

RTMA/URMA V2.5.0

Implementation Briefing

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Overview

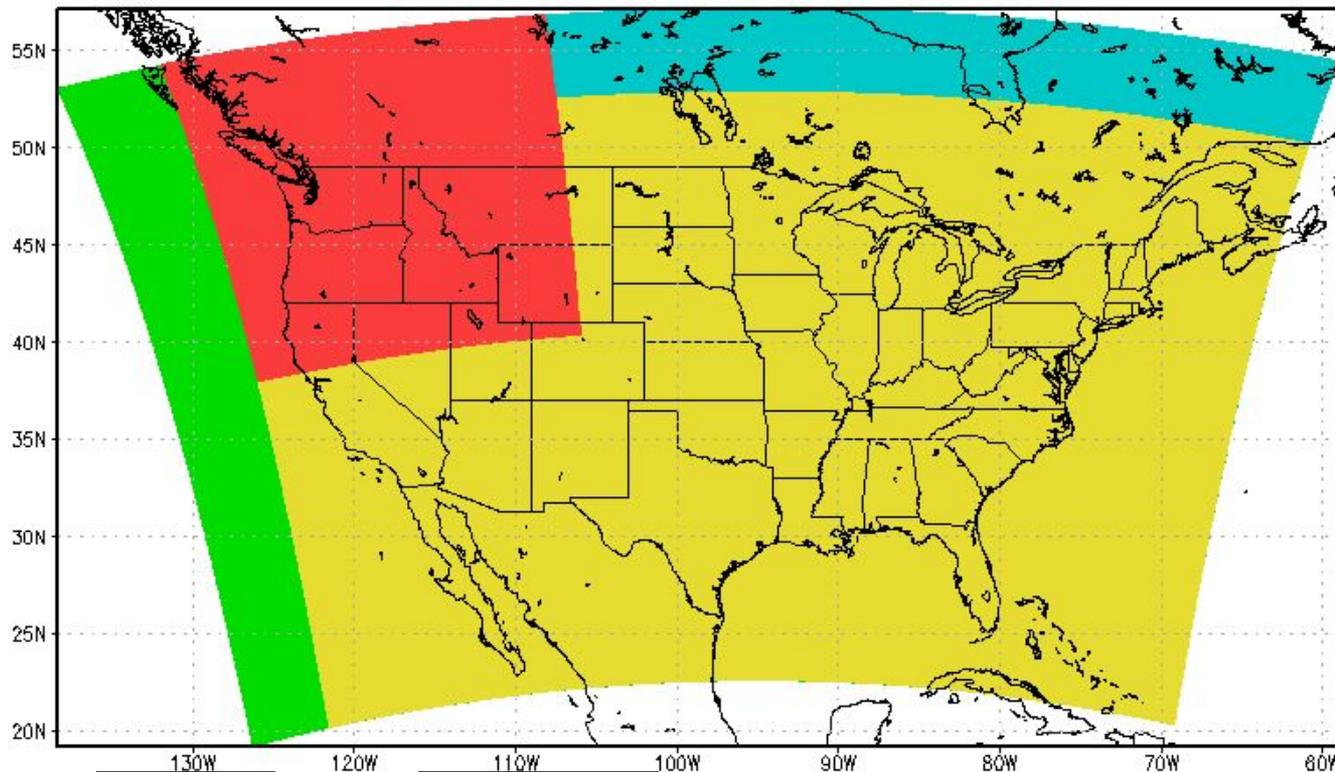
- Expanded CONUS domain westward by 200 points
 - Request from OPC and MDL/NBM
- Changes to ceiling analysis
 - Original request from FAA/AWC, but enhancement was requested by all users
 - Use HRRR rather than RAP based background (RAP still used where HRRR is unavailable)
 - Ceiling analysis will be elevated from 'experimental' to operational
- Visibility Improvements over Alaska
 - Requested by Alaska Region
 - Switch from NAM-based background to RAP-based background over this domain
- Quality Control Improvements
 - Request from SOO-DOH group (Dave Bernhardt, SOO at TFX)
 - Beginning of near-real-time mesonet QC
 - Remove an old static accept list
 - Updated wind-bin lists to reflect HRRR v2 background, ~ 10k more winds used per URMA
- Add Alaska and Puerto Rico to 6h precip URMA (currently ConUS only)
 - Requirement from MDL/NBM

Items De-Scoped From This Version

- 15-minute Rapid Update RTMA
 - Requirement from FAA/AWC
 - Delays in getting 15-minute dumps prod-ready
 - Parallel feed is already up and being fed to AWC, initial feedback is positive
- GLERL enhancement
 - Requested by Eastern Region, MMAB at EMC (Henrique Alves) and staff at GLERL (John Kelly)
 - Ob re-location needs to be recomputed with new 'consensus' land/sea mask
 - Parallel with GLERL will be made available shortly after hand off.
 - Some slight ob location adjustments still needed

ALL will be ready for handoff with v2.6!
(Handoff in May 2017, implementation in Q4FY17)

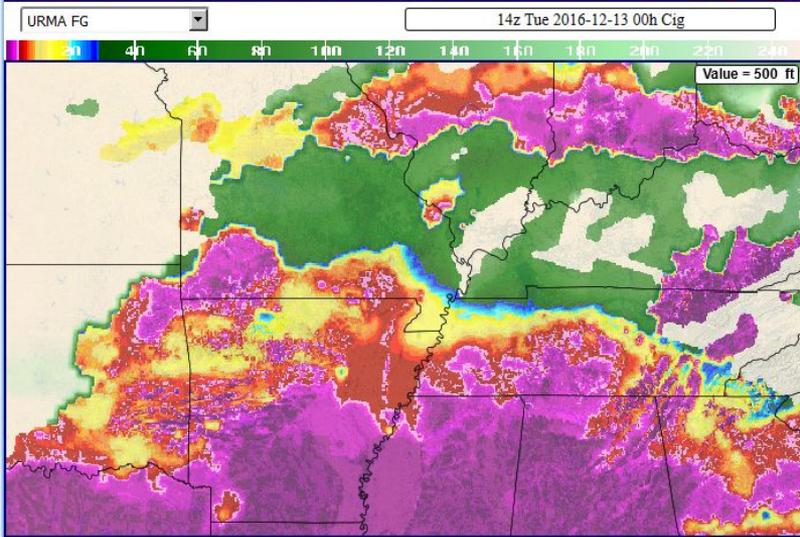
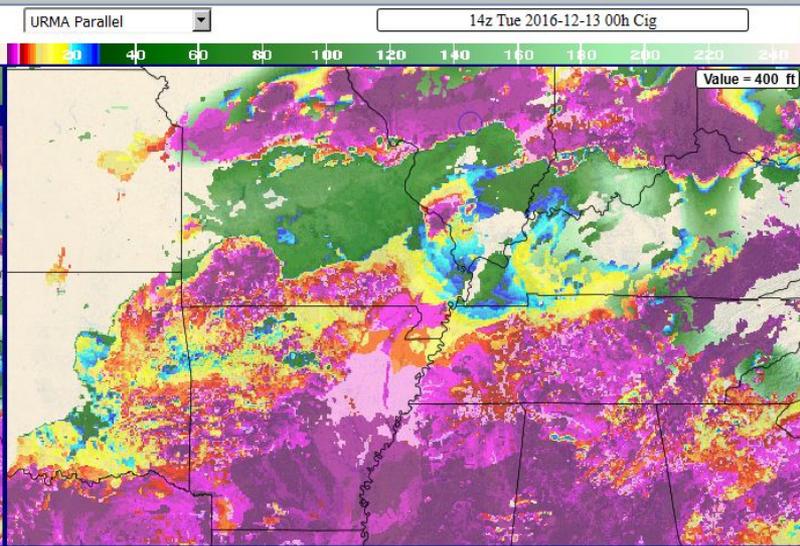
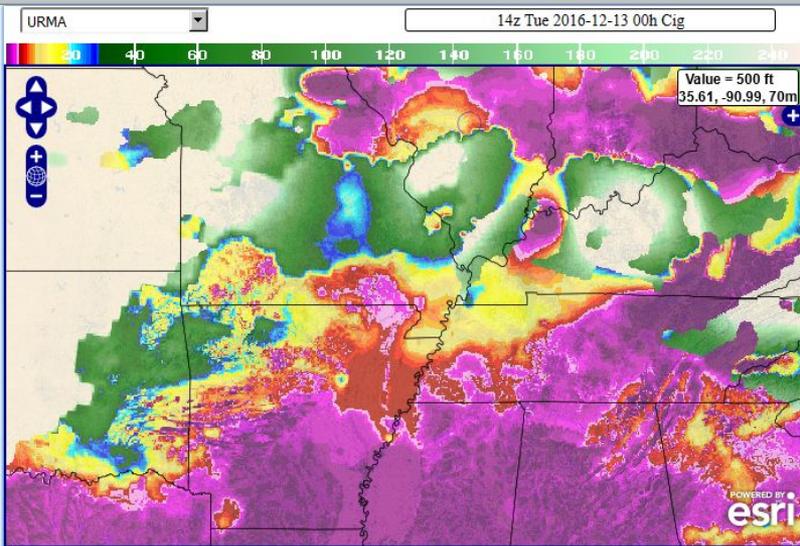
CONUS Grids: **NDFD** **NWRFC** EXT WEXP (new)



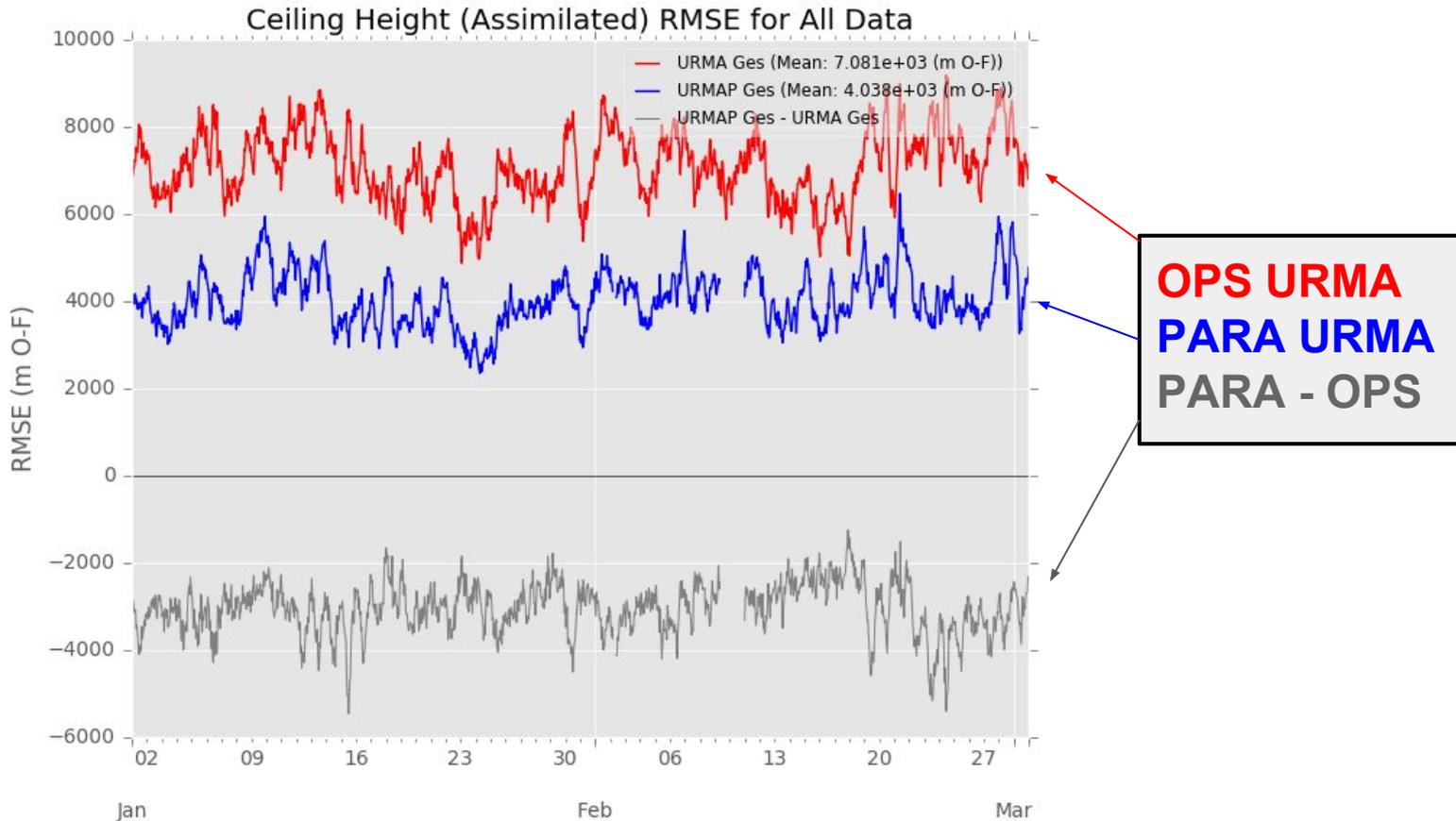
Only **NDFD** and **NWRFC** to be distributed on AWIPS
Others on ftpprd/com to be used as needed

Cloud Ceiling Height Changes

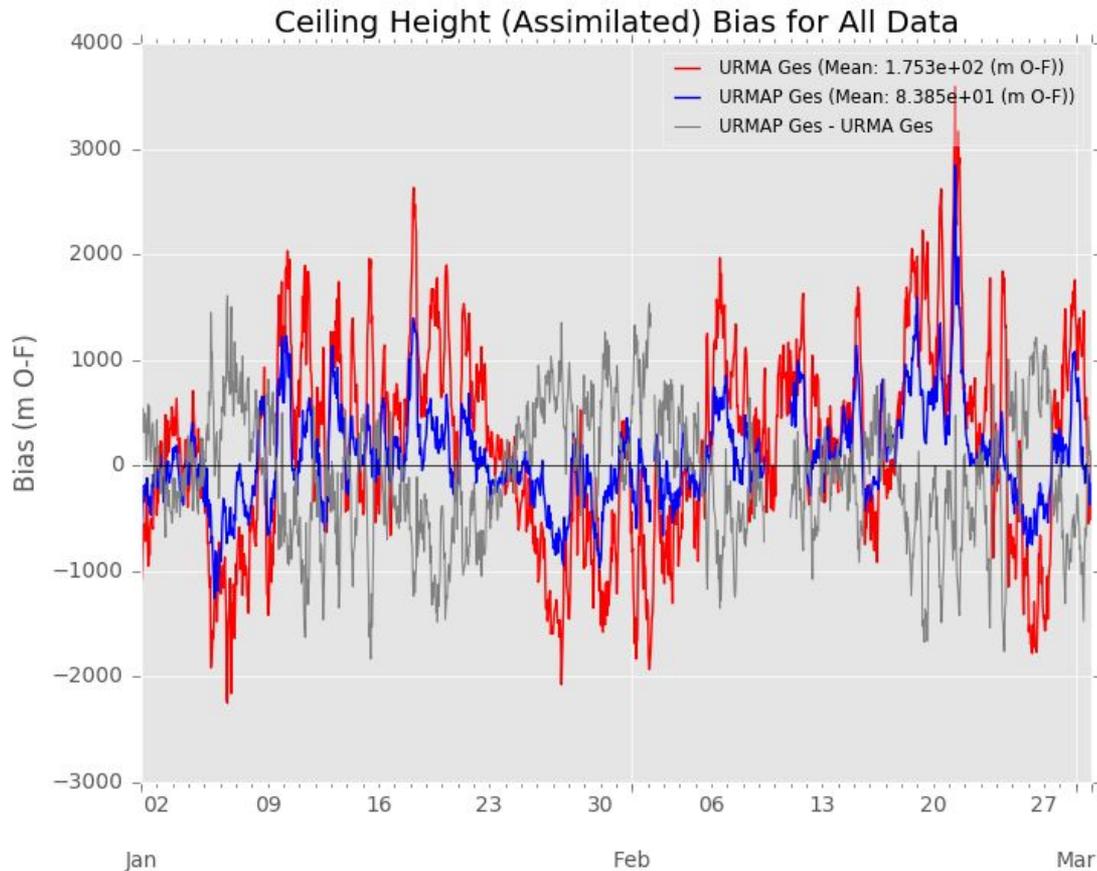
- Requested by many users, most notably FAA/AWC
- HRRR/RAP blend for background
 - Use HRRR where available, use RAP to fill in around edges, smoother provided by Jim Purser
 - Previous version used RAP only
- Ceiling is elevated from 'experimental' to 'operational'
 - No more separate file for ceiling - one grib file contains all fields
 - Previous version was considered experimental due to RAP-only background and lack of evaluation prior to hand-off
 - Ceiling will continue to be disseminated via NCO's FTP server only. Will work to have it added to the SBN
- Fulfills request from FAA/AWC
 - V2.6 RU-RTMA 15-minute analysis of ceiling and visibility will be used in HEMS tool from AWC
- Ceiling remains available for CONUS only



Domain Avg Background Fit to Obs Ceiling RMSE



Domain Avg Background Fit to Obs Ceiling Bias



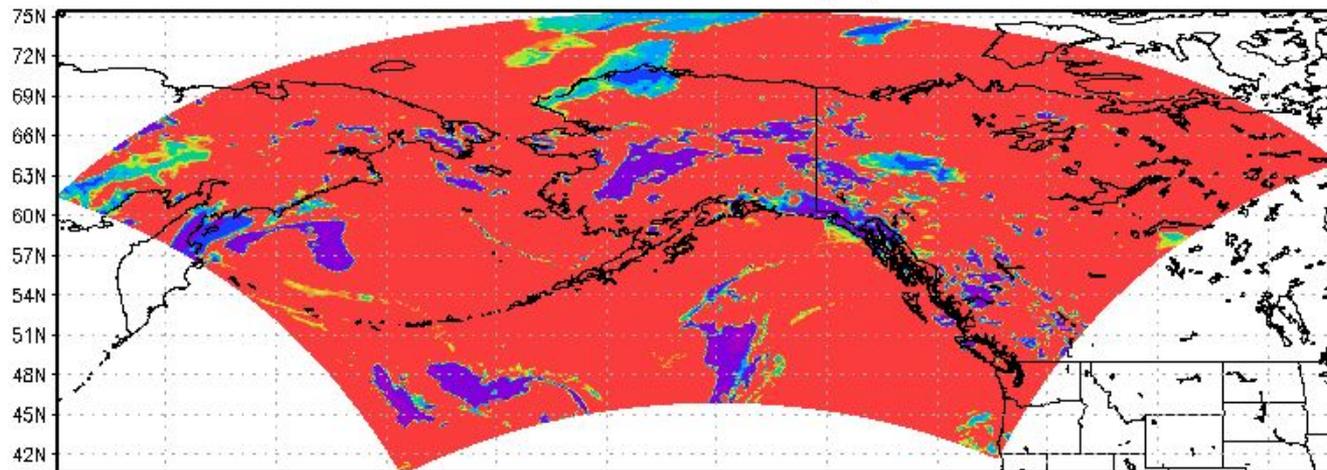
OPS URMA
PARA URMA
PARA - OPS

OPS URMA Mean Bias: **175.3 m**
vs.
PARA URMA Mean Bias: **83.85 m**

Alaska Visibility Changes

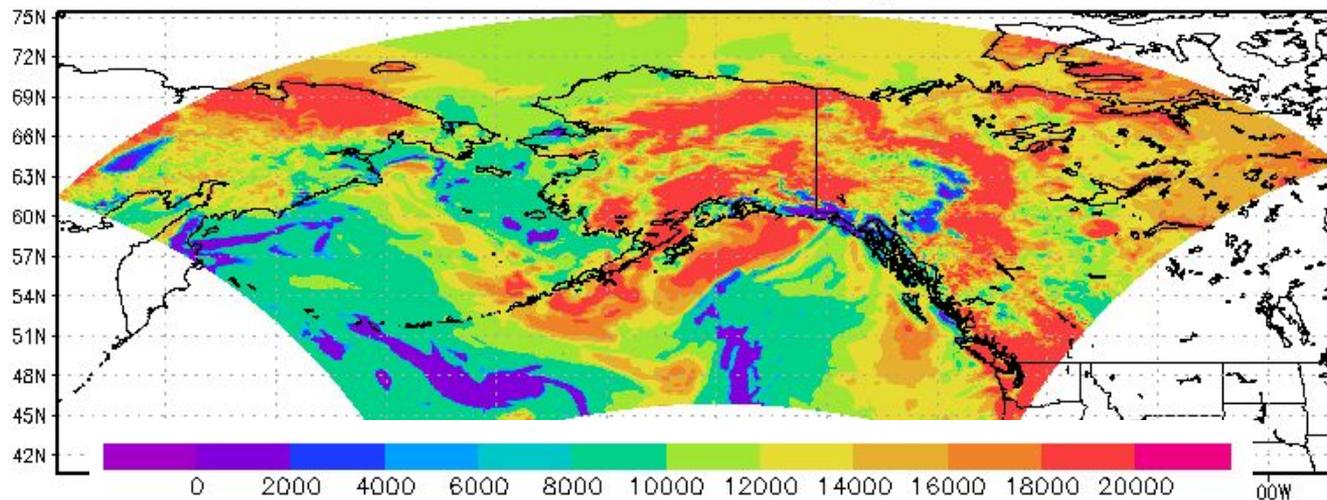
- Change visibility background for Alaska from NAM parent-based to RAP based background
- Visibility background is now more consistent with background for other variables, where we have always used RAP as a primary
 - RAP v1/v2 did not cover entire AK domain, blending does not make sense with visibility
- Improved statistics (based on user-suggested list of METAR sites over 30-day parallel)
 - MAE for background decreased from 4951 m to 4002 m.
 - Bias for background improved from -1854 m to 455 m
 - MAE for analysis decreased from 1468 m to 1146 m
 - Bias for analysis improved from 418 m to 143 m

Old Vis Guess (m)

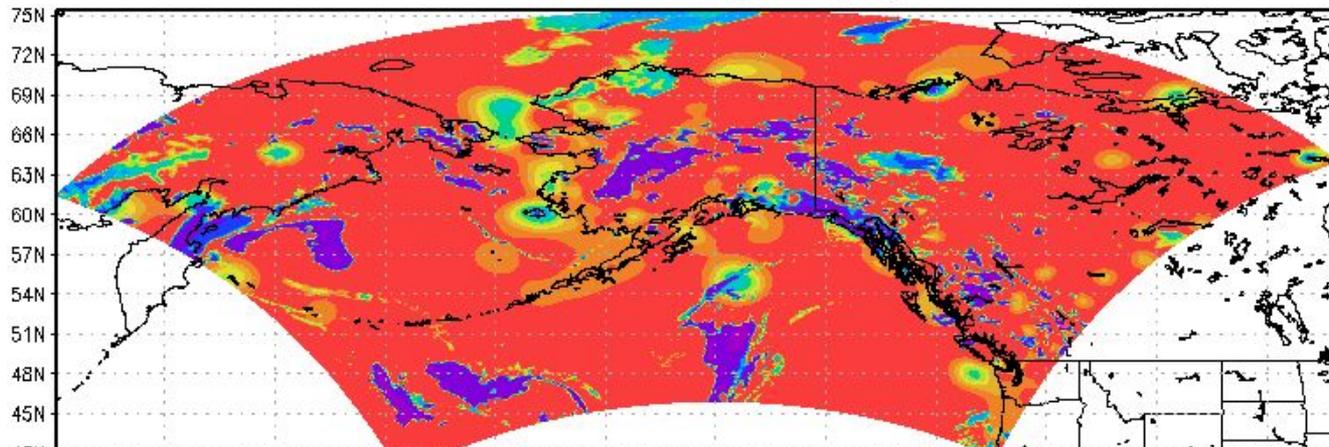


March 20,
2017 15Z
URMA

New Vis Guess (m)

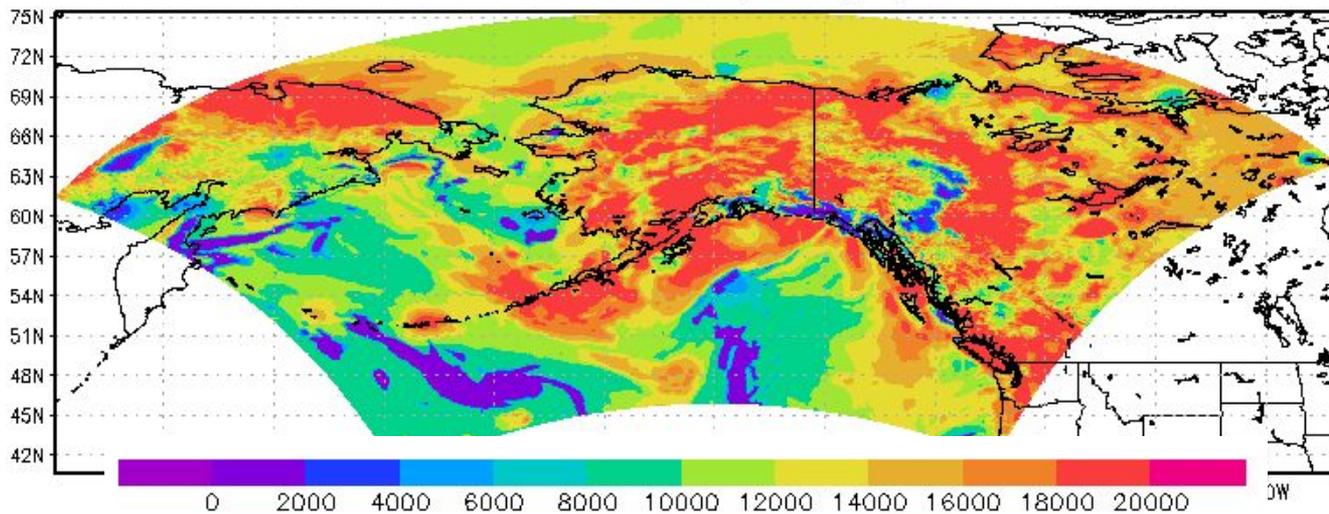


Old Vis Analysis (m)



March 20,
2017 15Z
URMA

New Vis Analysis (m)

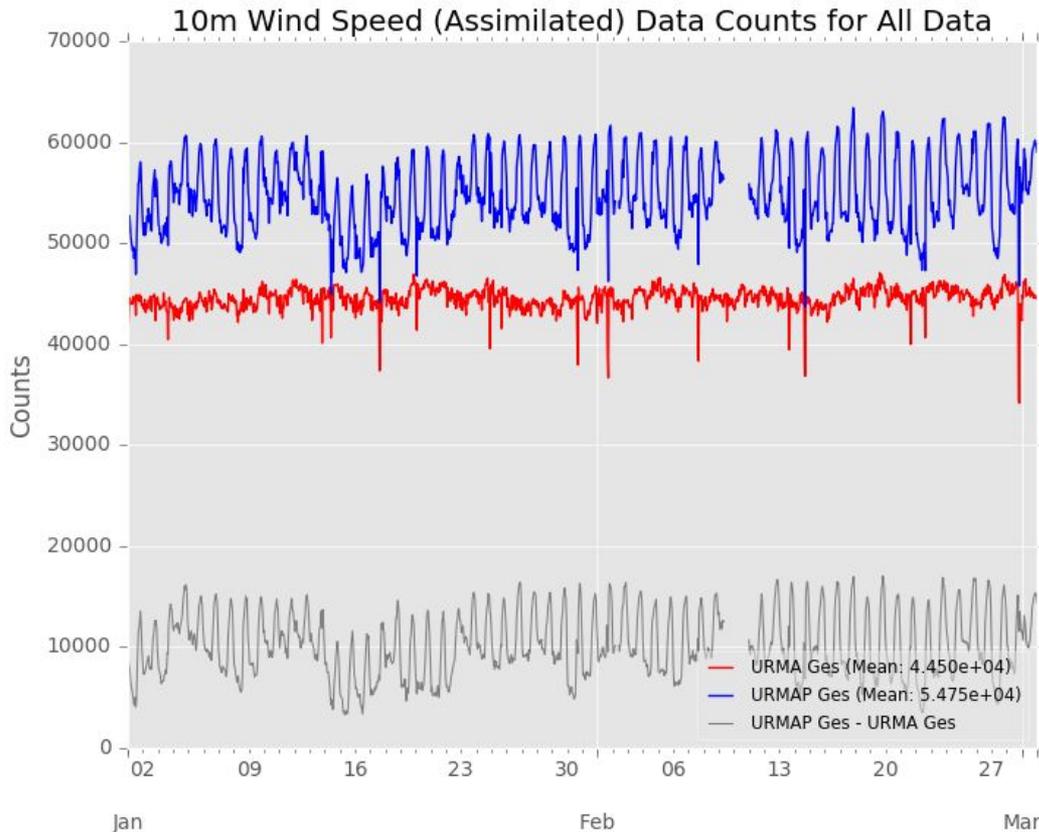


Wind Quality Control Enhancements

- Mesonet wind pose significant challenge due to siting issues
- Users have noticed a recent low-speed bias in RTMA/URMA
- Legacy station accept lists and bin lists were based on RUC and RAP based statistics
 - List code has been re-run based on HRRRv2 background
 - Mesonet stations with O-B stats similar to nearby METARs (within 100 km) are used
- Directional wind bins (45 degree pie slices) allow us to work around wind obstructions.
 - In practice, many stations pass for all bins
 - Bug fix: When being applied, calm wind obs from mesonets are not considered part of any bin (previously assumed to be from due north)
- Changes to 'fixed' files only
- About 10k more wind observations
 - Slight increase in RMSE by about 0.09 m/s

Wind QC Enhancements

10 m AGL Wind Speed Data Counts



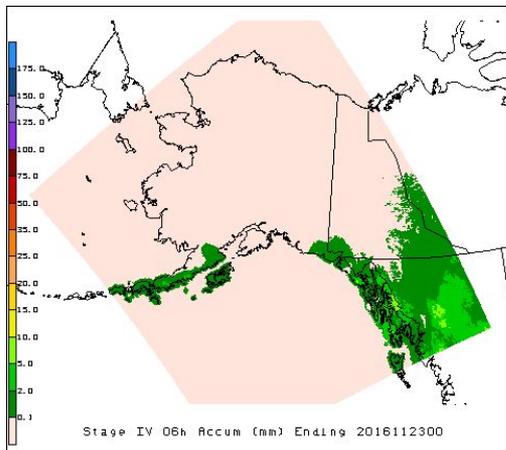
OPS URMA
PARA URMA
PARA - OPS

OPS URMA Mean Data Count: **44 500 obs**
vs.
PARA URMA Mean Data Count: **54 750 obs**

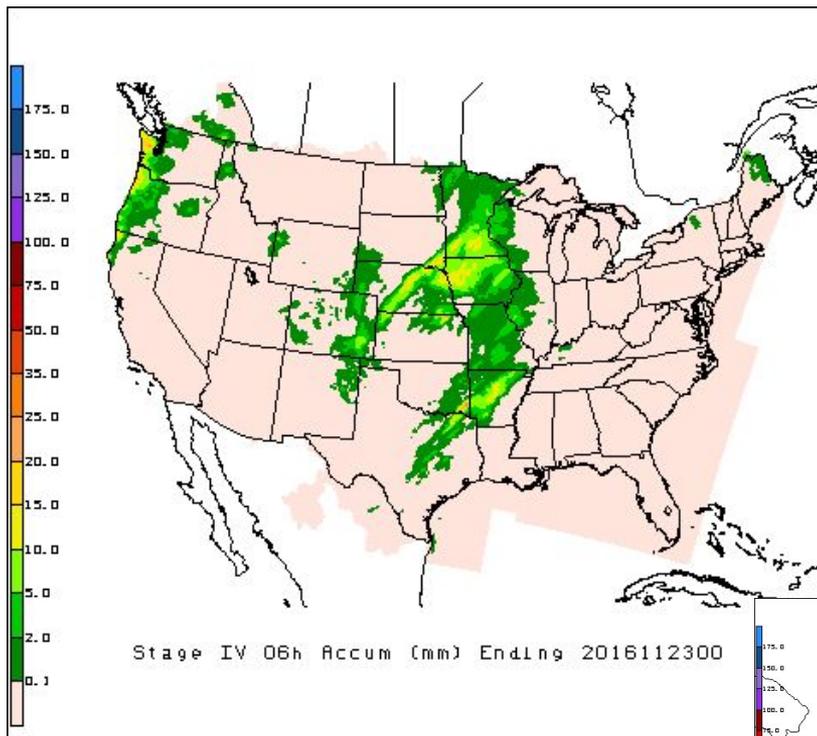
Use of EDTBFR for Real-Time Mesonet QC

- Requested by many users, notably our SOO-DOH group
- Current mesonet reject lists are 'fixed files', difficult to edit
 - Field does not like because changes cannot be made easily or quickly
- SDM-edit reject list can be edited in near-real time via the SDM
 - Already done for most surface marine obs, METARs and aircraft data
- Part of obs processing bundle already implemented on 21 Feb 2017
- Meeting within next two weeks to ensure standards and procedures for flagging are consistent
 - Intent is not to run up and change the list hour-to-hour
 - Also want to avoid issues we
- All changes will be noted on SDM log

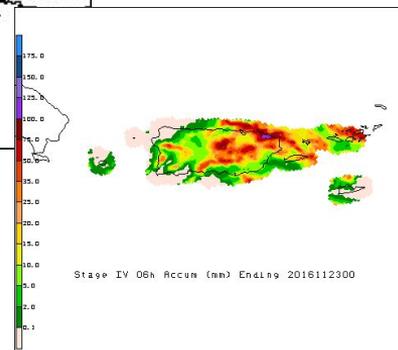
6h ending at 00Z 23 Nov 2016: add AK and PR URMA to current opnl ConUS URMA



AK URMA: QPE from APRFC (gauge only; Mountain Mapper). Due to the lack of reliable obs in Alaska, esp. in winter, the QPE should be considered “qualitative” and should not be used to tune models.



PR URMA: QPE from SERFC (radar+gauges)

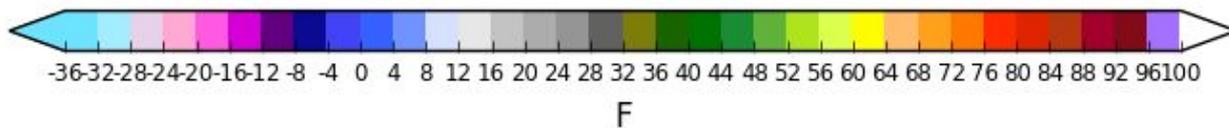
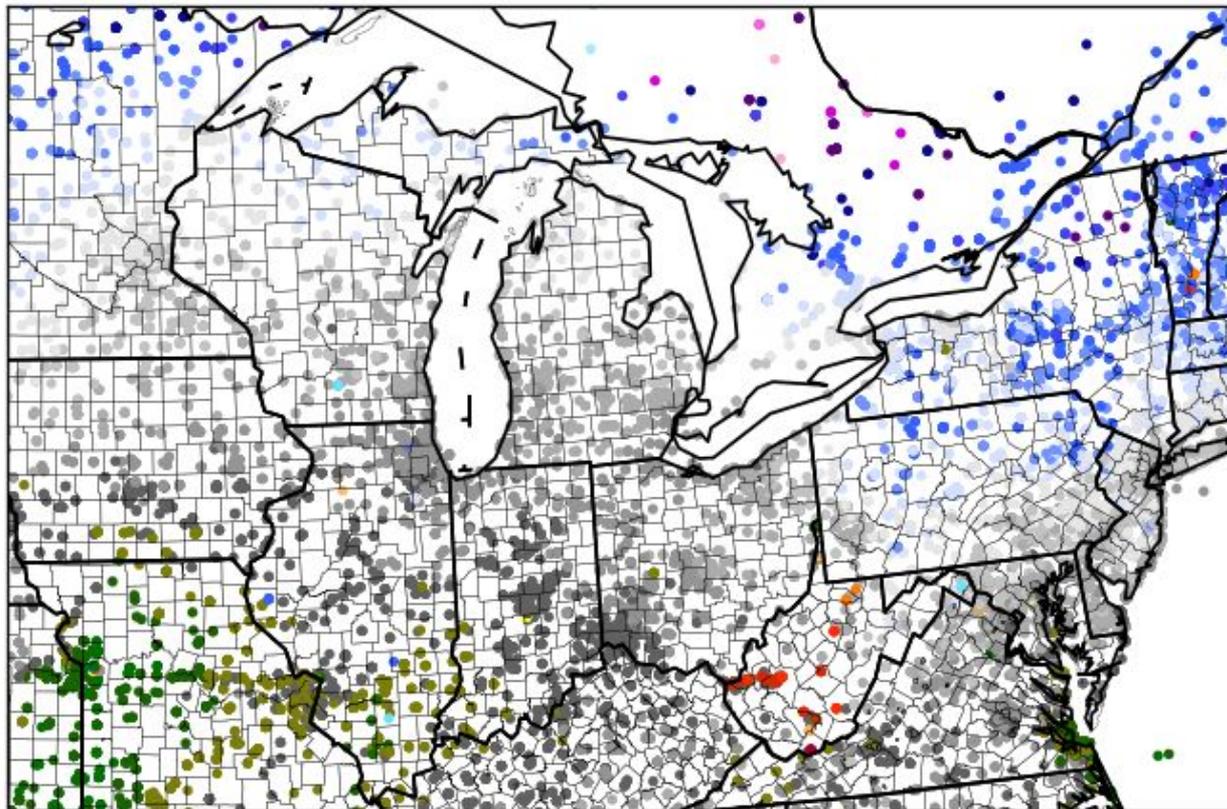


Backup Slides

Station Metadata and Quality Control Issues

- Issue is separate from but related to RTMA/URMA
- METAR, SYNOP and some buoys have fixed file decoder dictionaries containing location info
 - Some locations are outdated or wrong
- METAR table update implemented on 17 November 2016
- SYNOP table update in progress
- Coordination with OFCM, Regions, Environment Canada and NAV CANADA
- Idea is to update tables ~quarterly as time allows
- Attention requested by SOO-DOH working group
- Later (future): Get data in BUFR, which includes location metadata
 - But is that metadata correct?
- Metadata for mesonets comes directly from MADIS

RTMAP 2 m Temperature Observations
Valid 20170313 09Z



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Station-based Stats

- Request by SOO-DOH working group
- 30-day running average O-B and O-A stats at specific METAR sites with plot
 - METAR sites generally more valuable/important to forecaster
- Help identify where URMA is doing well and where it's struggling
 - Help identify potential problem stations and assist with SDM EDIT-based monitoring
- Dev job runs every morning when dev machine is available
- Station plot identifies stations with large O-As
- Temperature only now, easily expanded to other variables
- FAA has expressed particular interest with ceiling and visibility

Technical Resources Changes (minor)

/com2 disk space: Current daily usage : 7 TB

(Note: accounts for multi-day RTMA & URMA output residing on disk!)

Additional 635 GB required due to expanded domain ⇒ 9% increase

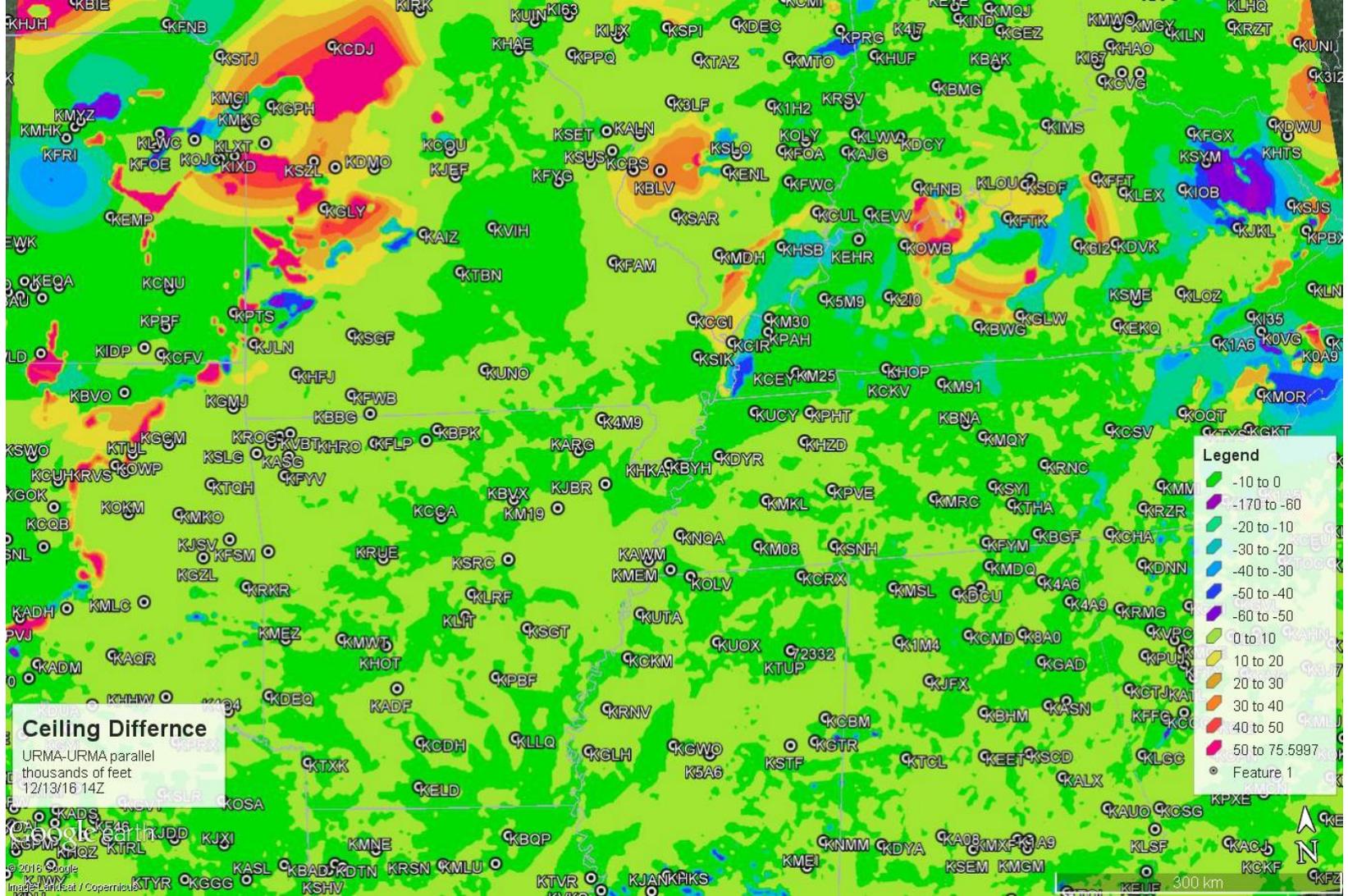
HPSS usage:

Currently: 149 GB/day of permanent storage + 130 GB/day of 2-year storage.

Additional 13 GB of permanent storage required ⇒ 9% increase

Number of WCOS2 compute nodes and cores: *No changes*

Continue to use: 24 nodes / 320 cores



Legend

- 10 to 0
- 170 to -60
- 20 to -10
- 30 to -20
- 40 to -30
- 50 to -40
- 60 to -50
- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 50
- 50 to 75.5997
- Feature 1

Ceiling Difference
 URMA-URMA parallel
 thousands of feet
 12/13/16 14Z