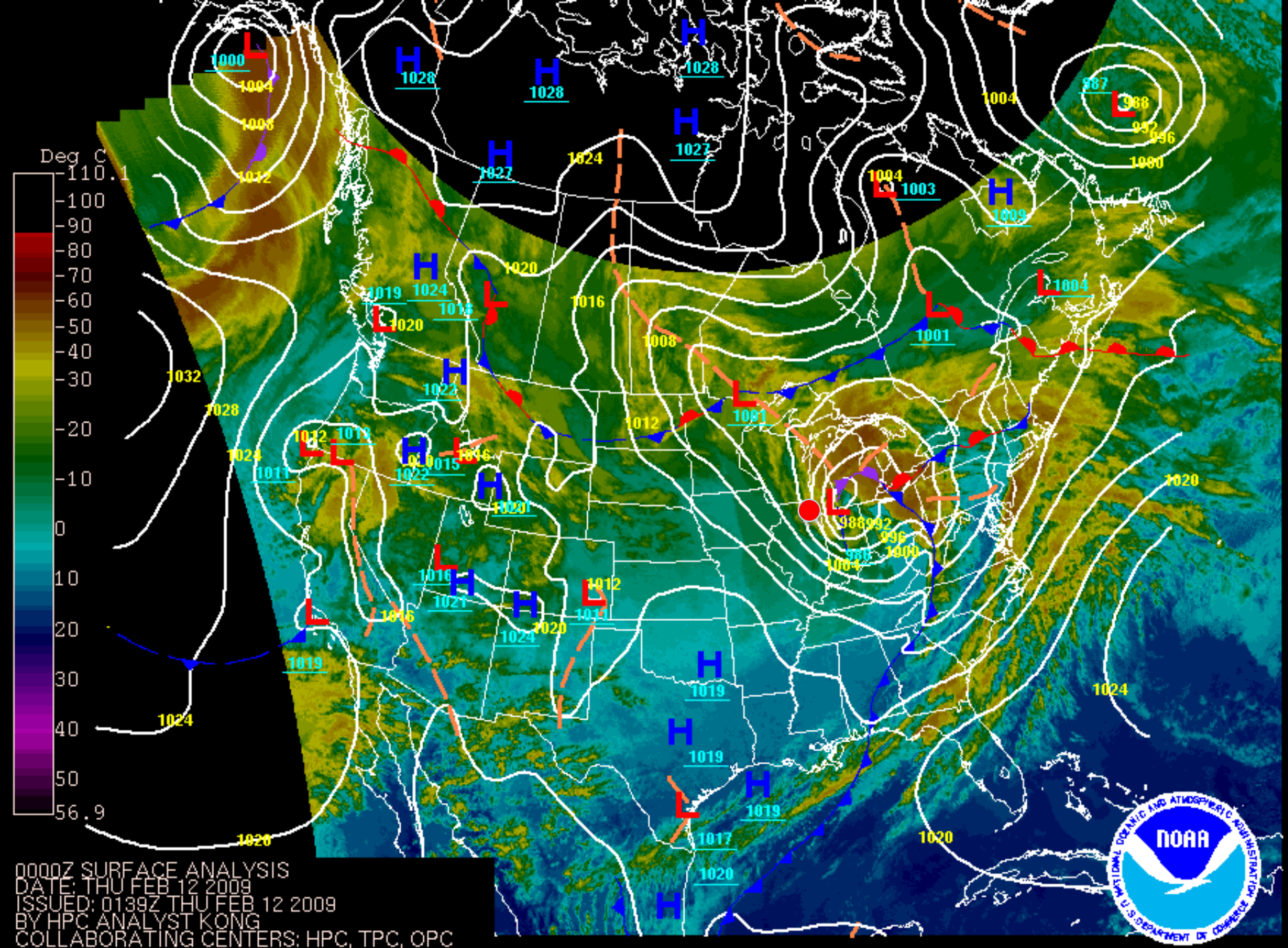


1200Z SURFACE ANALYSIS  
 DATE: WED FEB 11 2009  
 ISSUED: 1330Z WED FEB 11 2009  
 BY HPC ANALYST OTTO  
 COLLABORATING CENTERS: HPC, TPC, OPC





1800Z SURFACE ANALYSIS  
 DATE: WED FEB 11 2009  
 ISSUED: 1929Z WED FEB 11 2009  
 BY HPC ANALYST OTTO  
 COLLABORATING CENTERS: HPC, TPC, OPC



0000Z SURFACE ANALYSIS  
 DATE: THU FEB 12 2009  
 ISSUED: 0139Z THU FEB 12 2009  
 BY HPC ANALYST KONG  
 COLLABORATING CENTERS: HPC, TPC, OPC

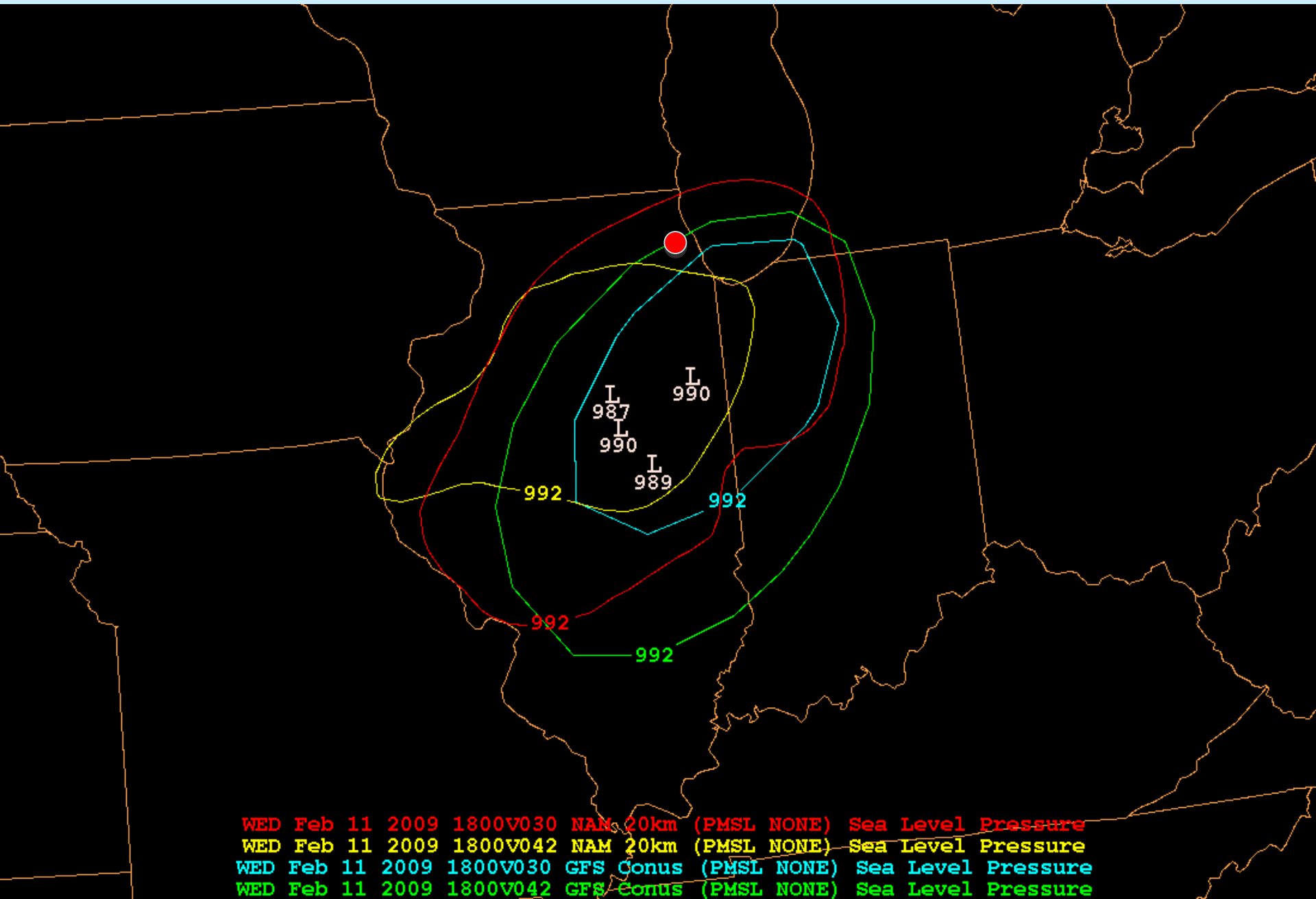
IR 20090212 0015Z GOES-E SAT IMAGE

# Overview

- Possibility of operations in next 48h: *high*
- Next chance for operations: *Tue PM - Wed*
- Teams/equipment: *UAH, Columbia on road*

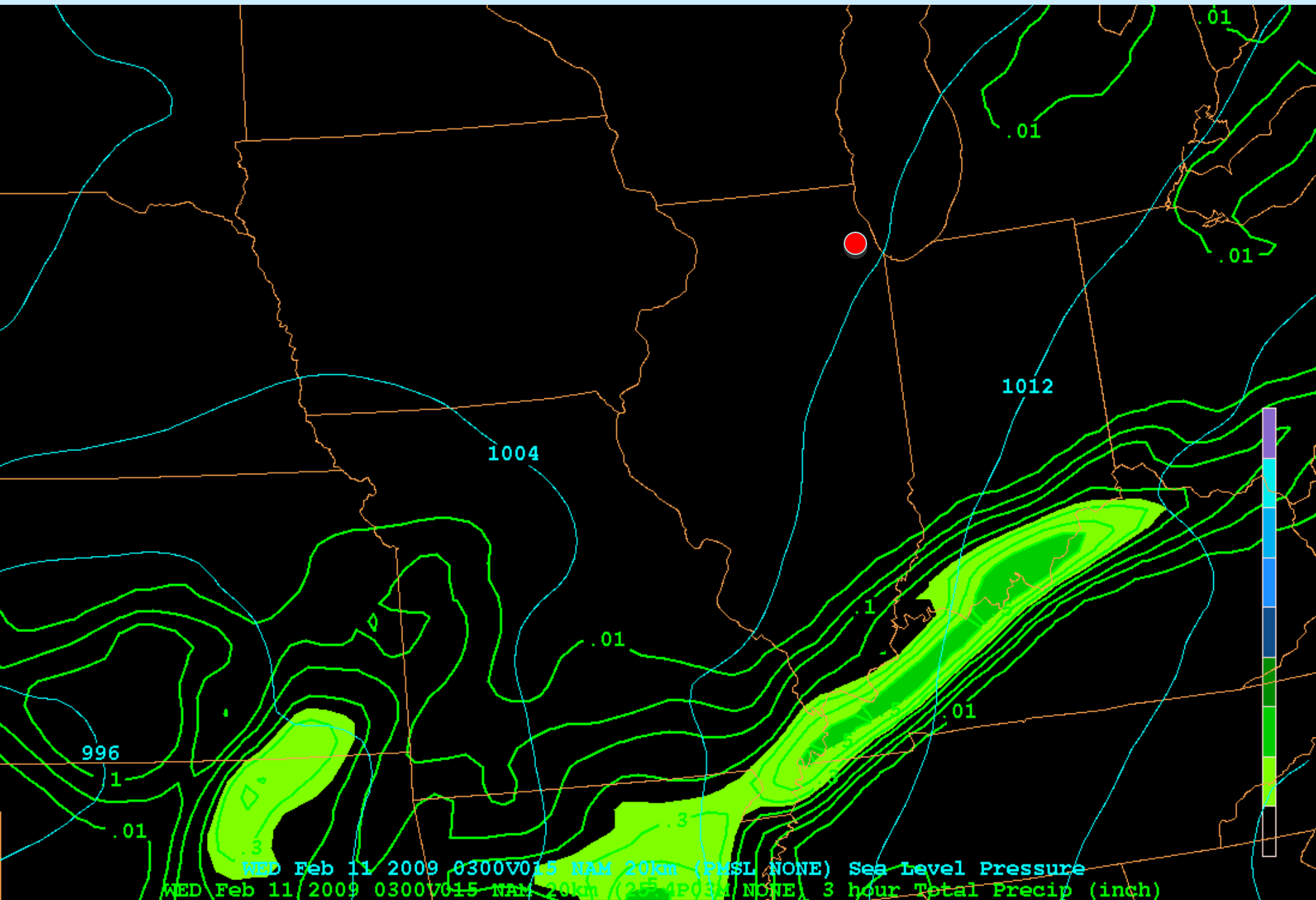


dProg/dT: MSL pressure forecasts (992mb isobar) valid 18z Wed (30, 42h NAM, GFS)

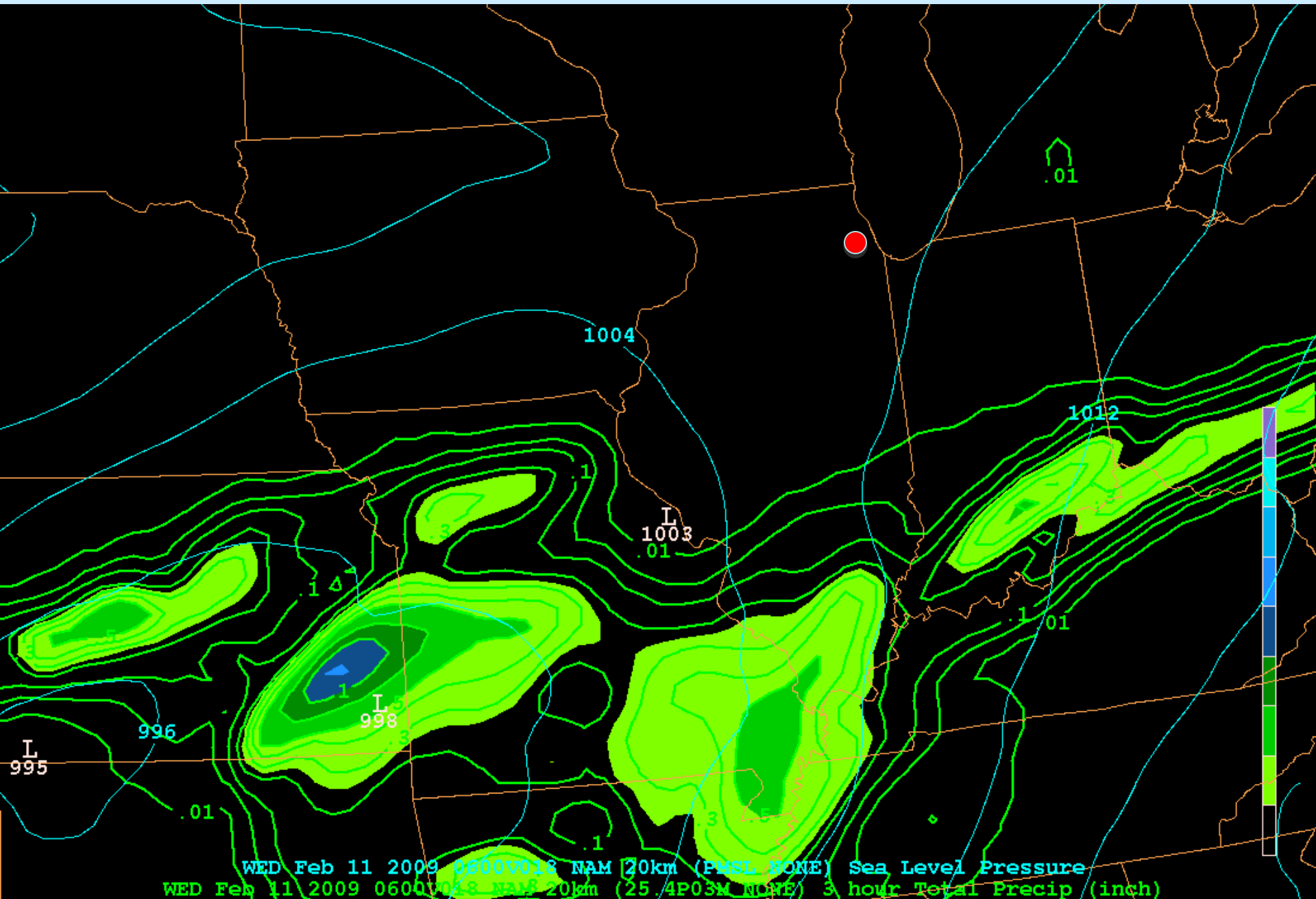


WED Feb 11 2009 1800V030	NAM	20km	(PMSL NONE)	Sea Level Pressure
WED Feb 11 2009 1800V042	NAM	20km	(PMSL NONE)	Sea Level Pressure
WED Feb 11 2009 1800V030	GFS	Conus	(PMSL NONE)	Sea Level Pressure
WED Feb 11 2009 1800V042	GFS	Conus	(PMSL NONE)	Sea Level Pressure

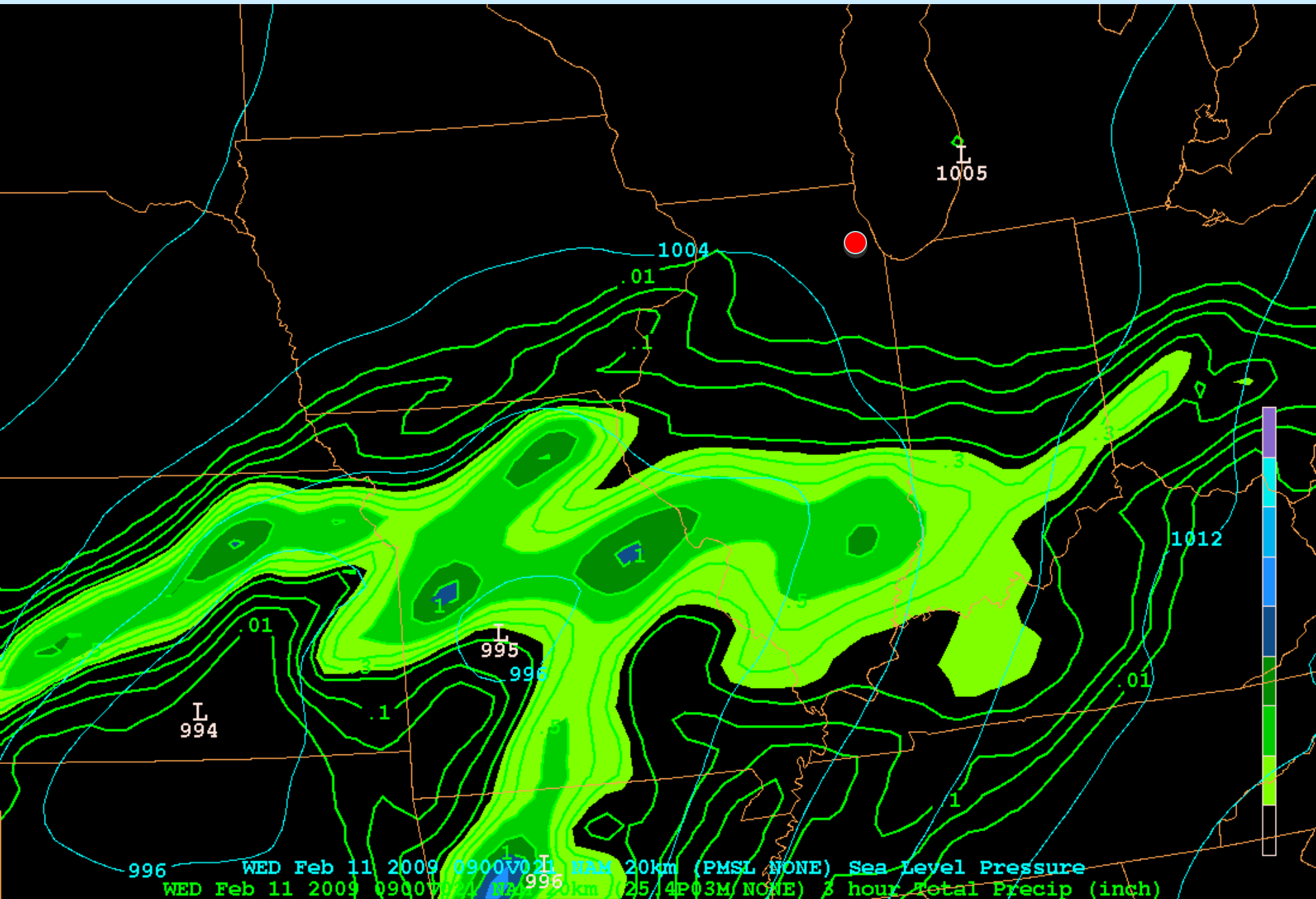
NAM forecast valid 03z Wed :: MSL pressure, 3h precipitation



NAM forecast valid 06z Wed :: MSL pressure, 3h precipitation

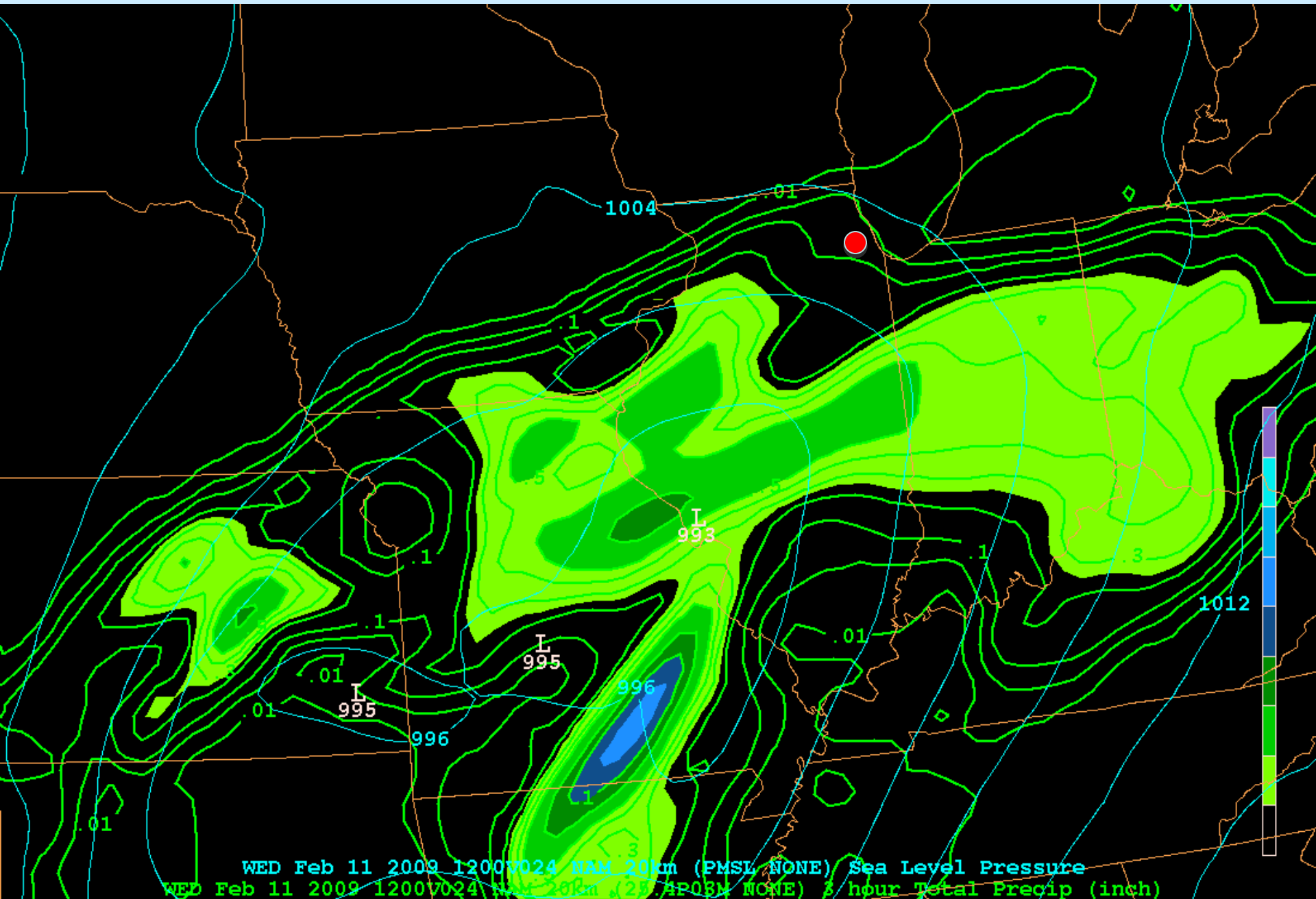


NAM forecast valid 09z Wed :: MSL pressure, 3h precipitation



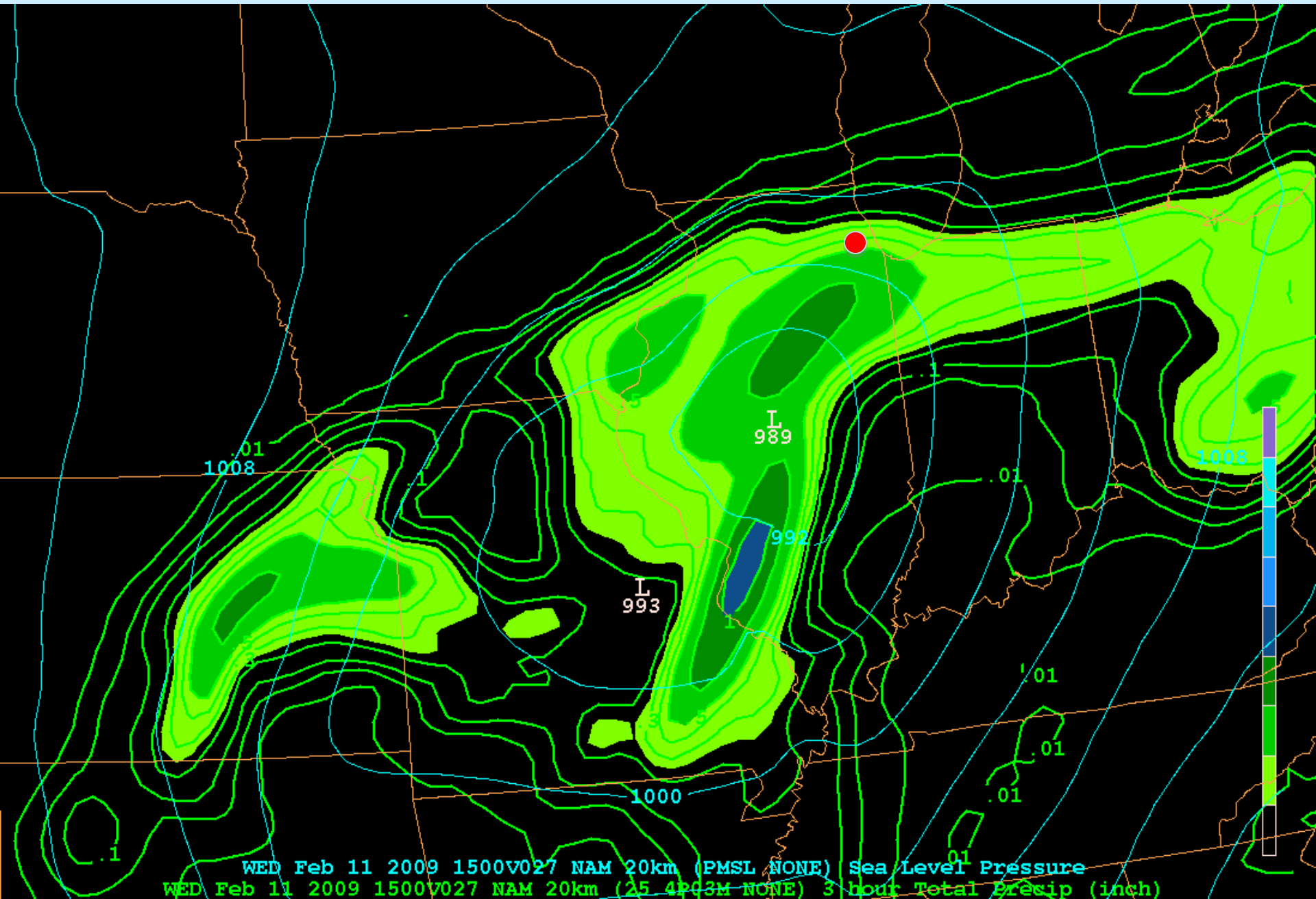
996 WED Feb 11 2009 0900V01 NAM 20km (PMSL NONE) Sea Level Pressure  
WED Feb 11 2009 0900V01 NAM 20km (25/4P03M/NONE) 3 hour Total Precip (inch)

NAM forecast valid 12z Wed :: MSL pressure, 3h precipitation

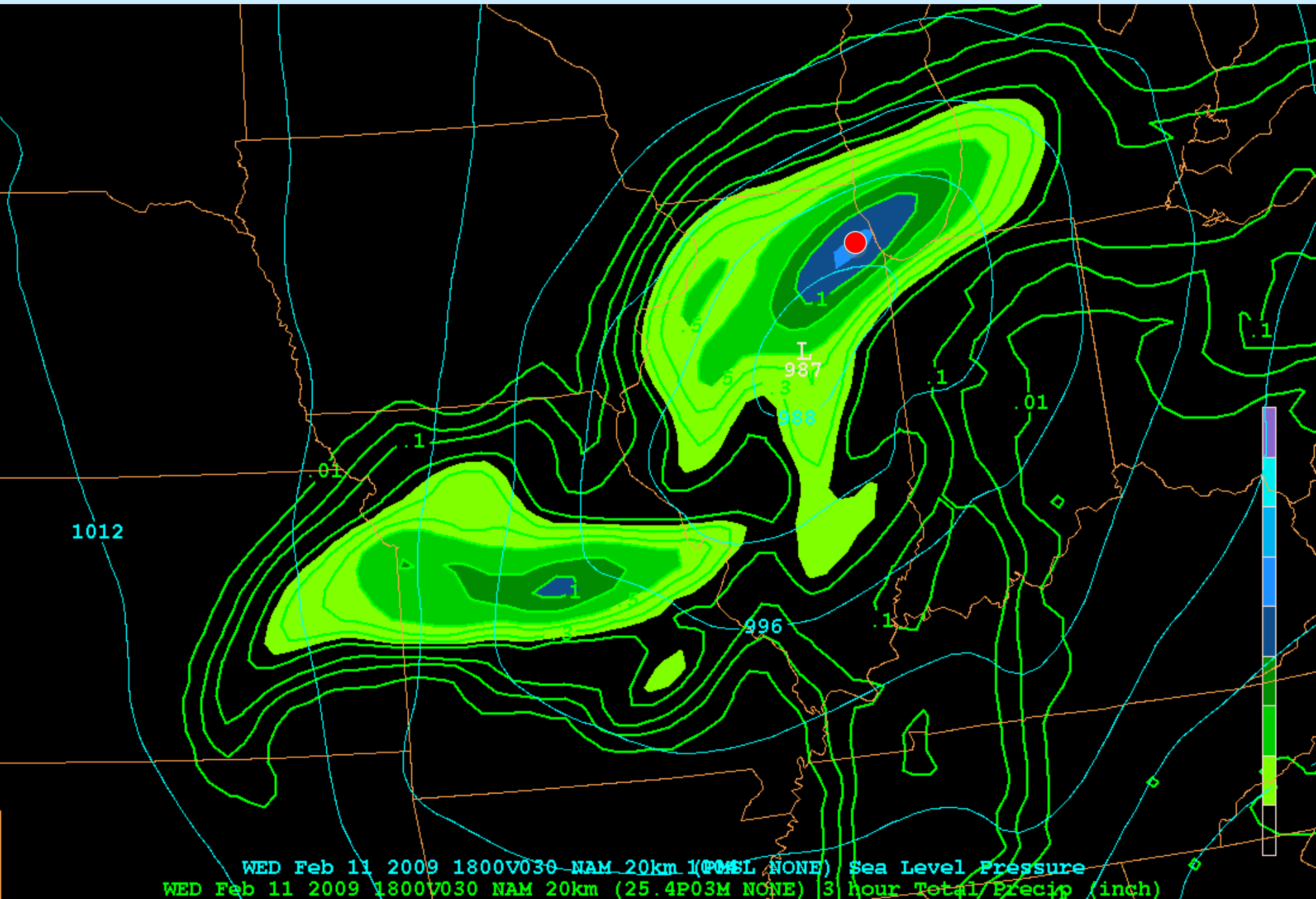


WED Feb 11 2009 1200V024 NAM 20km (PMSL NONE) Sea Level Pressure  
WED Feb 11 2009 1200V024 NAM 20km (25.4PO3M NONE) 3 hour Total Precip (inch)

NAM forecast valid 15z Wed :: MSL pressure, 3h precipitation

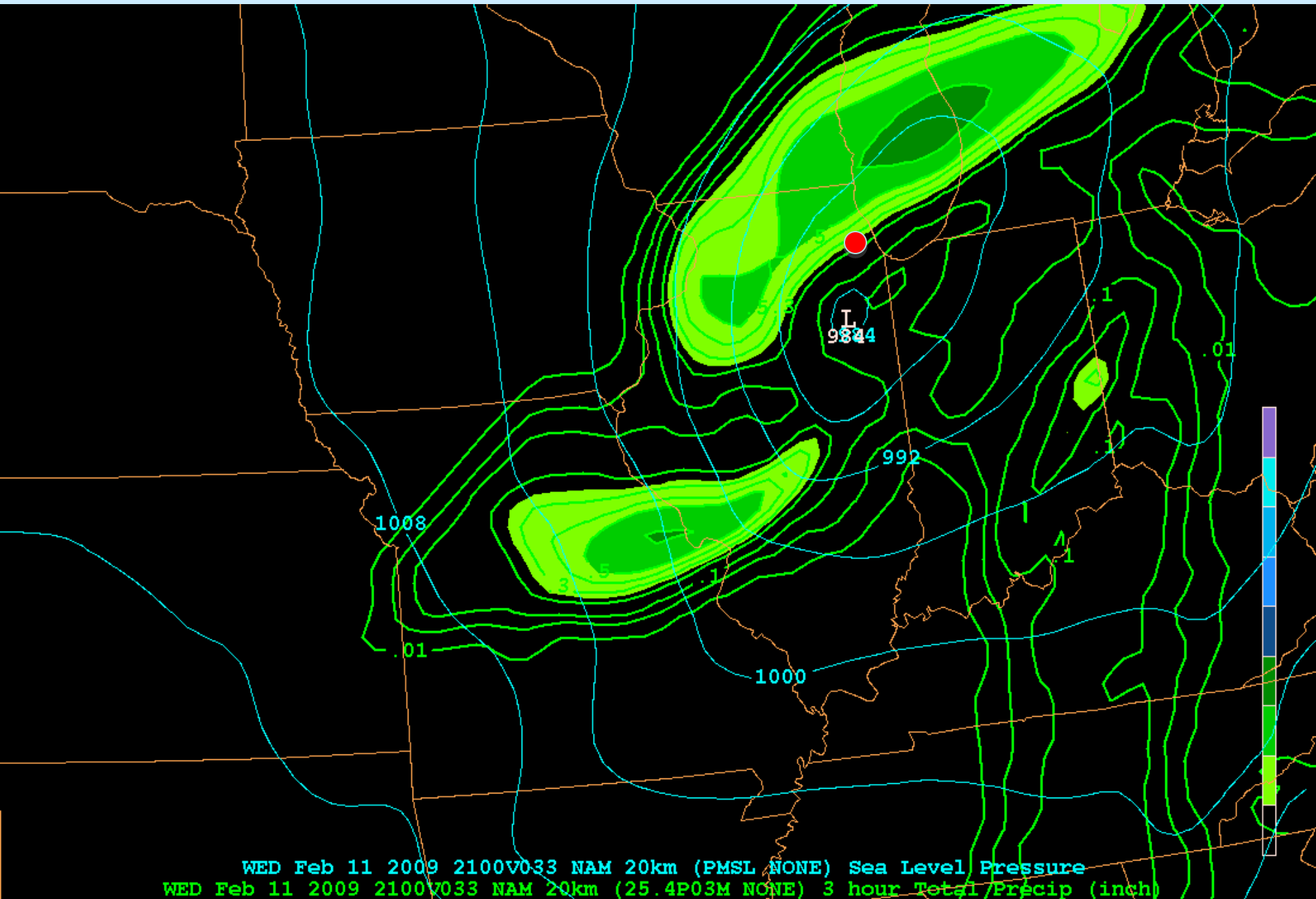


NAM forecast valid 18z Wed :: MSL pressure, 3h precipitation



WED Feb 11 2009 1800V030 NAM 20km 1(PMSL NONE) Sea Level Pressure  
WED Feb 11 2009 1800V030 NAM 20km (25.4P03M NONE) 3 hour Total Precip (inch)

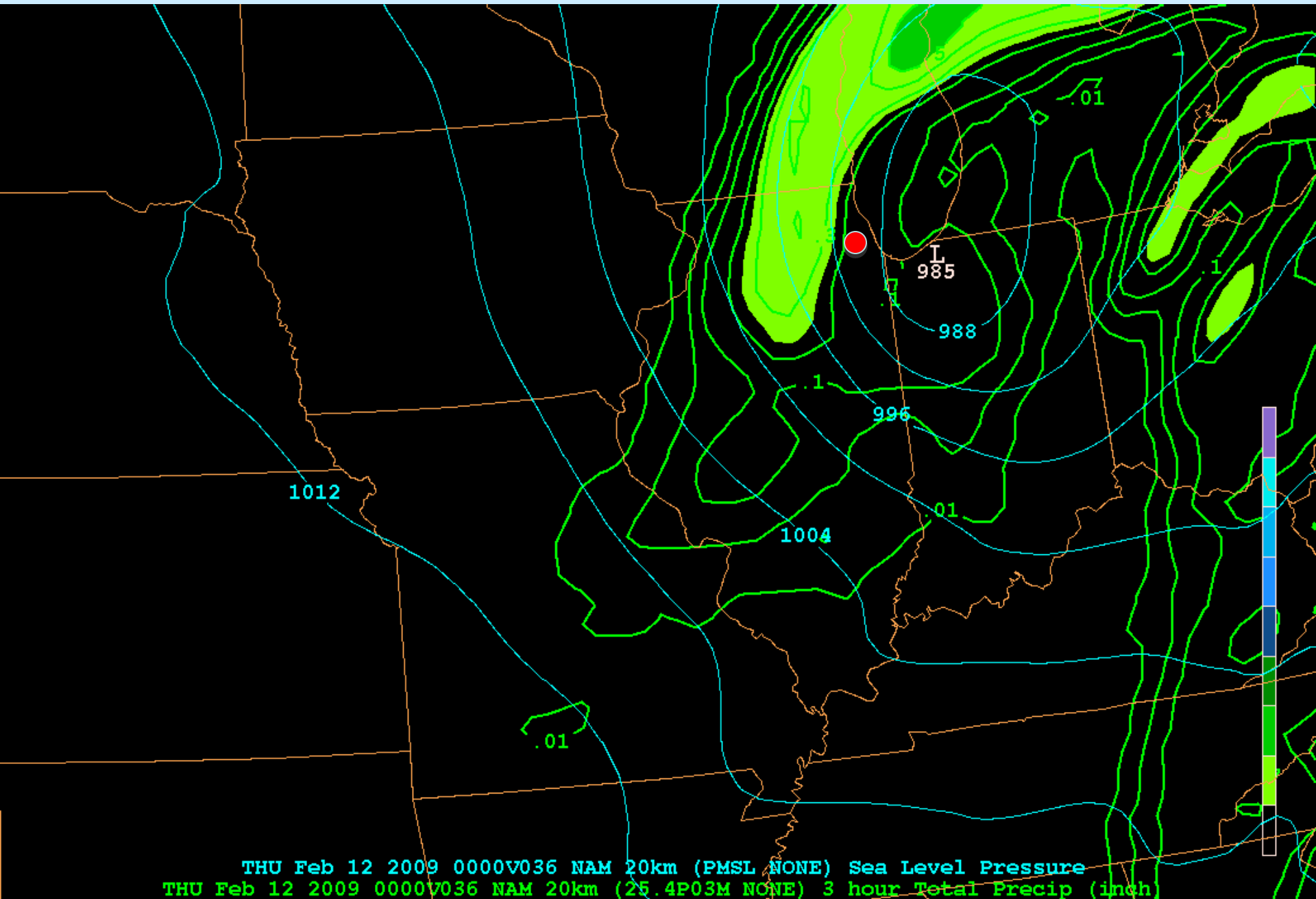
NAM forecast valid 21z Wed :: MSL pressure, 3h precipitation



WED Feb 11 2009 2100V033 NAM 20km (PMSL NONE) Sea Level Pressure  
WED Feb 11 2009 2100V033 NAM 20km (25.4P03M NONE) 3 hour Total/Precip (inch)

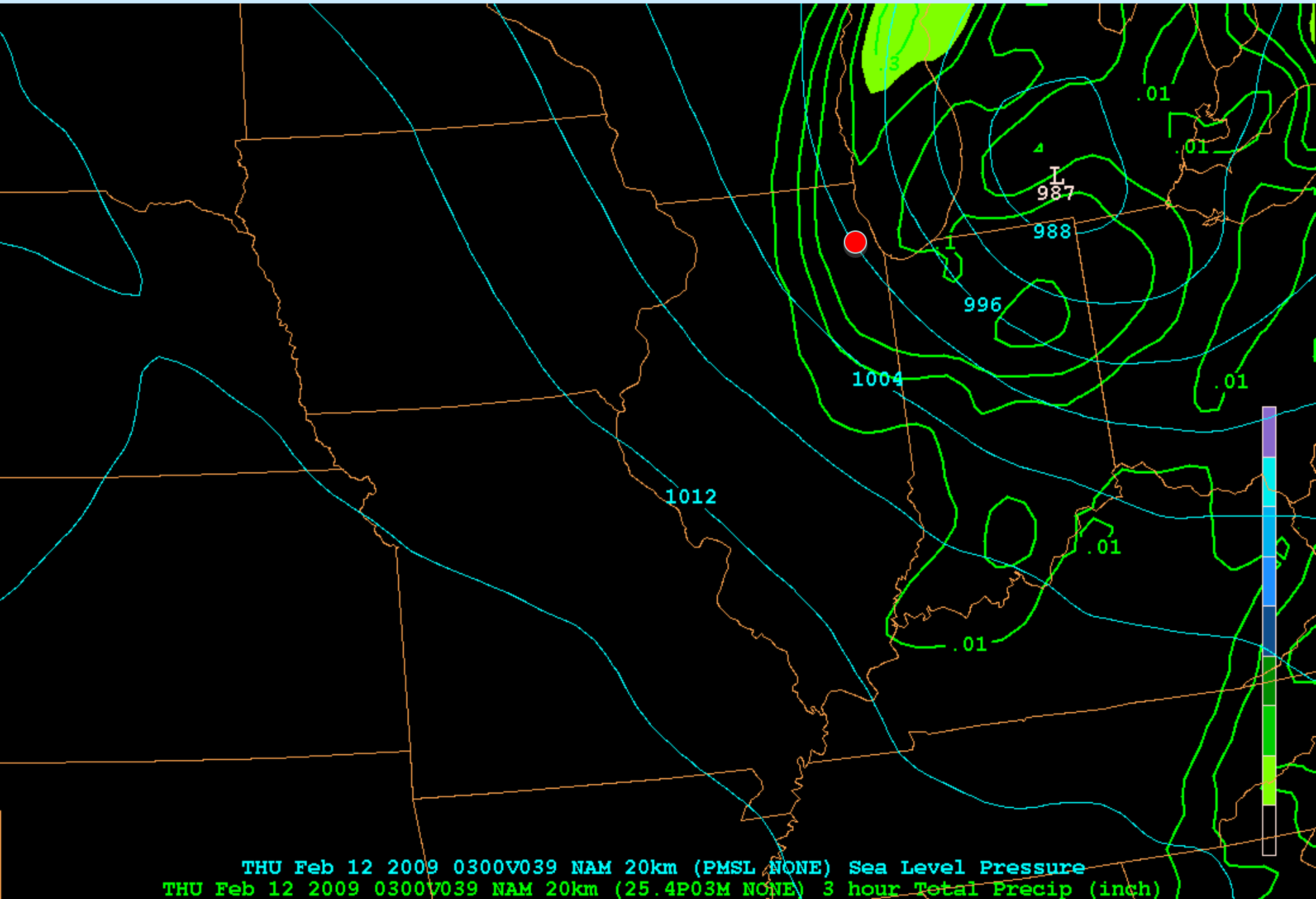


NAM forecast valid 00z Thu :: MSL pressure, 3h precipitation



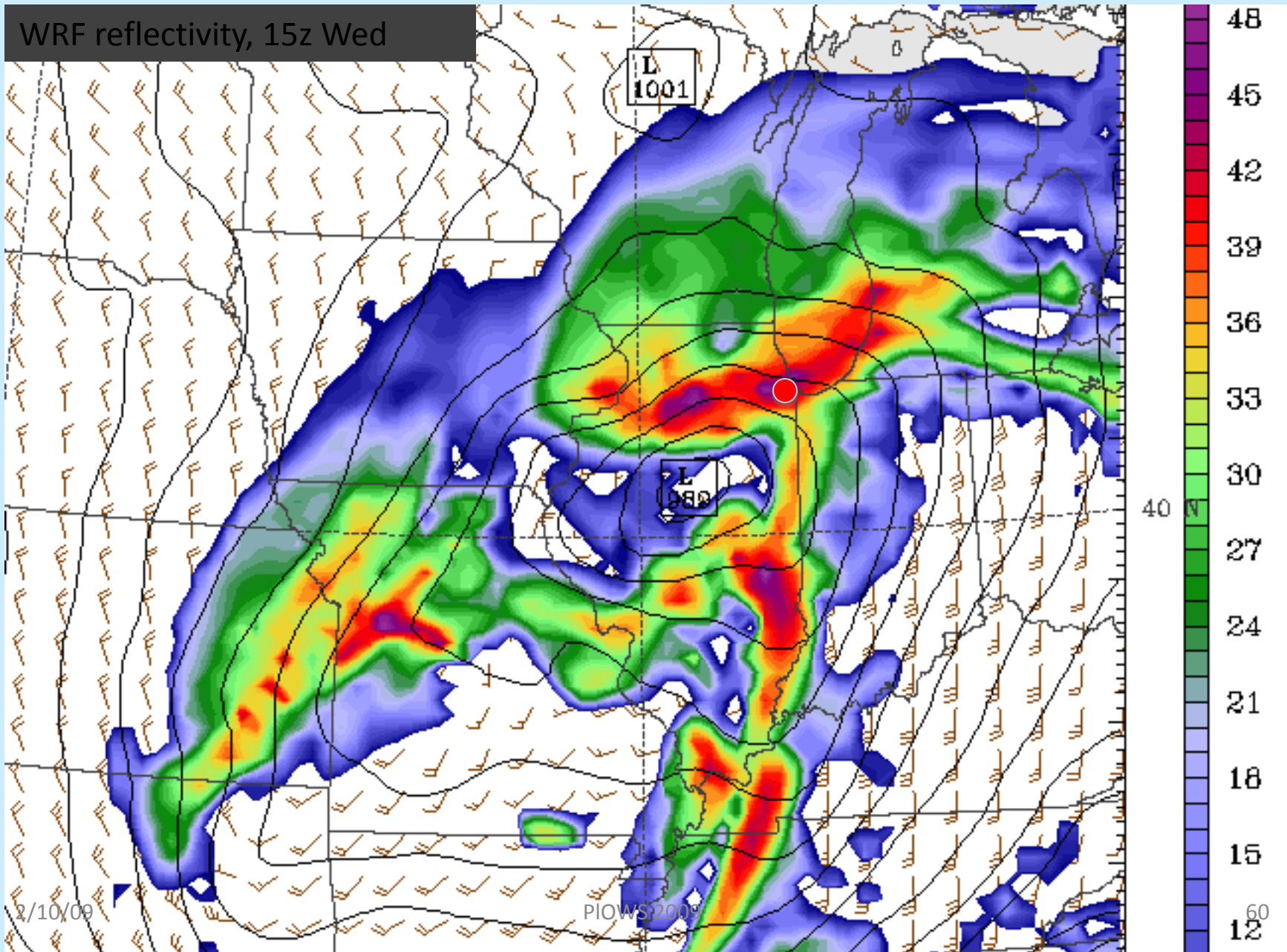
THU Feb 12 2009 0000V036 NAM 20km (PMSL NONE) Sea Level Pressure  
THU Feb 12 2009 0000V036 NAM 20km (25.4P03M NONE) 3 hour Total Precip (inch)

NAM forecast valid 03z Thu :: MSL pressure, 3h precipitation



# 12z WRF runs @ UIUC

# Warm adv. precip could be heavy



# reflectivity *valid 23z Wed.*

