

# NCEP Synergy Meeting Highlights: December 1, 2014

*This meeting was led by Mark Klein (WPC) and attended by Keith Brill and Tony Fracasso (WPC); Steven Earle and Jay Benedetti (NCO); Eric Rogers, Mark Iredell and Mary Hart (EMC); Hugh Cobb, Mike Brennan and Dave Zelinsky (NHC); Israel Jirak, and Andy Dean (SPC); Phil Shaffer (MDL); John Eise (CR)*

In some sections, this month's meeting notes are augmented with information from NCEP Production Suite Review presentations.

## 1. NOTES FROM NCO (*Steven Earle*)

The Global Wave Ensemble system and Hurricane wave model upgrades are running in parallel. 30-day evaluation period was restarted on November 14 and will end December 13. Implementation is now planned for January 7, 2015.

The GFS/GDAS upgrade is running in parallel, though will be unavailable from December 3-7 due to scheduled maintenance on the development WCOSS (GDAS will continue on production side). The evaluation period was restarted on November 20 and will continue until the end of December. Implementation is expected on January 14, 2015.

The CMAQ/AQM upgrade is currently running in parallel; 30-day evaluation period was restarted on December 1 due to an issue with particulate matter. Implementation scheduled for January 27, 2015

Finally, the next upgrade of the Great Lakes Wave model is expected to begin running in parallel this week, with implementation slated for January 27, 2015.

## 2. NOTES FROM EMC

**2a. Global Climate and Weather Modeling Branch (GCWMB) (*Mark Iredell, NCEP Production Suite Review*):**

- GFS parallel currently running with expected implementation on January 14, 2015
- GEFS upgrade
  - Change from GFS Euler to Semi-Lagrangian model
  - Horizontal resolution - increase from 55km to 34km from F000-F192, and from 73km to 55km from F192-F384
  - Vertical resolution increase from 42 to 64 levels
  - Implementation ~ April 2015

**2b. Mesoscale Modeling Branch (MMB)** (Eric Rogers, NCEP Production Suite Review presentations)

- RTMA/URMA upgrade (Two phases)
  - Q2 FY15
    - Background fields will be CONUS HRRR blended with downscaled NAM nest. Still use RAP in regions outside of HRRR/NAM nest domain
    - Adding buddy checks to QC
    - Modify gross-error check to account for terrain variability
    - Cloud cover will be added for this upgrade
    - 7 day expansion of look-back period for URMA precipitation analysis
  - Q3/Q4 FY15
    - Wind downscaling enhancements
    - maximum/minimum temperature, ceiling heights, 10m wind, and significant wave height will be added
    - Use EMC/GFE common topography and land/sea masks
    - Enhanced variational observation quality control within the GSI
    - Westward extension of 2.5km CONUS grid for OPC
    - Implement URMA for Alaska
    - Add GLERL-type coastal observation adjustment to improve wind analysis over the Great Lakes
    - Grids extending to HI, Puerto Rico, and Guam
- SREF upgrade
  - Still targeted for FY15Q2 upgrade; horizontal resolution will remain at 16-km, but membership increases to twenty-six (13 NEMS-NMMB, 13 WRF-ARW)
  - Increase from 35 to 40 levels
  - More physics diversity and stochastic physics parameters
  - Initial conditions diversity is enhanced: (a) mix use of multiple analyses (NDAS, GFS and RAP) for each model core, and (b) blending of GEFS and SREF IC perturbations for all members
  - Uses bred vectors and global EnKF to perturb initial conditions
  - Physics diversity is enhanced: (a) more variety of physics schemes, and (b) stochastic flavor in physics parameters (GWD and soil moisture)
- Next NAM upgrade is scheduled for FY15 Q4 or early FY16
  - Nests for both CONUS and AK will increase to 3km resolution (from 6km and 4km, respectively)
  - Physics upgrades to reduce warm season high QPF bias in CONUS nest
  - LSM upgrades to reduce winter afternoon cool bias over the CONUS
  - Upgrades to GSI analysis and data assimilation
    - Replace NDAS' 3 hr update frequency with RAP-like hourly cycle of

- NAM Rapid Refresh (NAMRR)
      - Continue NDAS-like reach-back to GDAS with catch-up cycle every 6-h or 12-h
      - 4-d version of hybrid ensemble variational analysis
      - Diabatic digital filter radar-derived temp. tend. & cloud analysis
      - Tropical cyclone relocation [Sandy Supplemental]
  - Hourly updated analysis, which will incorporate reflectivity to improve precip
  - Upgrade observation processing
    - Accommodate TAC –to–BUFR conversion of international transmissions including high density radiosondes with thousands of levels in vertical
    - Use Doppler obs from MRMS ingest on IDP with 3 new Caribbean sites [SS]
    - Improve radial wind qc and start moving MRMS into GSI [NextGen]
  - New observations in analysis and data assimilation
    - SEVIRI, NOAA17-18 SSMIS, Metop\_B (IASI, HIRS4, AMSUA, MHS), Himawari, NPP (ATMS, CRIS), ...
    - New sources of aircraft observations [Sandy Supplemental]
    - Tower & nacelle obs from wind power producers
  - Moving toward future hi-res ensembles (NARRE/HRRRE)
- RAP version 3 and HRRR version 2 FY15 upgrade information
  - WRF-ARW v3.6 core
    - RRTMG radiation scheme
    - Upgrade to Thompson microphysics, MYNN PBL, and RUC land surface model and cumulus parameterization (RAP)
    - Introduce shallow cumulus parameterization to HRRR (Grell-Freitas)
    - HRRR will use hybrid data assimilation
    - Improvements to 2m temperature and dewpoint background estimate

**2c. Marine Modeling and Analysis Branch (MMAB) (From NCEP Production Suite Review presentation)**

- RTOFS Global ocean model (v1.1.0) - FY15
  - Increase from 32 to 41 layers
    - Air-sea boundary flux improvements
    - Finer resolution for mixed layer (9 new near-surface layers)
    - Improved vertical coastal resolution
  - 2-way coupled HYCOM with Los Alamos Community ICE code (CICE)
    - 1-hour coupling frequency
    - Additional forecasts (ice thickness, concentration, drift and speed)

- RTOFS Atlantic (v 3.0.0) - FY15
  - Update codes to unify with RTOFS Global
  - Improved basin geometry
  - Updates to data assimilation algorithm with new surface data sets
- Sea-ice modeling - changes coming for FY15
  - Ice concentration analysis
    - Adding AMSR2 and SSMI/S
    - Update weather filter
  - Ice drift model - Updating for new GEFS
- Real-Time Global SST - changes coming for FY15
  - Adding GOES, VIIRS, METOP-B, and AMSR2 data sources
  - Updated land treatment and climatology reference
- Global Wave model planned FY15 upgrades
  - Upgraded physics package: More wave energy in previous regions of negative bias
  - Extend grid domain to North Pole

### 3. NATIONAL OCEAN SERVICE (*from NCEP Production Suite Review presentation*):

NOS Operational Forecast System transitioning to NCEP

- Lake Erie upgrade FY15 Q4 - Resolution will be increased to 2.5km and forecasts will be available out to 120 hours.
- Future planned upgrades
  - FY 16 - Cook Inlet (AK), Lake Michigan
  - FY17 - Gulf of Maine OFS, Huron-Erie Corridor
  - FY18 - West Coast OFS, Lake Superior OFS
  - FY19 - Lake Ontario OFS

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

#### 4a. MDL (*Phil Shaffer*)

- Refresh of GFS MOS guidance to coincide with model upgrade in January, 2015 - cool season equations. Parameters - Temperature, Dew point, Max/Min Temperature, and Wind
- Q2 FY15
  - Probabilistic Storm Surge (PSURGE) upgrade. Increase temporal resolution from 6-hourly to 1-hourly time steps for “incremental exceedance above datum” products. Output will be on 2.5km grid - expected in early March
  - Extratropical Storm Surge (ETSS) upgrade. (March 2015)
    - Nest coarse extratropical basins with fine-scale tropical basins for East Coast and Gulf of Mexico
    - Implement inundation code for storm surge

- Operationalize post processing methods for computing total water level at stations
  - Refresh of GFS MOS for warm season equations delivered around mid-March
  - Extend GFS-based gridded MOS for CONUS and Alaska to Day 10
- Q3 FY15
  - Gridded LAMP upgrade - improves temperature/dew point/ceiling height and visibility. Add winds and sky cover
  - ECMWF-based MOS implementation for 00Z and 12Z - May
  - NAM MOS upgrade expected in June

#### **4b. NCEP Centers and NWS Regions**

- Weather Prediction Center (WPC) (*Keith Brill, Tony Fracasso*): Nothing to report.
- Storm Prediction Center (SPC) (*Israel Jirak, Andy Dean*): Nothing to report.
- National Hurricane Center (NHC) (*Hugh Cobb, Dave Zelinsky, Mike Brennan*): Nothing to report.
- Space Weather Prediction Center (SWPC) (No representative)
- Ocean Prediction Center (OPC) (No representative)
- Aviation Weather Center (No representative)
- Pacific Region (PR): (No representative)
- Alaska Region (AR): (No representative)
- Western Region (WR): (No representative)
- Southern Region (SR): (No representative)
- Eastern Region (ER) (No representative)
- Central Region (CR) (*John Eise*): Nothing to report.
- OHD (No representative)

#### **5. NESDIS (no representative)**

**The next Synergy Meeting is tentatively scheduled for January 26, 2015 at 2:30 pm EST in NCWCP conference room 2890, with remote teleconferencing capability.**

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