



The Growing Challenge: Consistency

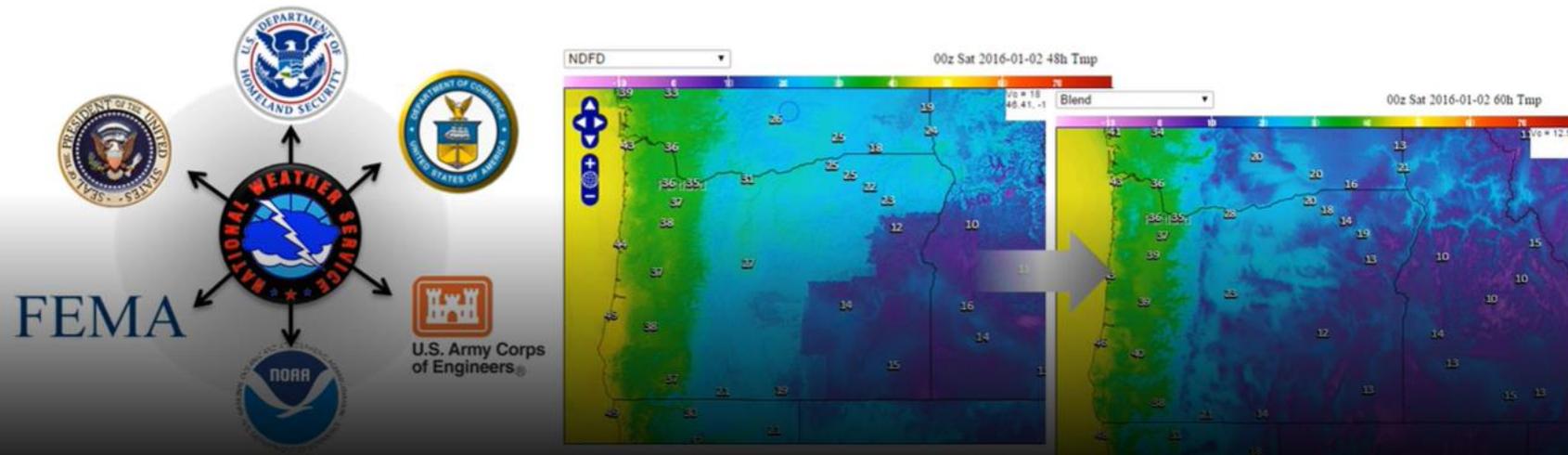
Issue: Local forecast offices work primarily to serve local user requirements.
How are state, regional, and national needs being addressed?

Consequence: Inconsistencies from office to office or across Regional lines can lead to challenges for Impact-based Decision Support Services on the state, regional & national scale.

What do our partners think when they see sharp changes in our forecast grids?

It impacts their confidence in our forecasts

Need: To develop nationally consistent methodologies





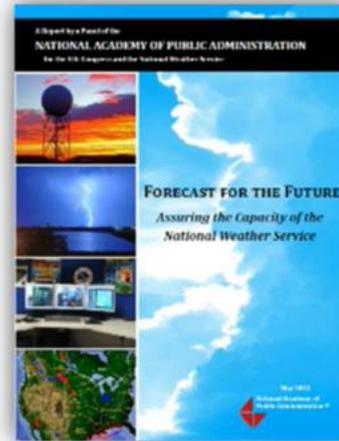
Origins of the National Blend

REASONING

Local / Regional Model Blend Initiatives



NAPA Report



WRN Roadmap



FUNDING



Sandy Supplemental JPSS Gap Mitigation:
projects that make better use of existing model data



National Blend of global Models (NBM)



Objective: To create a nationally consistent and skillful common starting point for producing the National Digital Forecast Database (NDFD) grids

Project Goals:

- Through an integrated and structured approach
 - Develop a set of gridded guidance products for NDFD weather elements based on NWS and non-NWS deterministic and ensemble model information
 - Create a methodology for a national blend from multiple models, optimized for the Day 3-8 time frame and extensible to all NDFD elements covering days 1-10





Development Scope



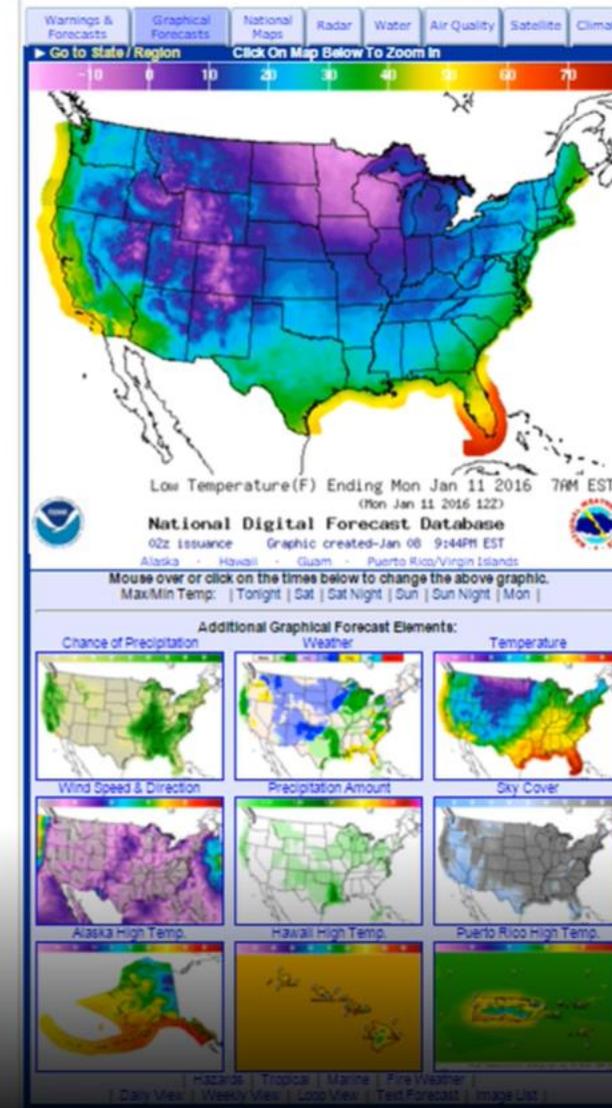
NBM being developed to have the same weather elements available in the National Digital Forecast Database (NDFD)

Version 1, Jan 6, 2016:

- Temperature
- Dewpoint
- Daytime Max T and Nighttime Min T
- Sky Cover
- Wind Speed/Direction
- Wind Gusts
- Relative Humidity
- Apparent Temperature

Version 2 elements (Fall 2016):

- Probability of Precipitation (POP)
- Precipitation Type
- Snowfall Amount
- QPF
- Predominant Weather
- Add AK, HI, PR, Oceanic Winds





NBM Methodology



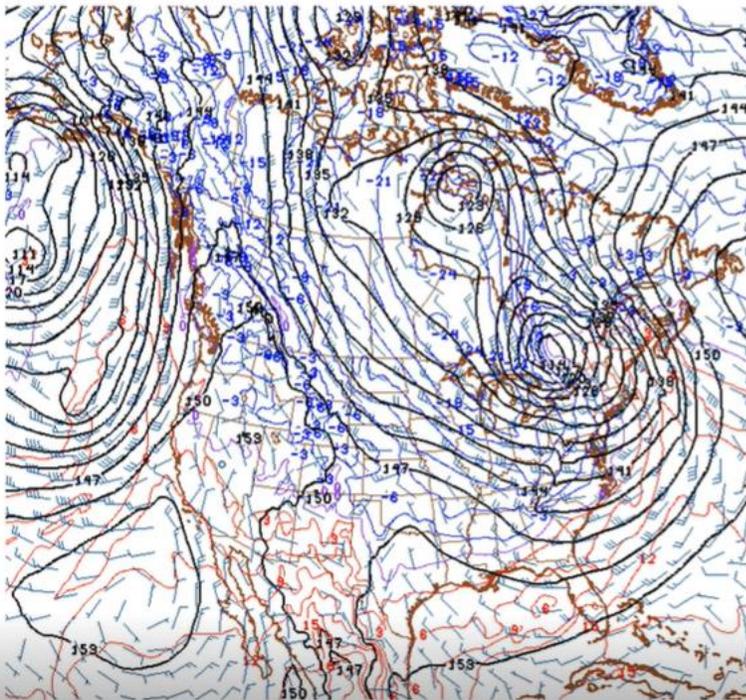
- NBM combines forecasts from multiple global numerical weather prediction models to create calibrated, blended guidance on the 2.5 km NDFD grid
- The 2.5 km UnRestricted Mesoscale Analysis (URMA) is used for calibration and verification
- Components are blended using an MAE-based weighting technique



NBM V1: Global Model Inputs



Products are generated on NOAA's Weather and Climate Operational Supercomputer System (WCSS)



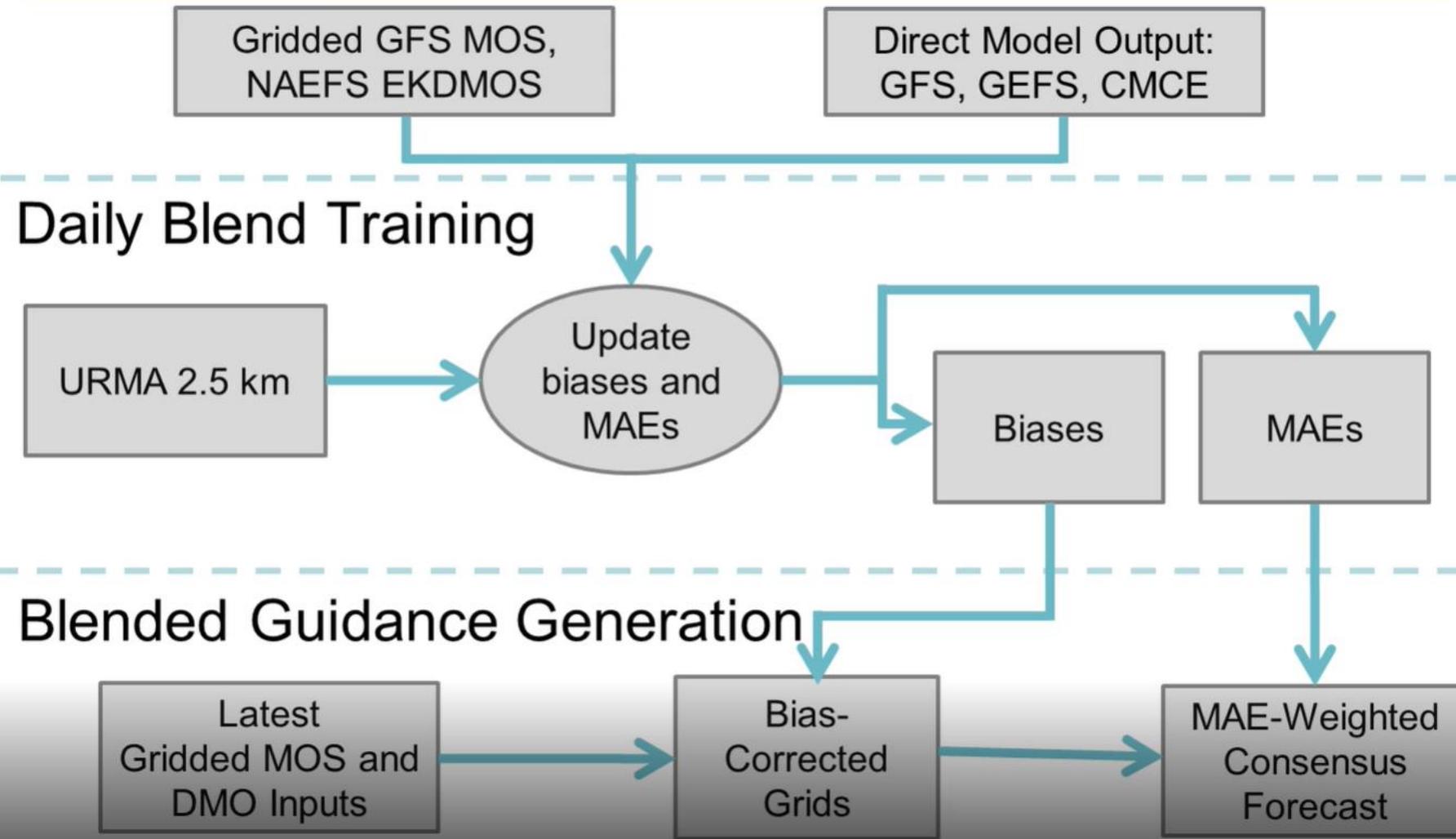
Initial efforts focused on blending global models

- Current global model inputs
 - GFS
 - GEFS Ensemble
 - CMC Ensemble
 - GFS MOS
 - EKDMOS (NAEFS-based)
- Considered for future versions
 - CMC
 - FNMOC - NAVGEM
 - BoM (Australian)
 - Mesoscale models

We are not using ECMWF model output in the National Blend due to data restrictions



Blend Inputs for Temperature Elements

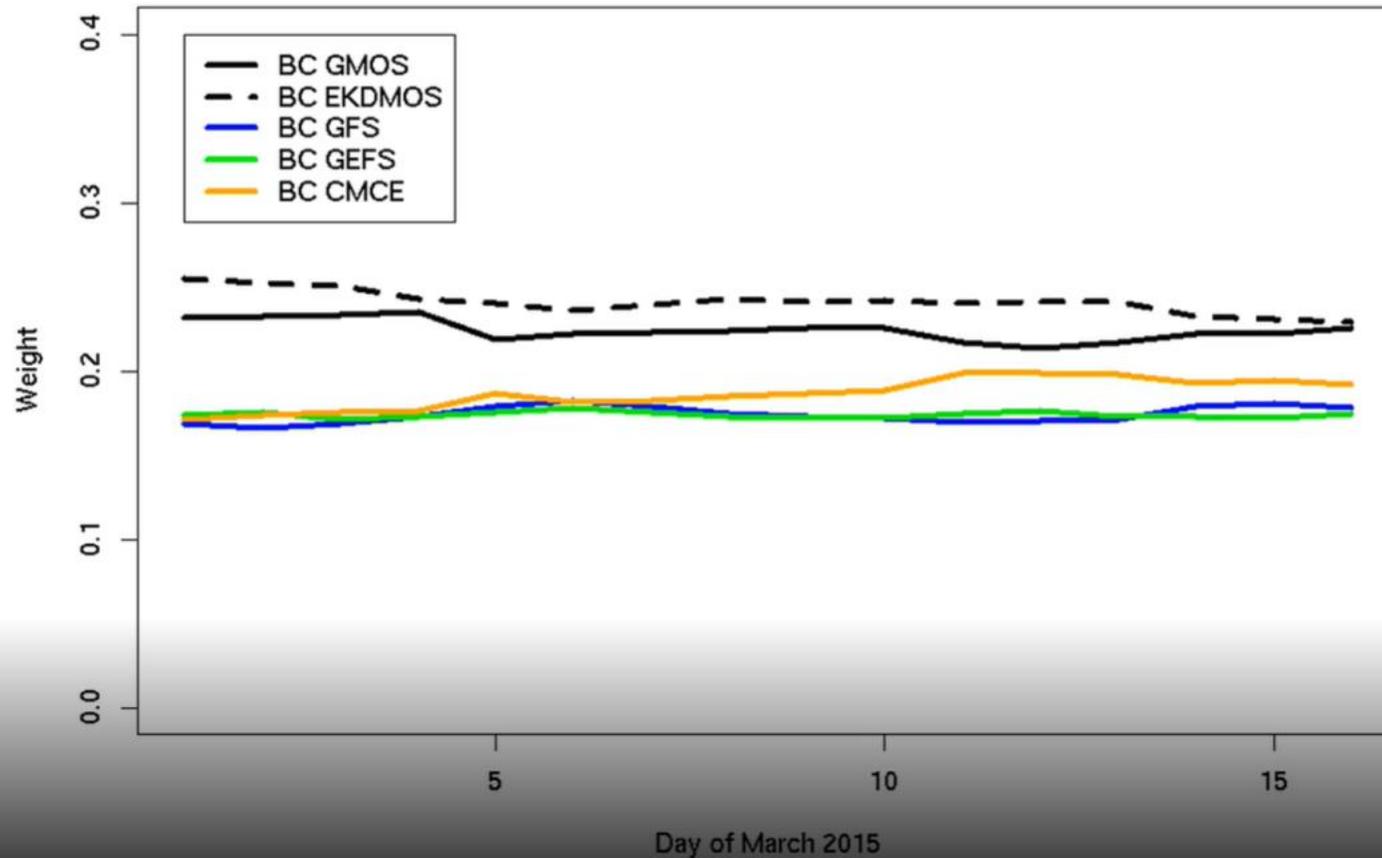




Atlanta, GA 2-m T Weights



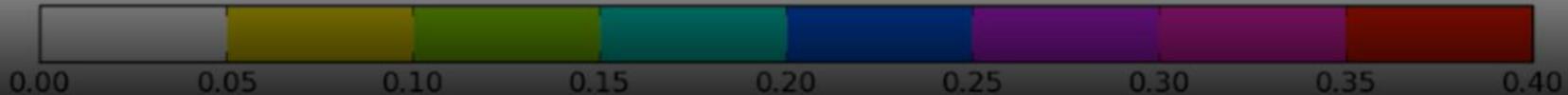
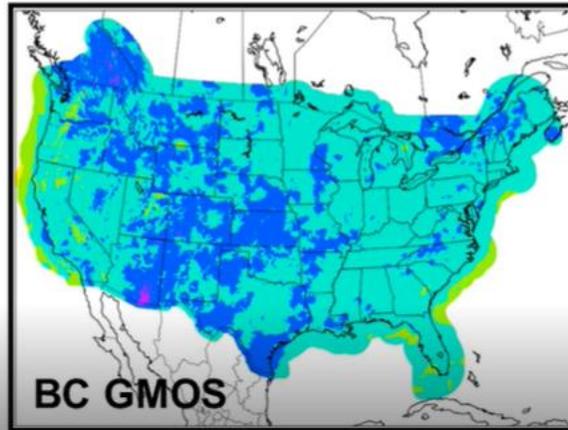
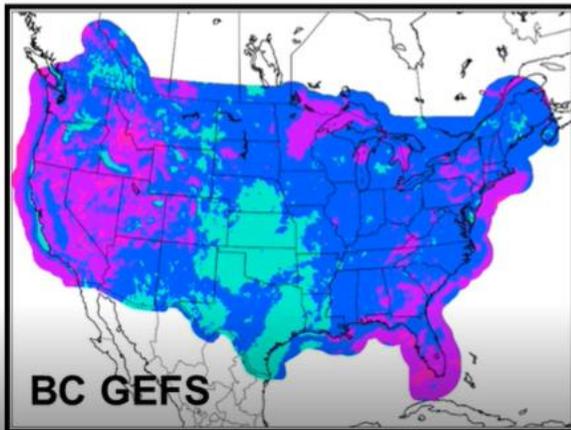
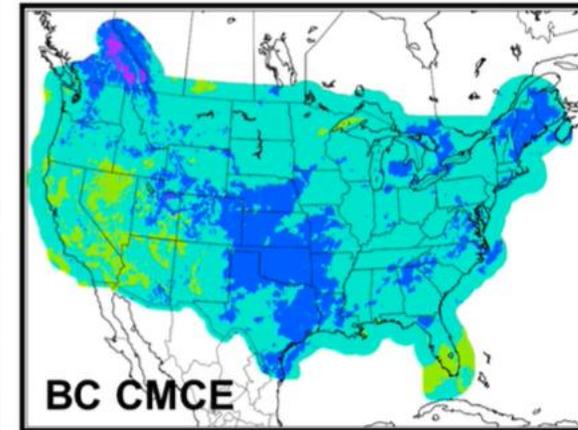
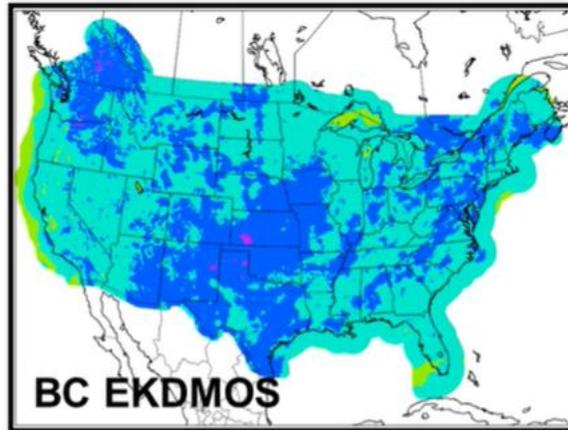
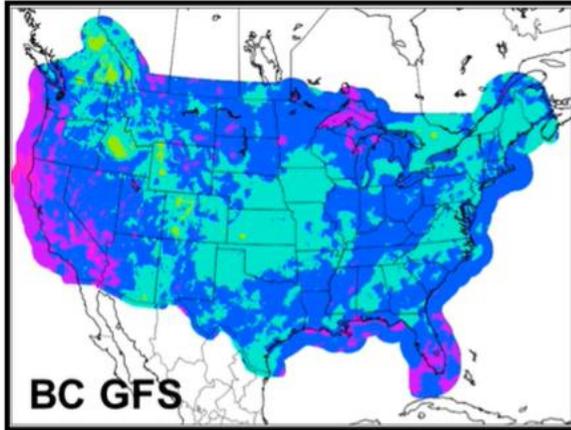
2-m T: 120-hr Forecast: Atlanta, GA





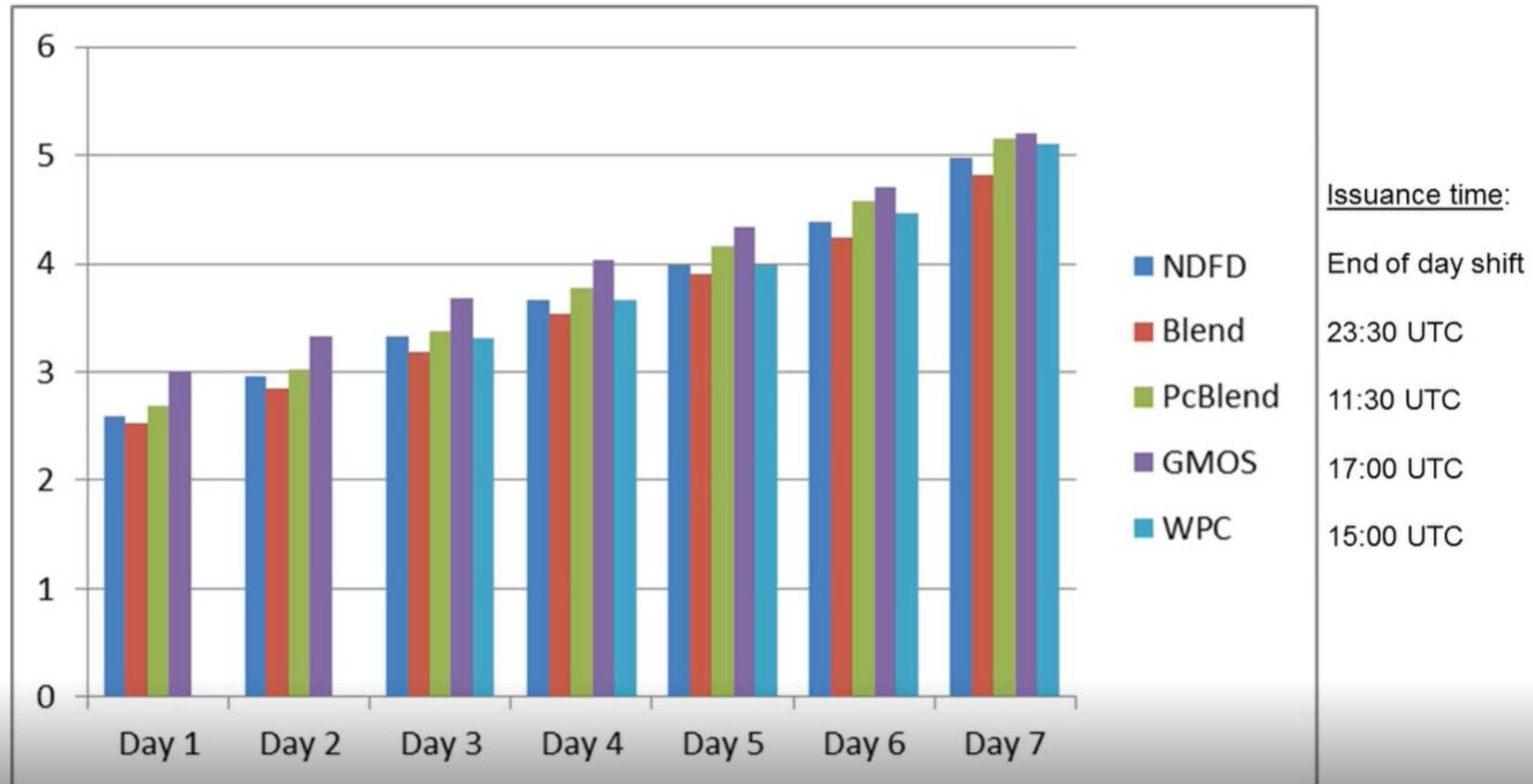
NBM Temperature Weights

16 Dec. 2015 00z F120



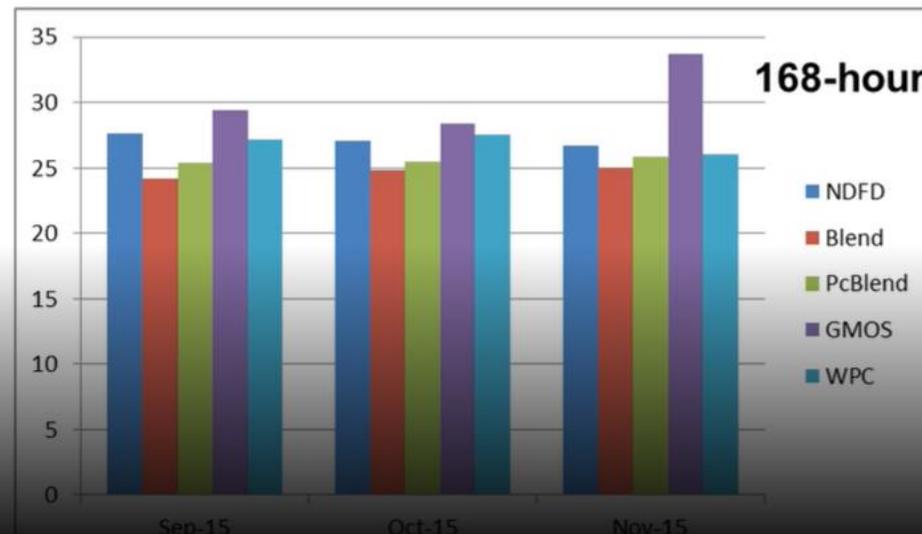


CONUS MaxT MAE (°F) – Nov. 2015





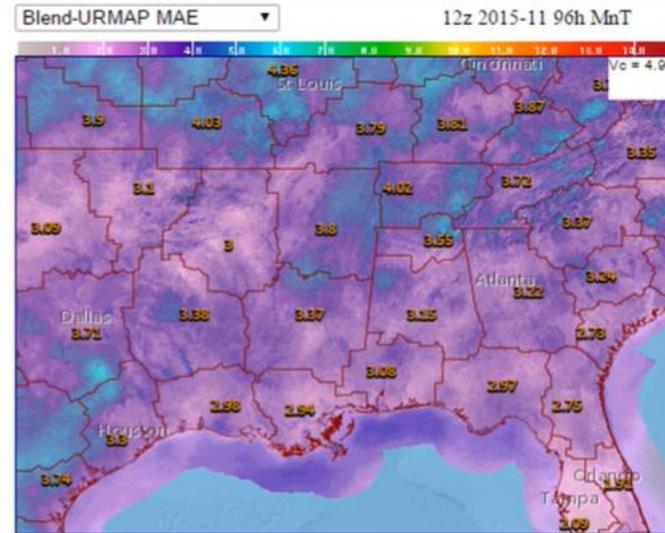
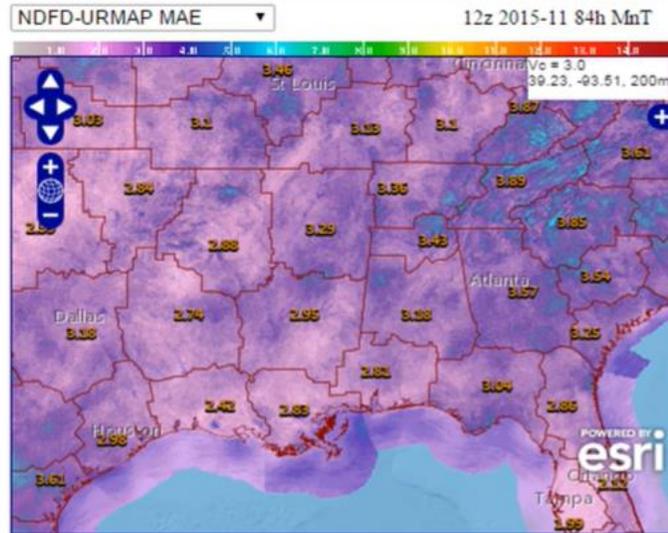
CONUS Sky Cover MAE (%)



Verifying analysis = URMA



November 2015 Day 4 MinT





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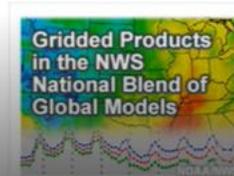
NBM COMET® Training

1. Introduction to the National Blend of Global Models (Sept. 2015)
2. Gridded Products in the NWS Blend of Global Models (Dec. 2015)
3. Statistical techniques and procedures (coming March 2016)
4. Product Verification (coming June 2016)



Lesson/Resource Listing » Description

Gridded Products in the NWS National Blend of Global Models



Languages: English
Publish Date: 2015-12-21
Skill Level: 1
Completion Time: 25 - 50 h
Includes Audio: no
Required Plugins: none
Topics:
Numerical Modeling (NWP)

Reviews:
★ ★ ★ ★ ★ (0 reviews)
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Technical Information Notice 15-50



<http://www.weather.gov/os/notif.htm>

Version 1 implemented 6 Jan 2016 on WCOSS as an experimental product

Guidance products for deterministic CONUS grids for these weather elements:

1. Sky cover (3-hourly)
2. 10-m Wind Direction (3-hourly)
3. 10-m Wind Speed (3-hourly)
4. 2-m Temperature (3-hourly)
5. 2-m Dewpoint Temperature (3-hourly)
6. Daytime Maximum Temperature
7. Nighttime Minimum Temperature
8. 2-m Relative Humidity (3-hourly)
9. 2-m Apparent Temperature (3-hourly)
10. Mean 10-m Wind Gust (3-hourly)

Runs 2x/day from 0000 and 1200 UTC model cycles for lead times from 6 hours to 192 hours in advance.

GRIB2 files available in the experimental area of NDGD on the NWS ftp server at:

<ftp://tgftp.nws.noaa.gov/SL.us008001/ST.expr/DF.gr2/DC.ndgd/GT.blend/AR.conus/>



Issues & Challenges

- Need nationally consistent foundational datasets: terrain, land/water masks, observation analyses – unified terrain across NWS applications coming in 2016
- Analysis of Record is a work in progress
- Not fully known how to properly blend or bias correct all needed weather variables
- Feedback from WFOs has noted problems with temperature inversions and mesoscale winds (downslope, ridge/valley)
- High bar for success in place with blending capabilities already at the Weather Prediction Center and the WFOs
- Downstream impacts to NBM will need to be considered with future model upgrades. Major changes may require us to calibrate an updated set of NBM weights that are implemented along with the model upgrade.



