HPC Winter Weather Desk Operations and 2011 Winter Weather Experiment

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Winter weather focal point

with contributions from Keith Brill, David Novak, and Mike Musher

Presentation Goals

- **Overview of HPC's Winter Weather Desk (WWD) operations and collaboration**
- **Recent changes in WWD product suite**
- **HPC WWD verification**
- **2011 HPC Winter Weather Experiment**

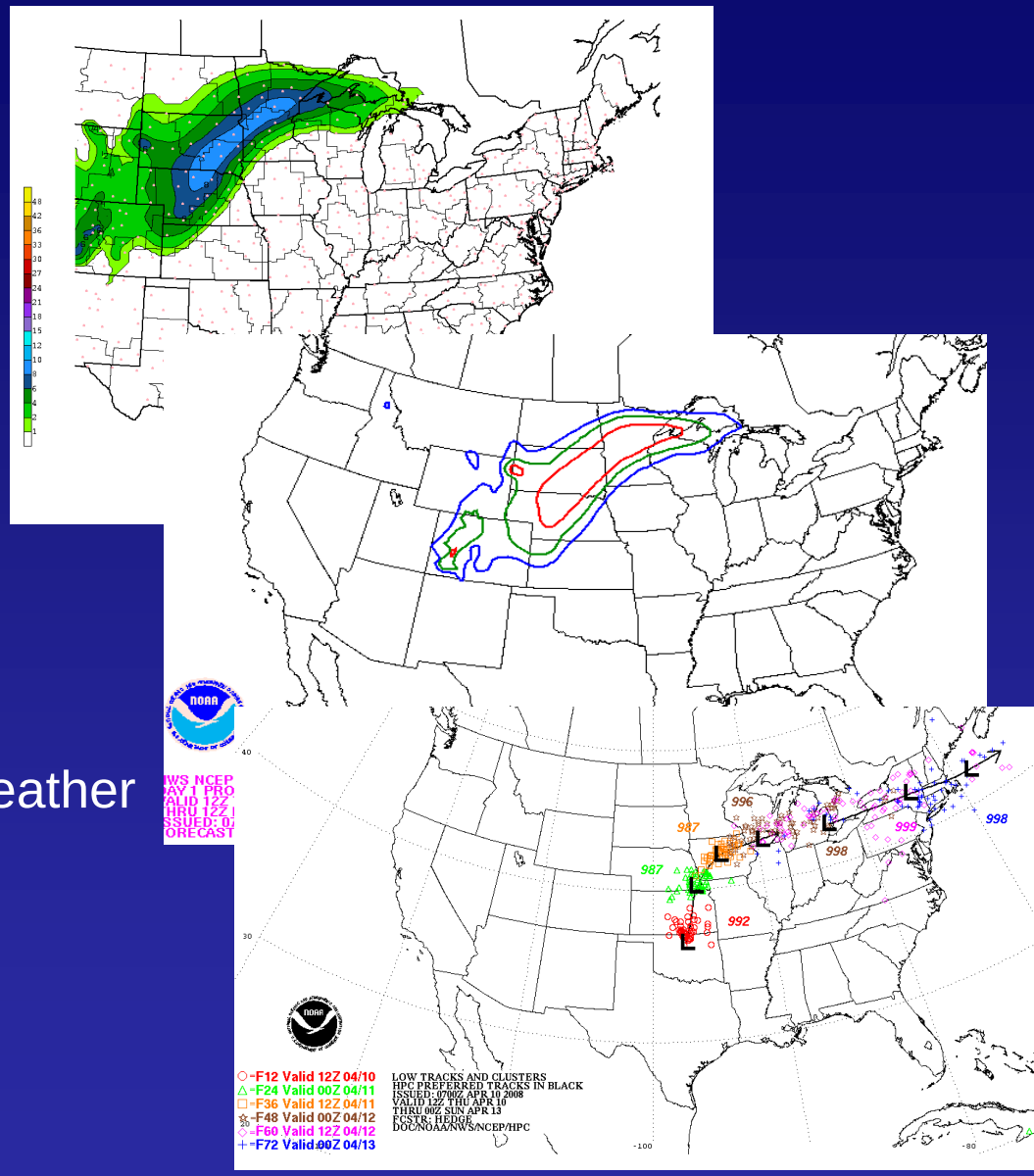
HPC Winter Weather Desk (WWD) Overview

Internal deterministic
6-hr snow /sleet /ZR / SLR
grids & graphics
http://www.hpc.ncep.noaa.gov/wwd/internal/

Public products:
24 hr probabilities for:
Snow/Sleet: 4, 8 and 12 in.
Freezing Rain: 0.25 in

Track forecasts for surface lows
associated w/ significant winter weather

Heavy Snow and Ice Discussion
(QPFHSD)

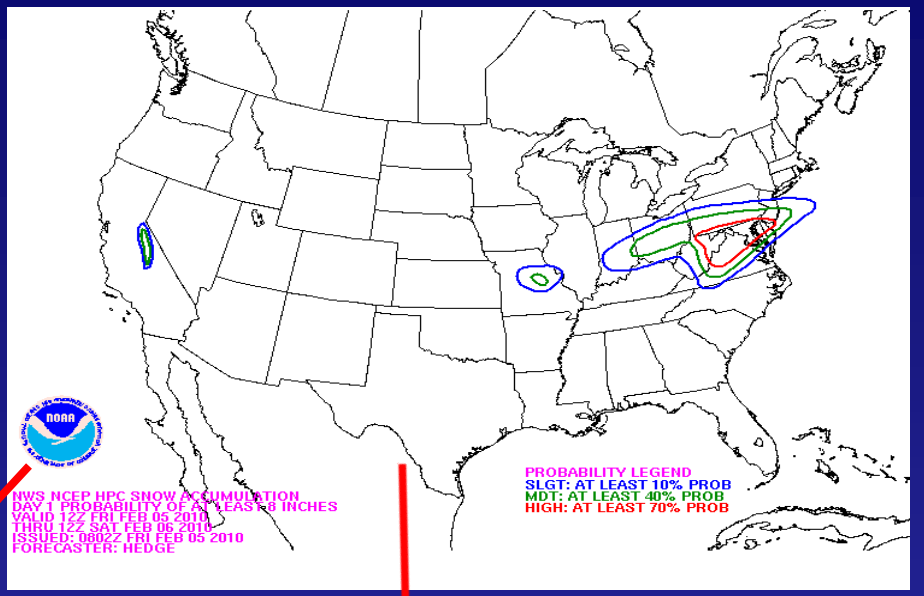


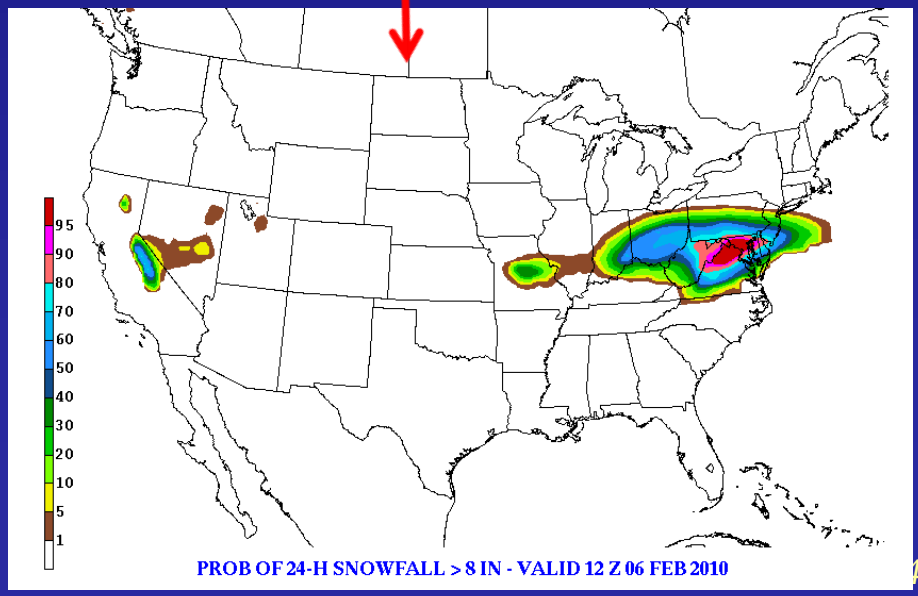
http://www.hpc.ncep.noaa.gov/wwd/winter_wx.shtml

2010-11 WWD Changes

Expand Probabilistic Snow and Ice Forecast Suite

Combine HPC deterministic forecast with model/ensemble forecasts to derive forecasts for probabilistic snowfall (1, 2, 4, 6, 8, 12, 18”) and ice (freezing rain 0.01, 0.10, 0.25, 0.5”) accumulations

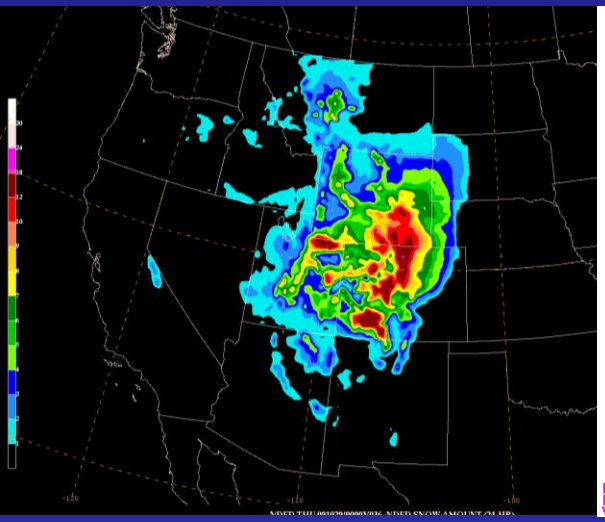


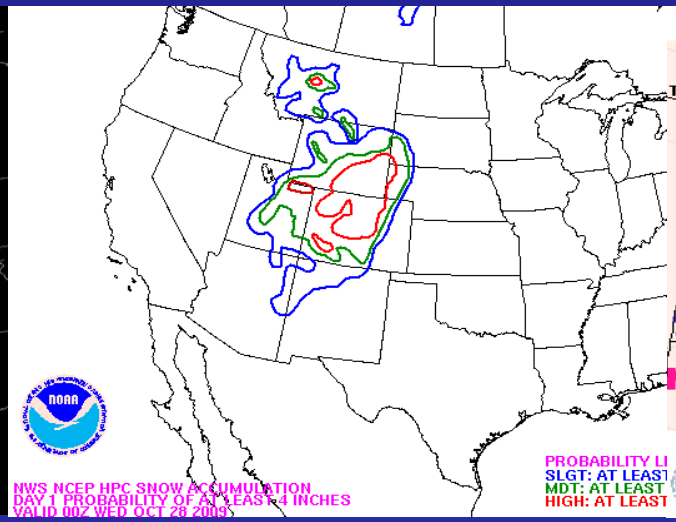


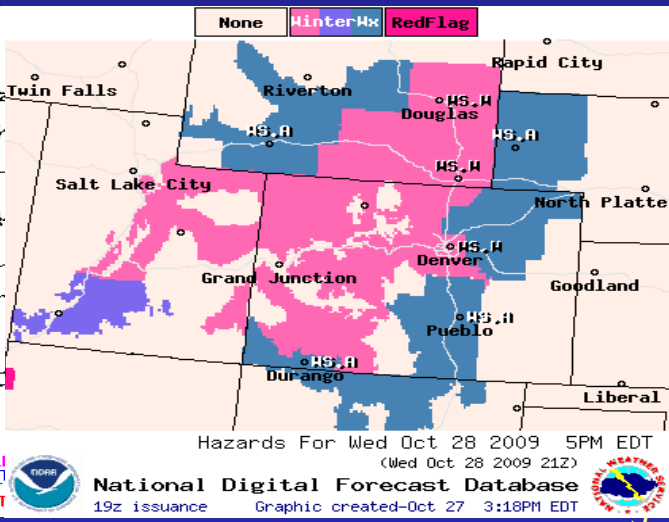
WWD Collaborative Forecast Process

HPC/WFO Collaboration via 12 planet, phone, and/or event conference calls.

- WFO input used to modify HPC public snow/ice probabilistic forecasts
- HPC input used to modify grids within GFE to produce local forecast
- Results in final collaborated forecast







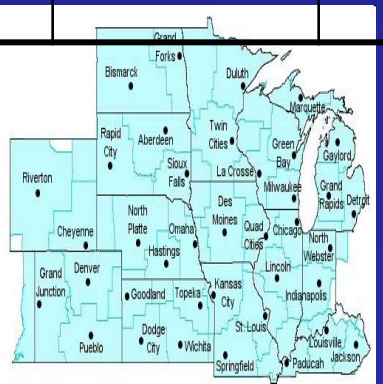
Collaboration Details
2010-11 season summary

224 questions from WFOs via 12Planet

22 telephone calls from WFOs

5 Conference Calls

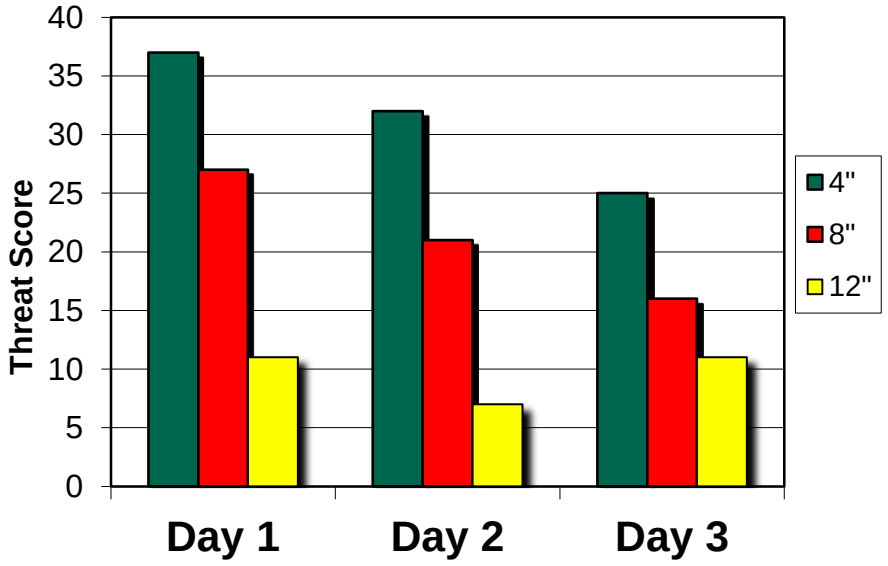
	WR	SR	CR	ER
#12 Planet inquiries	15	21	79	108
# phone calls	0	4	2	16
#conference calls	0	1	3	1

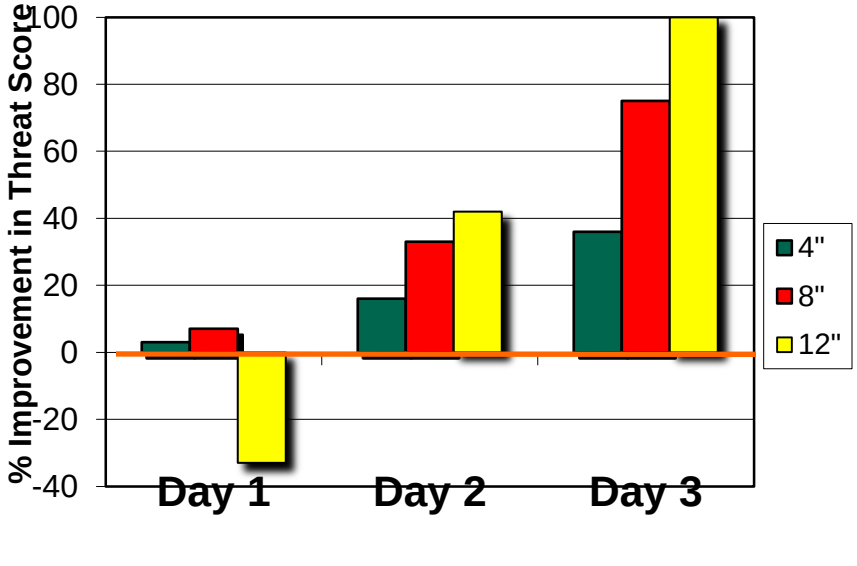


2010-11 Winter Weather Desk (WWD) Verification

HPC Deterministic Snowfall Forecast

East of the Rockies

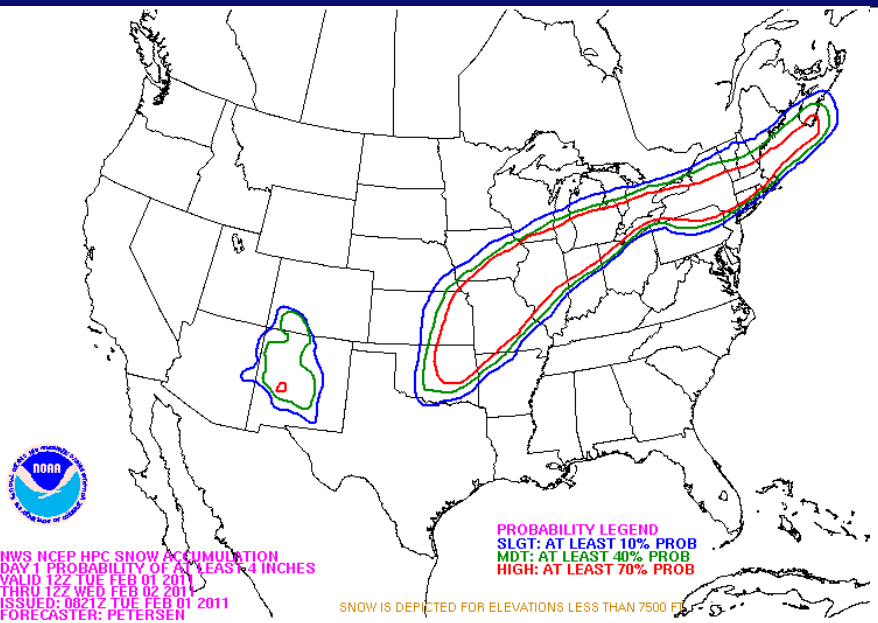


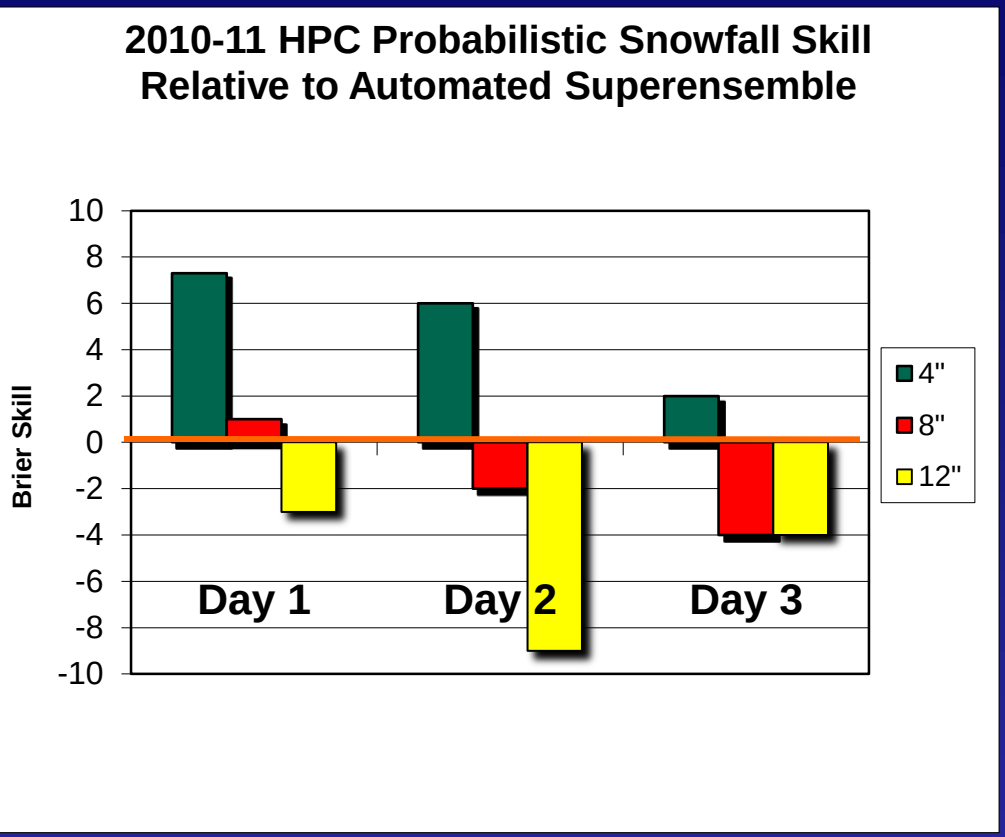


HPC generally improves upon model and ensemble guidance

Automated Superensemble: 0.8*(SREF members, GFS, NAM, ECMWF, ECMWF mean,CMC) + 0.2*(GEFS mean)

HPC Categorical Probabilistic Snowfall

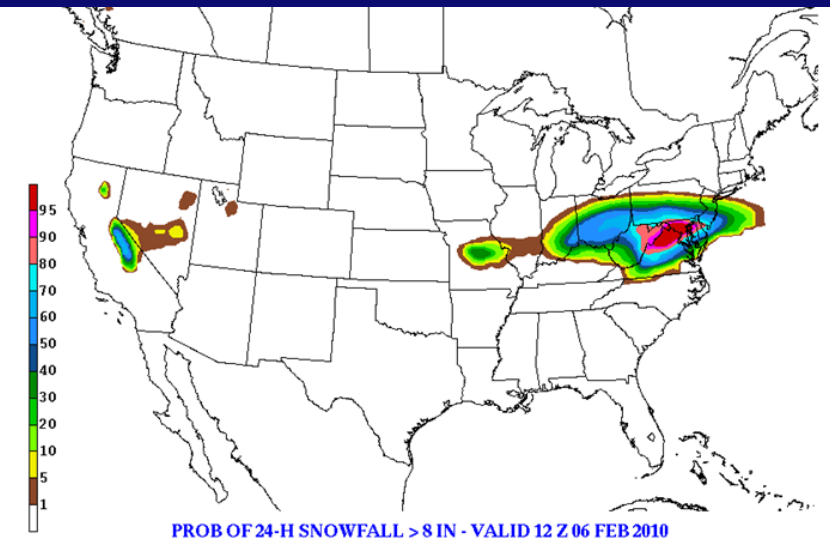


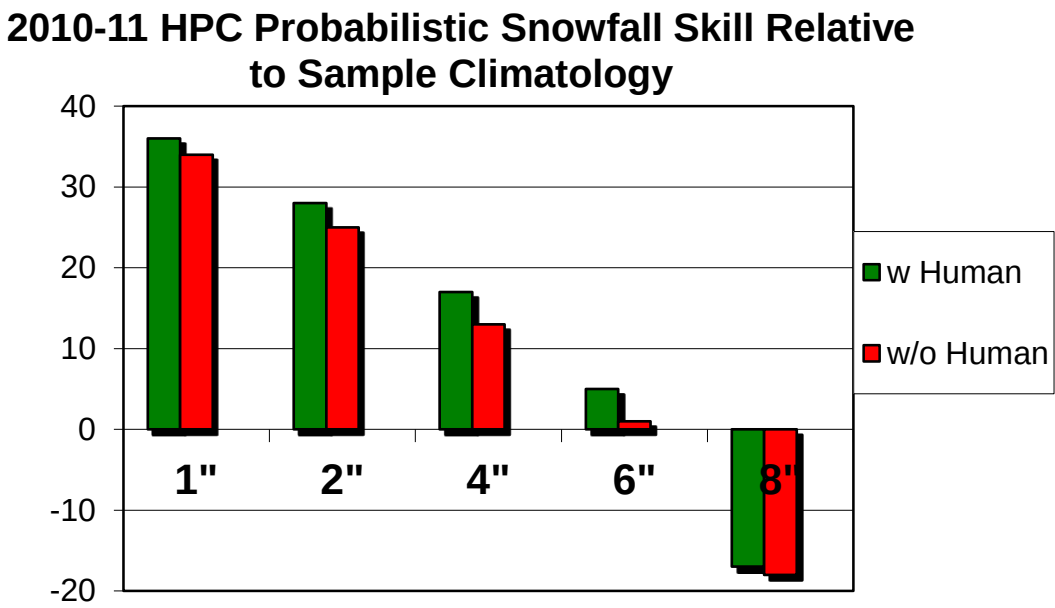


HPC forecaster edits degraded the skill of the higher accumulations thesholds

Automated Superensemble: 0.8*(SREF members, GFS, NAM, ECMWF, ECMWF mean, CMC) + 0.2*(GEFS mean)

HPC Continuous Probabilistic Snowfall





- Including human forecast in calculation of product makes positive improvement at all thresholds

- Probabilistic skill for thresholds at or below 6”

Inaugural Winter Weather Experiment
Jan 10 – Feb 11, 2011

- 14 participants
- Weather Forecast Offices (Sterling, La Crosse WI), SPC, AWC, HPC, EMC, ESRL, and COMET

GOALS

- Can high-resolution models add value for Day 1 ptype and amount forecasts?

- Can we better quantifying and communicate winter weather uncertainty for Day 1-2 forecasts?

Winter Weather Experiment
Jan 10 – Feb 11, 2011

Experimental Guidance

	Day 1	Day 2
HRW-ARW	**x**	
HRW-NMM	**x**	
NMMB nest	**x**	**x**
NAM Rime Factor	**x**	**x**
ECMWF snow	**x**	**x**
SREF	**x**	**x**
HPC Superensemble	**x**	**x**

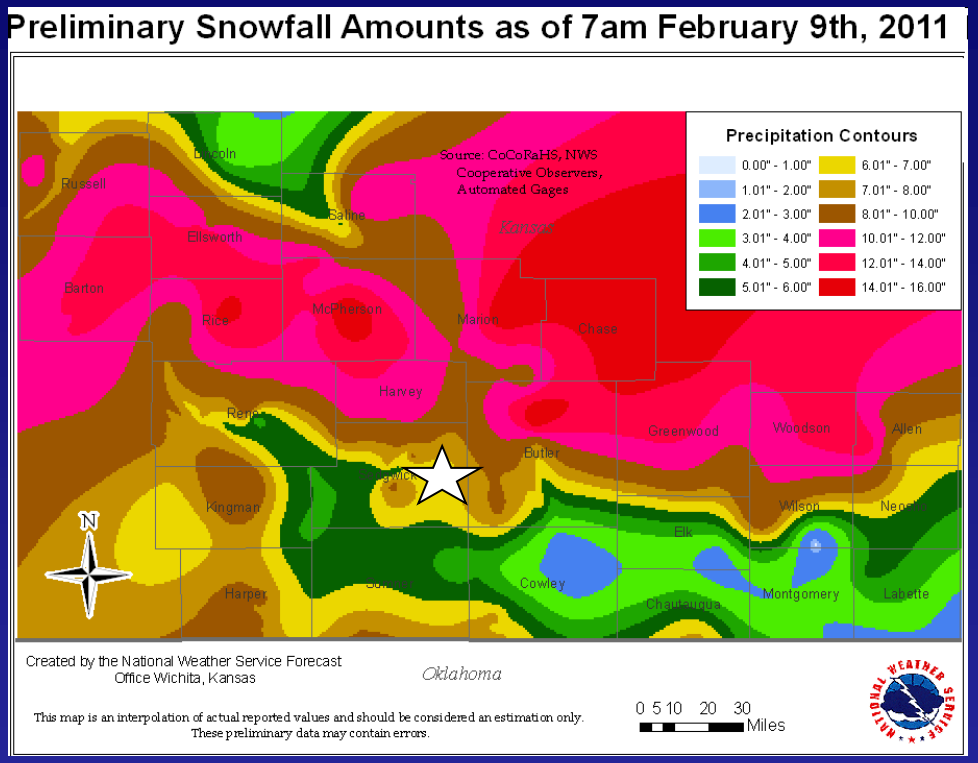
Activities

24 hr accumulated snow and ice forecasts for Day 1&2

Forecast Confidence Discussion

Model evaluation of precipitation type and amounts

Comparison of analyzed 24 hr snowfall vs model 36 hr forecasts from 00z 08 Feb 2011

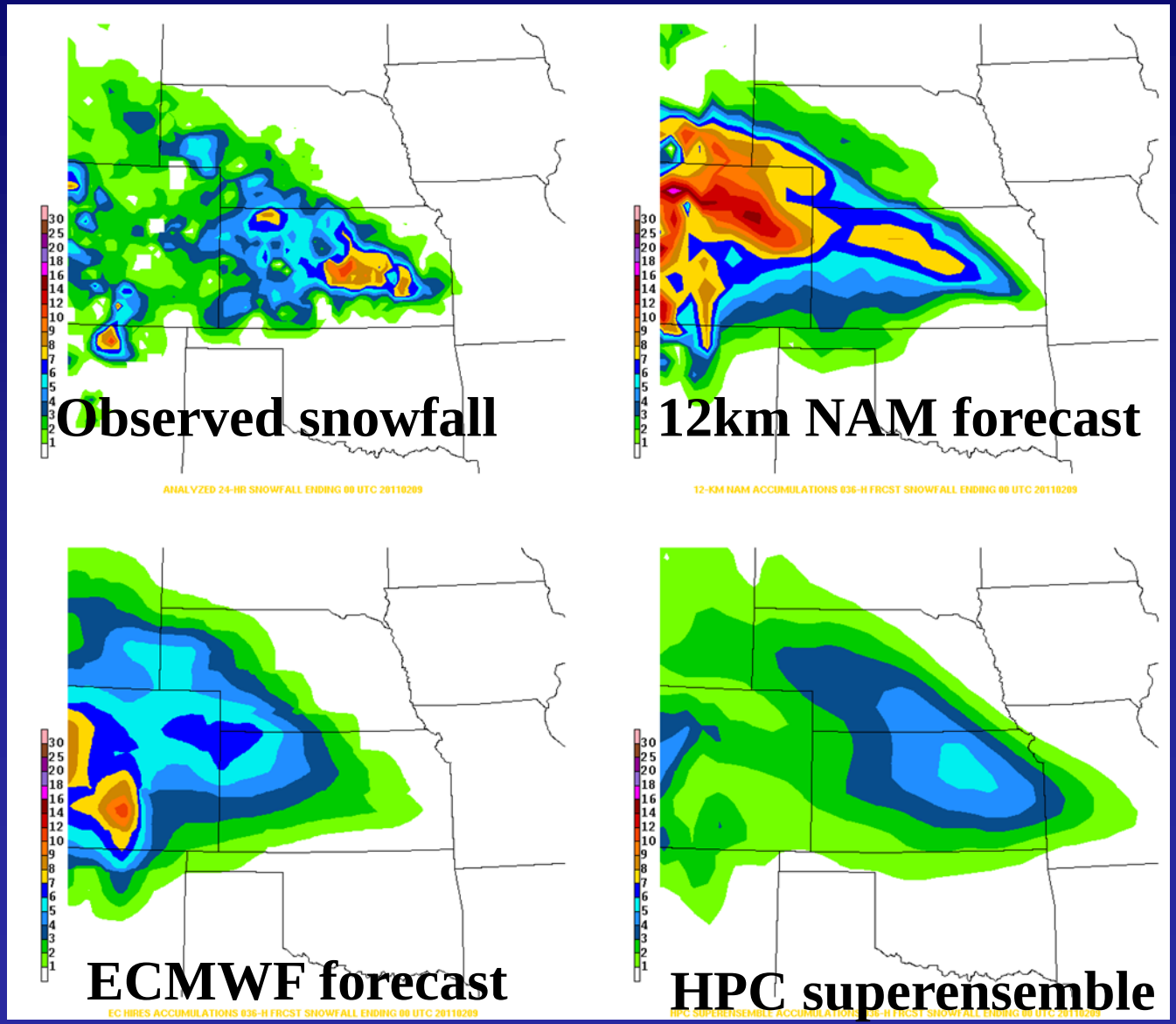


★ **Location of Wichita KS**

Area of 10-16” of snow in central KS

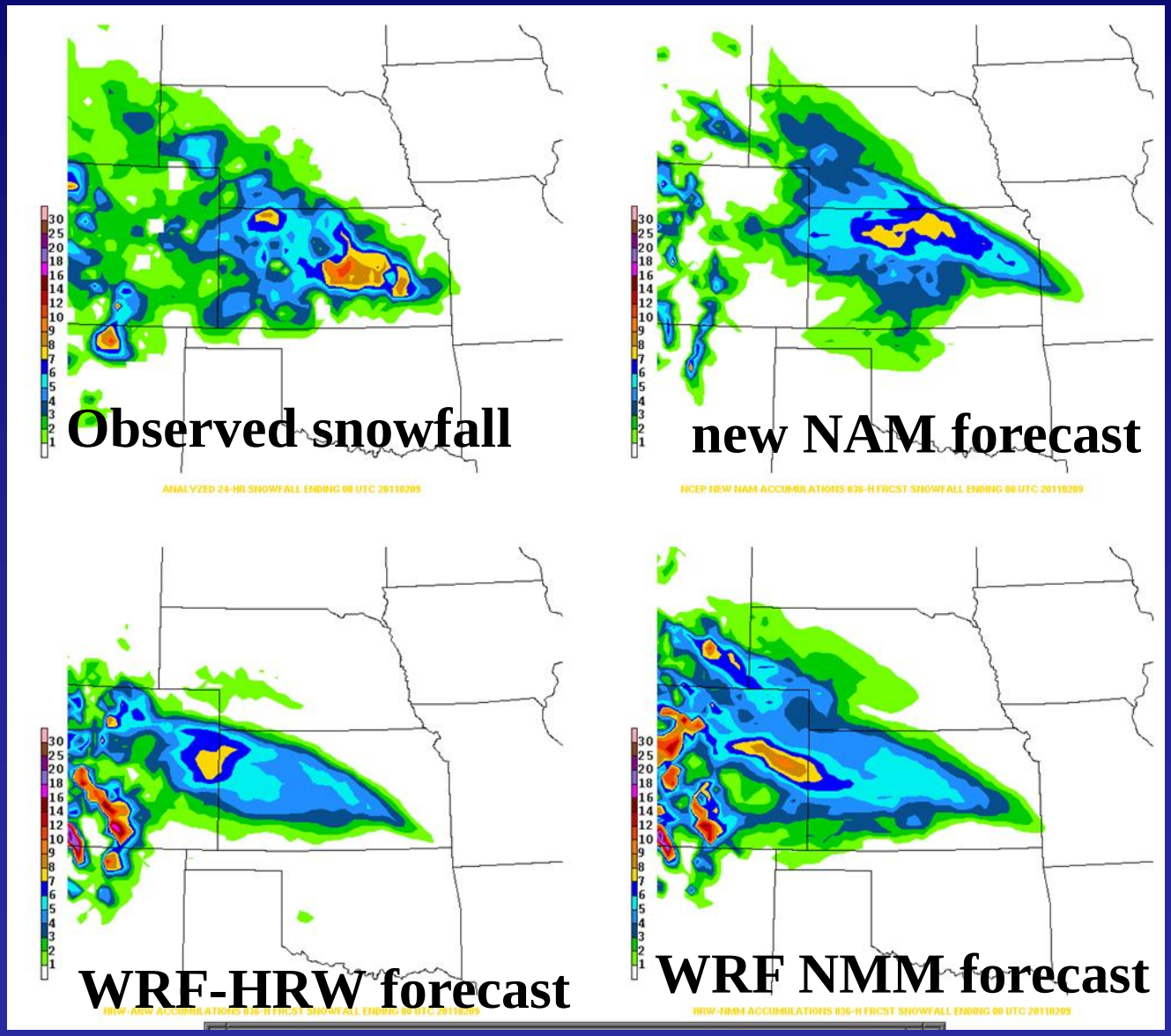
Analysis courtesy WFO Wichita KS

Comparison of analyzed 24 hr snowfall vs model 36 hr forecasts from 00z 08 Feb 2011



Analysis and forecast ending time 00z 09 Feb 2011

Comparison of analyzed 24 hr snowfall vs model 36 hr forecasts from 00z 08 Feb 2011



Analysis and forecast ending time 00z 09 Feb 2011

Winter Weather Experiment Results

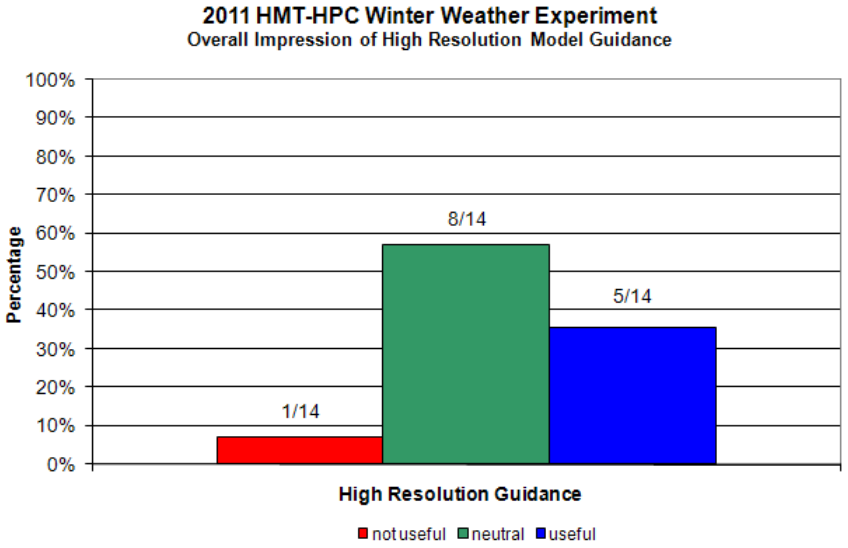
Can high-resolution models improve Day 1 forecasts of precipitation type and amount?

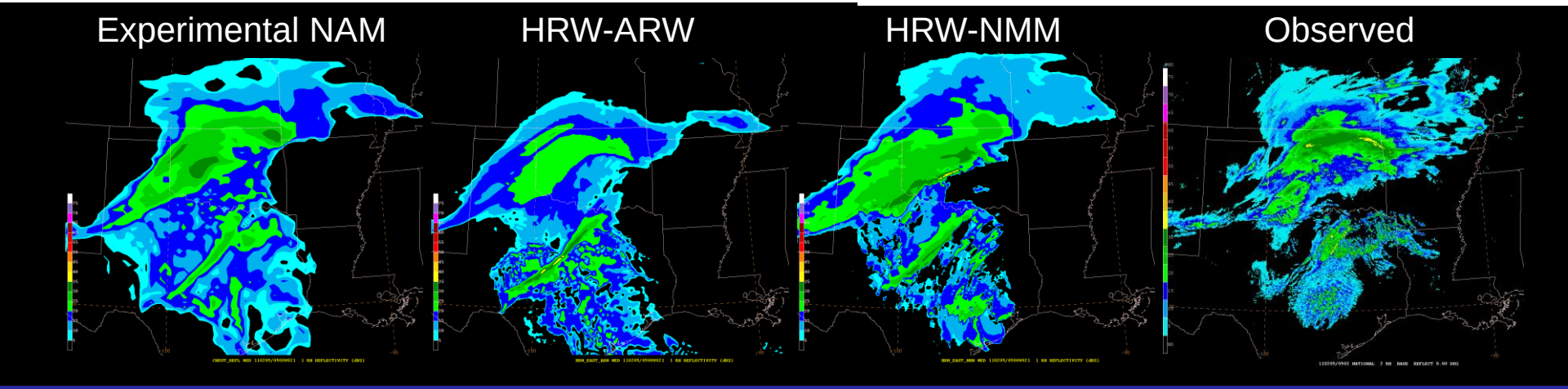
Pros:

- Improved orographic precipitation, lake effect
- Visualizing temporal evolutions
- Providing unique fields (simulated reflectivity).

Cons:

- Overall amounts not superior to operational





Summary

- **Winter Weather Desk (WWD) provides skillful deterministic snowfall forecasts**
- **WWD categorical probabilistic forecast edits did not improve upon most accumulation thresholds, so fewer edits will be done this year to the automated multi-model/multi-ensemble probabilities**
- **Including the human's deterministic forecast improves the continuous probability forecasts**
- **WWD is a resource for forecast collaboration, including chats and phone/conference calls**

Summary
2011-12 plans and references

- **2011-12 Expansion of continuous probabilistic snow and ice forecasts to include 48 hour totals (event perspective)**

- **UKMET will be added to suite of available models in forecast**

- **Another winter weather experiment will be conducted over the winter of 2011-12 (increase WFO involvement)**

Heavy snow continuous probability forecasts
www.hpc.ncep.noaa.gov/pwpf_24hr/wwd_24hr_probs_sn.php

Freezing rain continuous probability forecasts
www.hpc.ncep.noaa.gov/pwpf_24hr/wwd_24hr_probs_zr.php

Gridded continuous probability forecasts can be obtained at
ftp://ftp.hpc.ncep.noaa.gov/pwpf/conus/pwpf_24hr

Winter weather experiment summary results are available at
www.hpc.ncep.noaa.gov/hmt/HMT_HPC_WWE_Summary_Final.pdf

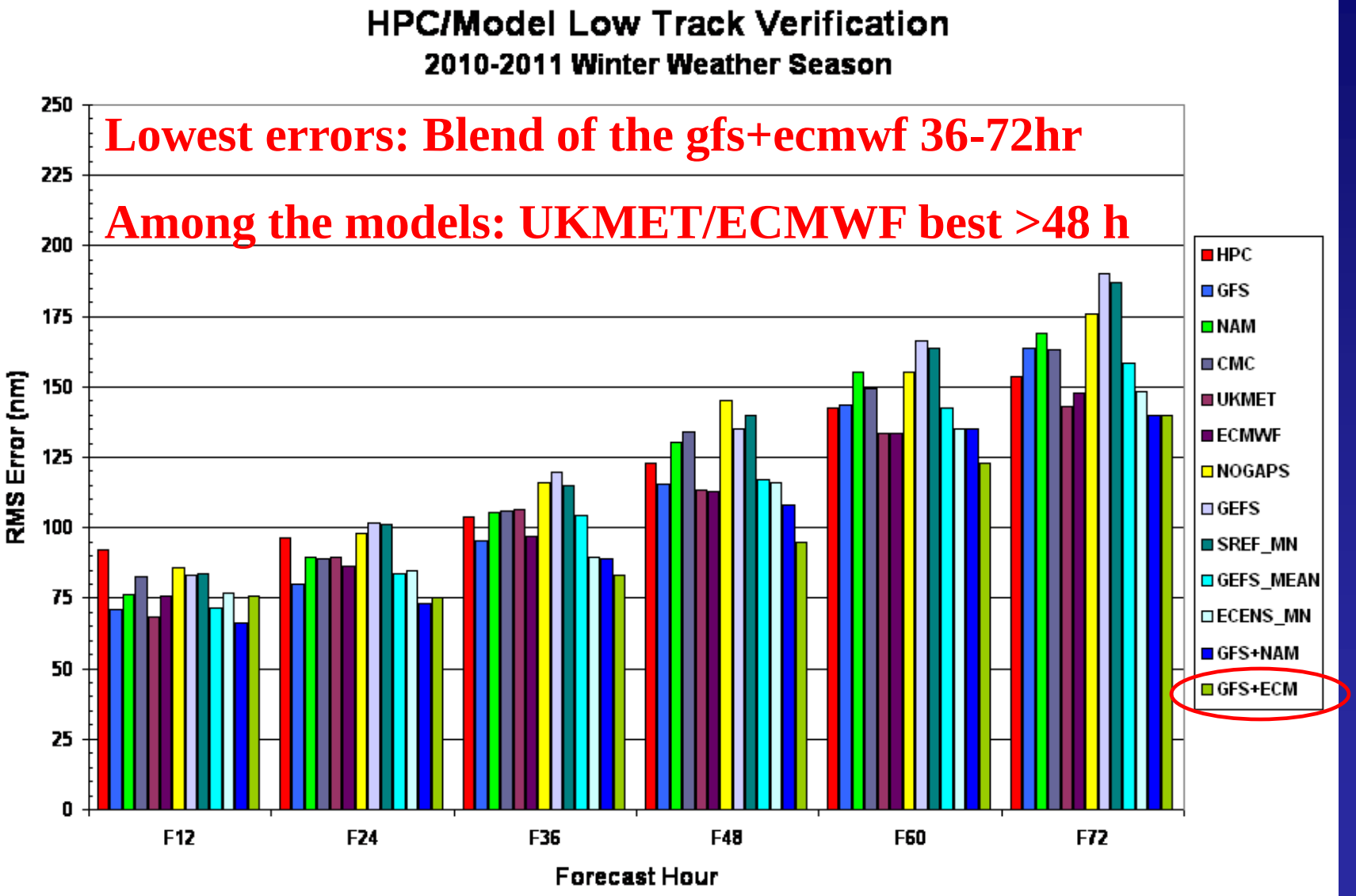
Questions or comments?

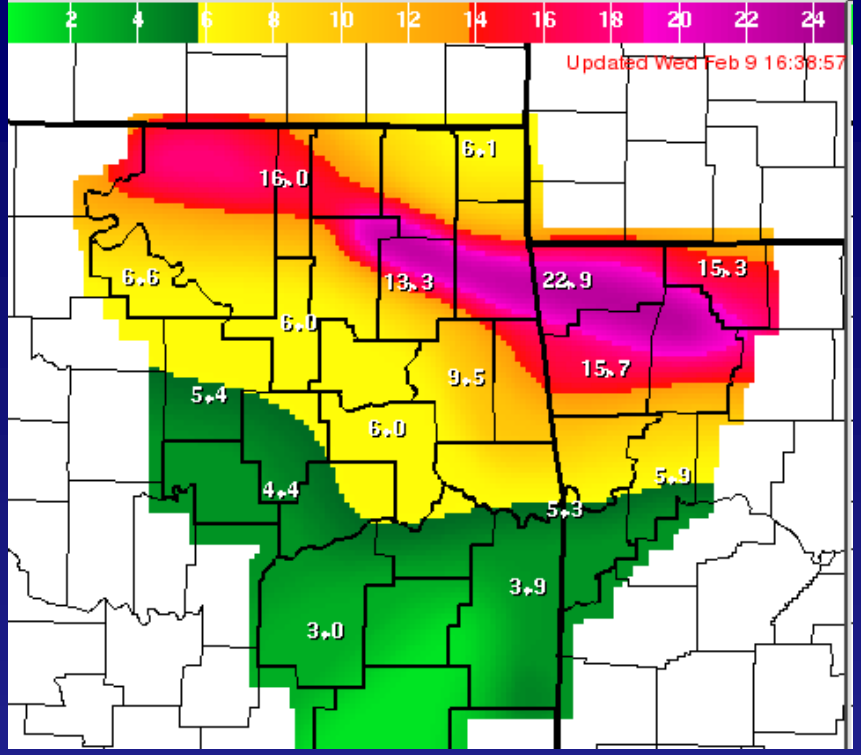
Dan.Petersen@noaa.gov

HPC Forecast Operations desk

(301) 763-8201

2010-11 Verification of HPC low tracks (position at each forecast hour)





New Oklahoma All-Time Record 24-hour Snowfall: 27" in Spavinaw, OK February 9, 2011

Analysis courtesy WFO Tulsa OK

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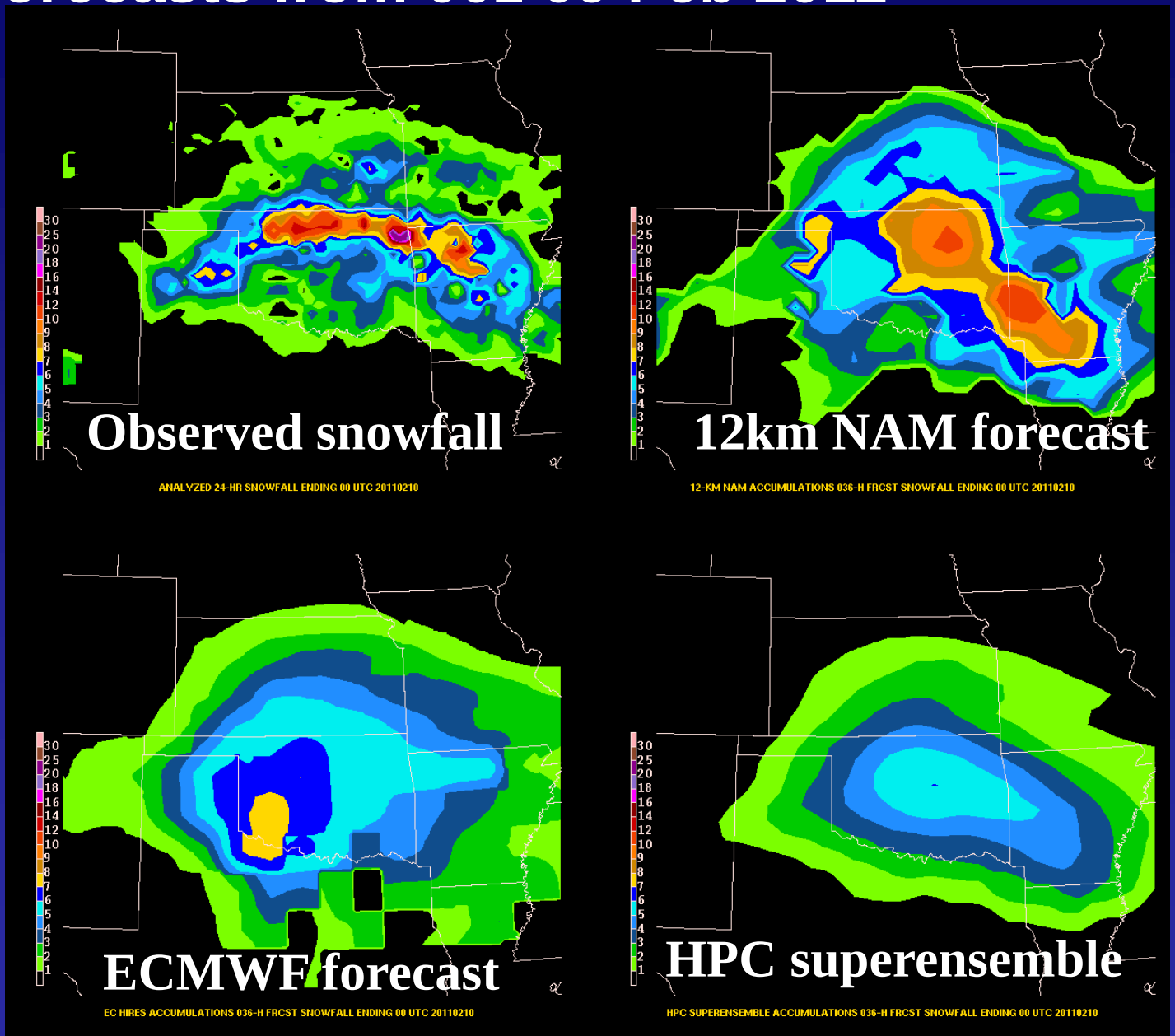

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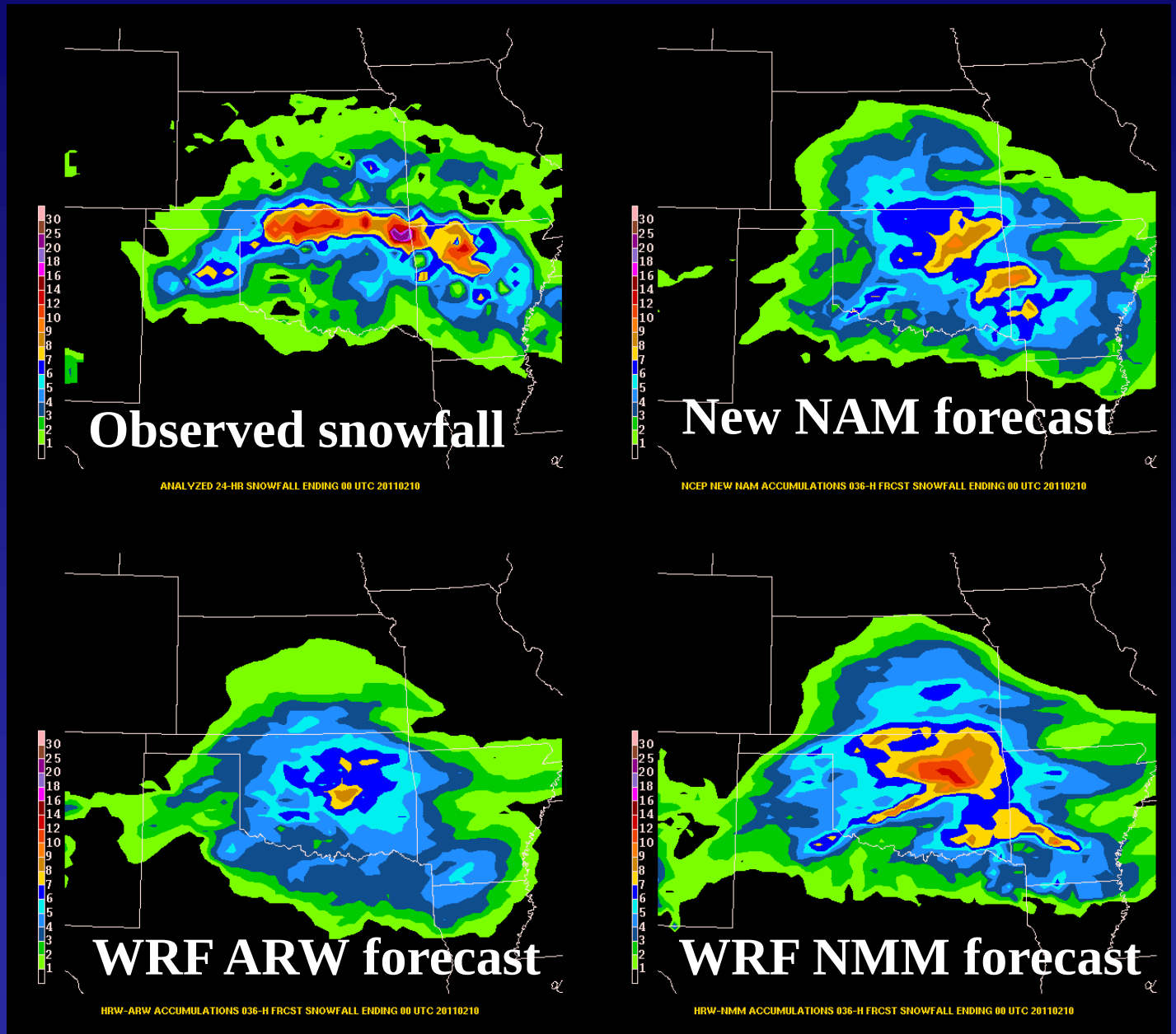

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