

# NCEP Synergy Meeting Highlights: February 29, 2016

*This meeting was led by Mark Klein (WPC) and attended by Simon Hsiao (NCO); Vijay Tallapragada (EMC); Arun Chawla (MMAB); Israel Jirak, Andy Dean and Steve Weiss (SPC); Scott Scallion (MDL); Andy Edman (WR); Jack Settelmaier (SR); Jeff Manion (CR); Brian Miretsky (ER); Brian Cosgrove (NWC); and Jason Taylor (NESDIS).*

## 1. NOTES FROM NCO (Steven Earle)

RTOFS Implementation approved on 9/30. Implementation delayed will be at the same time as NAVY upgrade, which is currently targeting Q3

<http://www.nws.noaa.gov/os/notification/tin1536globalrtofsaaa.htm>

NAEFS and CCPA 30-day parallel is in progress and will end on March 11

<http://www.nws.noaa.gov/os/notification/tin16-03gefs-naefs.htm>

<http://www.nws.noaa.gov/os/notification/tin16-02ccpa.htm>

NGAC 30-day parallel is in progress and will end on March 20

HYSPLIT 30-day parallel is in progress and will end on March 26

Geospace NCO parallel starts this week

Global Forecast System (GFS) scientific evaluation is currently being run by EMC... feedback is due today, February 29. NCO will run a technical parallel started April 6 with tentative implementation in mid May.

RAP/HRRR, which includes downstream RTMA/URMA upgrades is currently being setup in NCO... 30-day parallel evaluation is set to start in mid April

CFS upgrade was just received by NCO and is targeting end of April for the 30-day parallel

NOS Lake Erie Forecast System is in the final stages of NCO checkout. The evaluation details and timeline will be coming soon.

\*\*\* The implementation / briefing process has been changing recently. There is a much more weight being put on evaluations and the feedback received from the field. If your organization can't formally participate in an evaluation then we at least need an email stating this and that you are okay with the upgrade proceeding.

-- SBN bandwidth issues

It has come to the attention of the NCF and NCEP that twice a day the SBN line

containing grib data is becoming saturated. In return data is delayed up to 20 minutes being delivered to AWIPSII. The times are 0826 and 2026z plus or minus 10 minutes. We are working with the NCF on how to move forward and address this problem.

## 2. NOTES FROM EMC

*2a. Global Climate and Weather Modeling Branch (GCWMB) (Vijay Tallapragada):*

### Dates of importance:

1. Evaluation from the field completed: **February 29, 2016**
2. EMC CCB: **1 PM EST, March 10, 2016**
3. NCEP OD Briefing (Final Approval): **12.30 PM EST, March 17, 2016**

**NCO Briefing to NCEP OD will be separately held before planned implementation date on May 17th.**

The GFS 4D hybrid EnVar data assimilation is in the final stages of testing for possible implementation on **May 17, 2016**. Upgrades to the operational GFS include:

4D hybrid ensemble-variational data assimilation: The ensemble provides an updated estimate of situation dependent background error every hour as it evolves through the assimilation window. This flow dependent statistical estimate is combined with a fixed estimate. Improved use of satellite radiances; Improved use of satellite winds and aircraft observations; Corrections to land surface to reduce summertime warm, dry bias over Great Plains.

All retrospectives are now finished. Evaluation should be complete by **Feb. 29** and there will be an EMC CCB on **March 10** and a management briefing on **March 17** to determine whether the new system should be implemented. A 30 day parallel for IT checkout purposes only is scheduled to begin in April. If approved on March 10 the improved system would be implemented May 17.

A consistent parallel feed of gridded data is being planned for paraNOMADS.

Files from the real time parallel and 1 degree files from the retrospectives are on WCOSS.

Verification of the real time parallel can be found at:

[http://www.emc.ncep.noaa.gov/gmb/STATS\\_vsdb/](http://www.emc.ncep.noaa.gov/gmb/STATS_vsdb/)

## **Synoptic evaluation**

Near the top on the left is a link labelled Precip QPF. This will take you a page where you can find verification plots over CONUS for precipitation forecasts by the operational and experimental (GFSX ) GFS for a wide range of dates. If you go to the bottom on the left, there are 2D maps showing the current forecasts from the operational and parallel GFS. By 00z there is a link to arch. This will take you to an archive over the past few years for synoptic maps for different regions for the operational and parallel GFS. Note that the parallel GFS is whatever was running that day. Only since Nov. 1 2015 have we been running the current GFSX with the land surface correction.

Another site for precipitation verification is

<http://www.emc.ncep.noaa.gov/mmb/ylin/pcpverif/daily/>

These sites are subject to the availability of the computers to EMC and may not be up to date every day.

GEMPAK plots are being produced from the real time parallel and can be seen at: <http://mageval.ncep.noaa.gov> and can be compared to the operational gfs at <http://mag.ncep.noaa.gov/>

A real time comparison of soundings from the GFS and GFSX can be found at: [http://www.emc.ncep.noaa.gov/gc\\_wmb/tdorian/meg/index.html](http://www.emc.ncep.noaa.gov/gc_wmb/tdorian/meg/index.html)

Western Region has a side by side display of the operational and parallel GFS for North America and the North Pacific:

<http://ssd.wrh.noaa.gov/gfs/html/>

For those of you in NCWCP, the Ocean Prediction Center displays both the GFSX and operational GFS 9950 sigma winds and has difference fields for wind and EMSL.

<http://www2.opc.ncep.noaa.gov/eval/evaluation.php>. Click on GFS Evaluation.

<http://www2.opc.ncep.noaa.gov/eval/gfs/compare.php>

## **EMC Objective Verification**

An extended version of the real time parallel can be found at:

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devb/>

Please note that an additional analysis change from the operational not in the current parallel was in pr4devb until the forecast initialized Oct. 31 18 GMT. It was suspected that this change may have hurt the forecasts and it was removed and is not in any of the retrospectives below.

Verification covering all retrospectives from 2013 to 2016 can be found at (The page is a work in progress):

<http://www.emc.ncep.noaa.gov/gmb/wx24fy/vsdb/gfs2016/>

Verification for each of the seven retrospectives covering Sandy, 3 summers and 2 winters can be found at:

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbs12/> covering Sandy.

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbs13/>

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbs14/>

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbs15/>

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbw13/>

<http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbw14/>

(This covers from the 13 km implementation to the end of the winter.)

[http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbw14\\_before\\_20150114/](http://www.emc.ncep.noaa.gov/gmb/wd20rt/vsdb/pr4devbw14_before_20150114/)

(This covers from Nov. 2014 up to the 13 km implementation in January 2015.)

## **Case studies**

The global branch has offered to plot maps for specific cases from the retrospectives and has solicited specific cases and specific fields to look at. Western, Central, Southern and Alaska Regions have sent in cases to look at. NHC and WPC are working with the global branch to enable their evaluation of the new GFS.

Summary of Western Region case studies and one Central region case study:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/RetroRunsWRcases.pptx>

Summary of another Central Region case study, Alaska case study and Southern Region case study:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/GFSXSEvaluations.pptx>

Four case studies requested by Western region are in:

<https://drive.google.com/open?id=0B8-sH913lbhOOUE0Y1JWQXBqVVU>

A case study requested by Central Region for Jan. 29 2015 is in:

<https://drive.google.com/open?id=0B8-sH913lbhOa3IFUUNKRm9yNk0>

A case study for Central Region for March 23, 2015:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/CentralRegionMar23.pptx>

A case study for Dec. 5-6, 2013 requested by Southern Region:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/SouthernRegion.pptx>

Cases for WPC:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/ParallelGFSCaseStudies.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/ParallelHeights.pptx>

A comparison of operational and experimental GFS forecasts for Atsani is shown in:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/AtsaniEvaluation.pptx>

Forecast tracks for Sandy plotted by initial time can be found at:

<http://www.emc.ncep.noaa.gov/gmb/wx24fy/vsdb/pr4devbs12/sandy/>

WPC documented a dry bias over the southeast US in the GFS and GFSX:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/GFSDryBias.pptx>

Case study of GFS and GFSX cold bias over snowpack:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/Casezhengox.ppt>

## **Documents and evaluations**

The official letter asking for evaluation of the GFSX:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/EvalLetterfin.doc>

Data assimilation changes in the new GFS:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/GFSXDA.pdf>

updated version of data assimilation changes:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/daverification.pdf>

Hybrid 4D EnVar:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/AMS2016RM.ppt>

Preliminary evaluation presentation to EMC:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/MiniCCBglobalFinal.pptx>

Warm dry bias over Great Plains in summer:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/MEGShort82015.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/t2m.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/aug16GFS.pptx> (case study)

MEG presentations reviewing the new GFS:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/megnov12c.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/megnov19.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/megdec17a.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/megfeb11a.pptx>

MODE evaluations of new GFS:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/MODEprecip.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/MODETotalWinds.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/MODEZonalWinds.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/MODEMeridionalWinds.pptx>

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/MODECAPE.pptx>

Extratropical storm tracks:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/etstormtrack.pptx>

Stratosphere:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/clstratosphere.pptx>

Comparison of systematic errors in the GFS and GFSX:

<http://www.emc.ncep.noaa.gov/gmb/noor/4dGFS/docs/s15gfsx.pptx>

This is a new implementation procedure and very much work in progress. The global branch wants a thorough evaluation of the GFSX and values your insight. Please be patient and persistent with us.

## **2b. Mesoscale Modeling Branch (MMB)**

*Air Quality - CMAQ upgrade with 35 levels, NGAC dust lateral boundary conditions and particulate matter bias correction was implemented on February 4, 2016*

*HYSPLIT Dispersion - upgrades including improved wet deposition for RSMC radiological release, extension of runs driven by NAM nest to 48 hours, provision of volcanic ash trajectories by late March, 2016*

*NAM V4 upgrade (Implementation planned in 2016Q3, **recent changes/testing in boldface**)*

- Increase resolution of CONUS nest from 4 km to 3 km; CONUS nest output grid will be the same as that from the HRRR. 3 km nest has improved QPF bias over 4 km CONUS nest at higher thresholds.
- Increase resolution of Alaska nest from 6 km to 3 km
- Increase frequency in calls to model physics and for the 12 km parent, call the radiation scheme every 20 min instead of once an hour
- Physics changes (now being tested or under development; subject to change)
  - Convection changes → higher (i.e., closer to one) 12 km NAM QPF bias, improved 12 km NAM equitable threat score during cool season .
  - **Currently testing running shallow convection in 3 km parallel CONUS nest to reduce low level dry bias, decrease high QPF bias in nests, and remove unrealistic persistent light precipitation over the eastern Pacific.**
  - Land surface model changed to increase canopy resistance, reduce plant transpiration, and reduce direct evaporation from frozen soil, targeting low 2m Td bias during cool season.
  - PBL changes to address maritime shallow cloudiness.
  - Radiation/microphysics changes to address 2m T warm bias during warm season.
  - Use of radar-derived temperature tendencies in model's diabatic digital filter initialization; call digital filter at start of NAM forecast (now only done at start of 3h NDAS forecasts).
  - Replace 3h NDAS (which only runs on the 12 km domain) with hourly cycled system (NAMRR) with 12km parent/3 km CONUS and 3 km Alaska nest; make 18h forecast of 12 km parent and 3 km CONUS/Alaska nest every hour; first step towards future convectionallowing ensemble (ARW members (i.e., 3 km HRRR) + NMMB members (3 km NAM nests))
  - **Now running 6h NAMRR “catchup” cycle with a 6h, hourly cycle of the 12 km parent, 3 km CONUS nest, and 3 km Alaska nest in real time, followed by full 60h forecasts of the CONUS/Alaska nests and 84h forecast of the 12 km NAM. Links to web pages can be found at <http://www.emc.ncep.noaa.gov/mmb/mmbp11/eric.html#TAB2>**
  - **Hourly forecasts from NAMRR are now being run/tested in real-time. These forecasts are associated with all domains having a distinct data assimilation cycle, i.e. the 12 km parent, 3 km AK nest, and 3 km CONUS nest.**
  - New observations assimilated :
    - i. New satellite winds:
      1. MTSAT2 IMAGER WVct AMVs (JMA)
      2. 254 54 M7 IMAGER WVct AMVs
      3. M10 IMAGER WVct AMVs
      4. NOAA 15 AVHRR IR AMVs
      5. NOAA 18 AVHRR IR AMVs
      6. NOAA 19 AVHRR IR AMVs

- 7. METOPA AVHRR IR AMVs
- 8. METOPB AVHRR IR AMVs
- ii. New GPS Radio Occultation Data
  - 1. METOPB 3 (subtype)
- iii. New Satellite radiance data
  - 1. M10 Seviri
  - 2. metopb\_hirs4, amsua, mhs,iasi
  - 3. npp\_atms, cris
  - 4. f17\_ssmis
- iv. Resume use of AFWA snow depth product using envelope adjustment
- v. For CONUS/Alaska/Fire Weather nest: Land-sea mask changed to add all lakes resolved by the new fresh water lake (FLAKE) climatology. Water temperatures at "FLAKE" lake points are a blend using a Cressman analysis of the FLAKE climatology and temperatures at nearby water points resolved by the RTG\_SST\_HR analysis.
- vi. Use NESDIS burned area data in the NAM fire weather nest. Two "accumulation" burned area files are used: 2day and 45day. The greenness fraction and albedo is adjusted according to the 45day data and the top layer soil moisture according to the 2day data

***2c. Marine Modeling and Analysis Branch (MMAB) (Arun Chawla).***

- Tests on the parallel GFS show generally small differences with the operational. Some improvement with wave forecasts. Wave forecasts will move to hourly output with implementation
- Parallel West Coast and AK wave models are running...implementation due by end of FY16
- Hourly forecasts to be added to Great Lakes wave models by end of FY16
- Global wave model to be extended to the north pole Aug-Sep 2016.

**3. NATIONAL OCEAN SERVICE:**

**4. FEEDBACK FROM MDL/OPERATIONAL CENTERS/REGIONS**

**4a. MDL**



- LAMP
  - MDL is working on the Gridded LAMP implementation for June which will add gridded wind gusts and gridded probabilities of low ceiling heights and low visibilities to the Gridded LAMP suite of guidance.
  - We have 24 cycles of experimental LAMP+HRRR grids of upgraded gridded ceiling height and visibility running and we will be making the data available experimentally soon.
  - We have 4 cycles of experimental LAMP+HRRR grids of gridded convection guidance upgraded by using HRRR, MRMS, and Total Lightning data running and we will be making the data available experimentally soon.
  - The above two items will be implemented next winter.
- NAM MOS - Refresh of temperature and winds handed off to NCO in November, verification slide deck distributed to SSDs last week, implementation TBD
- GFS MOS - Redevelopment underway using retrospectives.
- GMOS Upgrade (to support NBM) - Adding unified terrain over CONUS and expansion of AK GMOS domain. Code delivery - mid-April.
- EKDMOS Upgrade (to support NBM) - Code delivery on track for 6/7/2016
  - Implement unified terrain over the CONUS
  - Alaska domain expansion (to cover entire area needed for Alaska NBM)
  - Refresh GEFS and CMCE equations for 00Z and 12Z, adding 600-700 new stations
  - Refresh NAEFS spread-skill equations for 00Z and 12Z
- NBM Version 2.0 - Code delivery on track for 6/7/2016

#### **4b. NCEP Centers**

- Weather Prediction Center (WPC):
  - WPC's Flash Flood and Intense Rainfall Experiment is set for June 20 - July 15
  
- Storm Prediction Center (SPC):
  - HWT Spring Forecasting Experiment set for May 2 - June 3
  
- National Hurricane Center (NHC):
  
- Ocean Prediction Center (OPC):

- Aviation Weather Center (AWC):
  - AWT Winter Experiment completed Feb 26
- Climate Prediction Center (CPC):
- Space Weather Prediction Center (SWPC):

#### **4c. NWS Regions**

- Pacific Region (PR):
- Alaska Region (AR):
- Western Region (WR); In terms of forecast performance -- there are few differences between the GFSX and the GFS. I did document one event that became the first Arctic outbreak for the midwest. I submitted the email case on Jan 1 and followed up with a “what verified “ email on Dec 10.
- Status of EC/GFS Ensemble Spaghetti page? I reported this problem during the NCEP review, and then again in a Dec 16 andh Jan 22 email. Any luck with restoring the data to EC/GFS Ensemble Spaghetti page the <http://www.emc.ncep.noaa.gov/gmb/tpm/emchpc/ens/index.html> . This is a really popular page in the west -- Any hope of making this permanent operational
- Southern Region (SR):
- Central Region (CR):

- Eastern Region (ER):

## 5. National Water Center

Code delivery for the National Water Model (note name change from WRF-Hydro) is scheduled for this Friday, 3/4.

## 6. NESDIS

NOAA-15 AVHRR Channel 3A / 3B Channel Switching Activation over Alaska Region:

- Office of Satellite and Product Operations (OSPO) engineers will activate channel switching for NOAA-15 AVHRR Channel 3A / 3B on March 2, 2016 within a predefined box encompassing the Alaska Region only (box coordinates 50°N to 75°N and 173°E to 135°W).
- Switching to NOAA-15 AVHRR Channel 3A (1.6 microns) over this area will further support the Alaska Region's Snow and Ice Mission by providing improved snow and ice discrimination.
- No switching will occur during the summer fire season annually from the period of May 15th to September 15th as NOAA-15 AVHRR will remain Channel 3B (3.7 microns), which traditionally supports fire detection.
- This change is being made in coordination with the NESDIS OSPO, National Weather Service (NWS) Alaska Region, University of Alaska - Geographic Information Network of Alaska (GINA), and the NWS Fire Weather Service Manager and is intended to seasonally optimize the Fire Weather and Cryosphere observing posture for Alaska.
- Activation of channel switching for NOAA-19 AVHRR Channel 3A / 3B is being planned to follow NOAA-15 in approximately 45 days. (*Jason Taylor, 301-683-3248*)

Operational Implementation of GOES-13 Imager ASOS Satellite Cloud Products:

- On December 28, 2015, the GOES-East (GOES-13) Imager ASOS (Automated Surface Observing System) Satellite Cloud Products (SCP) were made operational by the Office of Satellite & Product Office (OSPO).
- These products are used by the National Weather Service in their routine operation as cloud cover and aviation products at many of the NWS ASOS stations.

- The GOES-13 Imager ASOS SCP products were replaced for the Sounder ASOS SCP products as a result of GOES-13 Sounder instrument failure on November 20, 2015.
- The GOES-13 Imager ASOS SCP products may not be able to produce for all the stations and sectors that were produced by the Sounder ASOS SCP due to a different coverage of Imager and Sounder for CONUS regions, but are a capable replacement product for this outage.
- These products are available to users through ESPC Data Distribution Server (DDS) and the NOAA/NESDIS web site:  
<http://www.ospo.noaa.gov/Products/atmosphere/soundings/> (A.K. Sharma, 301-683-3229)

#### Jason-3 Reaches Final Reference Orbit:

- The Jason-3 satellite reached its final reference orbit and began cycle-0 at 0107Z (8:07 PM EST) on February 12. It is now flying 80sec (557 kilometers) behind Jason-2.
- NOAA began sending Operational Geophysical Data Records (OGDRs) to CLASS and the Ocean Prediction Center at approximately 1715Z (12:15 PM EST).
- This marks the beginning of the 5 month Near Real Time (NRT) Verification Phase. Full public release and distribution of Jason-3 products will begin in late June/early July. (Contact: David Donahue, 301-683-3236)

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## 7. Offline Discussions

**Topic:**

**Lead:**

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**The next Synergy Meeting is scheduled for Monday, April 4, 2016 at 2:30 pm EST in NCWCP conference room 2890, with remote teleconferencing capability.**

Telecon: **1-866-763-1213**

Passcode: **524234#**