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PNSWSH

Technical Implementation Notice 16-41
National Weather Service Headquarters Washington DC
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To: Subscribers:
     -NOAA Weather Wire Service
     -Emergency Managers Weather Information Network
     -NOAAPORT
      Other NWS Partners, Users and Employees

From: Dave Myrick
         NWS Office of Science and Technology Integration

Subject: Upgrade to the North American Mesoscale (NAM) Forecast
          System and Discontinuation of Downscaled GFS by NAM
          Extension (DGEX) Forecast System Effective
          February 1, 2017

Effective on or about February 1, 2017, beginning with the
1200 Coordinated Universal Time (UTC) run, the National Centers
for Environmental Prediction (NCEP) is proposing to implement
Version 4 of North American Mesoscale (NAM) and discontinue the
Downscaled GFS by NAM Extension (DGEX) Forecast System. Changed
include the following:

- Discontinue all DGEX model output
- Remove legacy NAM products on NOAAPORT and NCEP/NWS servers
- Make resolution changes for NAM nests
- Make major changes to the NAM Data Assimilation System (NDAS)
- Make model changes to convection, microphysics, land-surface
upgrades; frequency of physics calls increased

FORECAST MODEL CHANGES

1) Resolution changes to the CONUS (from 4 km to 3 km), Alaska
(from 6 km to 3 km), and CONUS fire weather (from 1.333 km to
1.5 km) nests
2) More frequent calls of physics (now every 2nd time step for
all domains); change frequency of radiation updates for the NAM
12 km parent domain from hourly to every 20 minutes
3) Advect specific humidity every dynamics time step
4) Changes to Betts-Miller-Janjic convective scheme to improve
12 km parent QPF bias, especially during the cool season
5) Update Ferrier-Aligo microphysics to improve stratiform
precipitation, better anvil reflectivity, reduce areas of
light/noisy reflectivity over oceans
6) Improve effect of frozen soil on transpiration and soil
evaporation, leading to reduced cold/moist bias during cool
season
7) Radiation/microphysics changes to reduce incoming surface

shortwave radiation; reduced warm-season 2-m temperature bias

DATA ASSIMILATION / ANALYSIS CHANGES

1) Replace 12-h NAM Data Assimilation System (NDAS) with
3-h analysis updates for the 12 km parent domain with a 6-h data
assimilation cycle with hourly analysis updates for the 12 km
parent and the 3 km CONUS/Alaska nests. The Hawaii/Puerto
Rico/Fire weather nests will be initialized from the 12-km first
guess at the end of 6-h assimilation cycle.
2) Use of lightning data (from NLDN and ENL networks) and radar
reflectivity-derived temperature tendencies in the diabatic
digital filter initialization.
3) Add execution of the diabatic digital filter initialization
prior to the NAM forecast (was only run during NDAS in current
ops NAM version 3).
4) Assimilate new observation types:
  - Aircraft data: Aeromexico, ADS-C, Air-Wisconsin
  - New satellite radiance data: NOAA NPP (ATMS, CRIS),
    METEOSAT-10 SEVIRI, DMSP-F17 SSMIS; METOP-B AMSUA, MHS,
    IASI
  - New GPS Radio Occultation data: METOP-B 3 (subtype)
  - New satellite winds: Himawari-B, METEOSAT-7, 10 Imager WV
AMV,
    NOAA-15, 18, 19 AVHRR IR AMV, METOP-A, B AVHRR AMV

OTHER SCIENCE CHANGES

1) Reinstate use of 557th Weather Wing (formerly AFWA) 23 km
snow depth analysis using envelope adjustment.
2) Use a new climatology of fresh water lake temperatures
(FLAKE) for inland water bodies not resolved by the 1/12th
degree RTG_SST_HR analysis in the CONUS, Alaska and Fire weather
nests
3) Reduce terrain smoothing in all NAM nest domains
3) Use NESDIS burned area data (30-day and 2-day average) in the
fire weather nest; greenness fraction and albedo are adjusted
based on the 30-day average, top-layer soil moisture based on
the 2-day average
4) Perform rropical cyclone relocation for the 12 km parent
domain at the start of the 6-h catchup cycle and for the NAM
forecast first guess.

OUTPUT CHANGES TO WEB SERVICES

Files below can be found on the following NCEP services:
  nomads.ncep.noaa.gov/pub/data/nccf/com/nam
  www.ftp.ncep.noaa.gov/data/nccf/com/nam
  ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nam

1) Change output grid for nests:

CONUS nest: change from grid #227 to the same output grid as the
HRRR (see
http://www.emc.ncep.noaa.gov/mmb/namgrids/conusoutgrid.jpg" for
difference)
  nam.tCCz.conusnest.hiresfFF.tm00.grib2
     Where CC is cycle and FF is forecast hour 00-60
Alaska nest: change from the 6 km NDFD grid to the 3 km NDFD
grid
  nam.tCCz.alaskanest.hiresfFF.tm00.grib2

2) Output all NAM nests grids hourly from 0-60 hour; in the
current ops NAMv3 they were output hourly from 0-36h and
3-h from 39-60 hour.

3) Add 1-h maximum precipitation rate (PRATE) and frozen
precipitation rate (SRWEQ) to the following grids:
  nam.tCCz.awip32FF.tm00.grib2
  nam.tCCz.awip12FF.tm00.grib2
  nam.tCCz.awak3dFF.tm00.grib2
  nam.tCCz.##nest.hiresfFF.tm00.grib2
     Where CC is cycle and FF is forecast hour and ## is either:
alaska, conus, prico, hawaii, firewx

4) Add a new visibility field based on the GSD algorithm to the
following output grids (this field is labeled with vertical
level=cloud top (VIS)
  nam.tCCz.awip3dFF.tm00.grib2
  nam.tCCz.awipakFF.tm00.grib2
  nam.tCCz.awip12FF.tm00.grib2
  nam.tCCz.awphysFF.tm00.grib2
  nam.tCCz.awip32FF.tm00.grib2
  nam.tCCz.awak3dFF.tm00.grib2
  nam.tCCz.awiphiFF.tm00.grib2

nam.tCCz.(alaska|conus|prico|hawaii|firewx)nest.hiresfFF.tm00.gr
ib2
  Where CC is the cycle time and FF is the forecast hour

5) Change ceiling height (HGT) in the NAMv4 from height above
ground level to height above mean sea level for all output files

6) Rename the NAM 12km CONUS grid #218 file:
  nam.tCCz.awphysFF.grb2.tm00 -> nam.tCCz.awphysFF.tm00.grib2

7) Rename the 0.108 deg lat/lon Caribbean grid:
  nam.tCCz.afwacaFF.grb2.tm00 -> nam.tCCz.afwacaFF.tm00.grib2

8) Rename the 0.108 deg lat/lon Hawaii grid:
  nam.tCCz.afwahiFF.grb2.tm00 -> nam.tCCz.afwahiFF.tm00.grib2

9) The current NAM 12km Alaska grid #242 file contains both
surface and upper level data. Rename NAMv4 and change it to
contain mostly pressure level data:

nam.tCCz.awak3dFF.grb2.tm00 -> nam.tCCz.awak3dFF.tm00.grib2

A second grid #242 file called is being added to the server containing mostly surface fields that will not be in the new awak3d file:
  nam.tCCz.awp242FF.tm00.grib2

10) Write NAMv4 output files on the NCEP/NWS web servers as GRIB2 format from the post-processing, instead of first being written out in GRIB1 format and converted to GRIB2. Users may see some differences with the encoding and are encouraged to upgrade their software to handle this. Please see the links below for upgraded code:
  http://www.nco.ncep.noaa.gov/pmb/codes/GRIB2
  http://www.cpc.ncep.noaa.gov/products/wesley/wgrib2
  ftp://ftp.cpc.ncep.noaa.gov/wd51we/wgrib

11) Change the number of days archived on the NCEP web services from 28 days to 7 days.

PRODUCT REMOVALS FROM WEB SERVICES

NCEP solicited public feedback through PNS 16-34 NAM Removals. After balancing user comments with the code management of the production suite the following changes will be made:

http://www.nws.noaa.gov/om/notification/pns16-34nam_removalaaa.htm

Files below can be found on the following
NCEP servers via
  nomads.ncep.noaa.gov/pub/data/nccf/com/nam
  www.ftp.ncep.noaa.gov/data/nccf/com/nam
  ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nam
Or NWS servers via
  http://tgftp.nws.noaa.gov/SL.us008001/ST.opnl/MT.nam_CY.CC
  ftp://tgftp.nws.noaa.gov/SL.us008001/ST.opnl/MT.nam_CY.CC

1) NAM Products listed will be discontinued from all NCEP web services
  nam.tCCz.awip12FF.tm00.10m.uv.grib2
  nam.tCCz.awp217FF.tm00_icwf.grib2
  nam.tCCz.awipakFF.tm00_icwf.grib2
  nam.tCCz.awip218tiles_fFF.grib2.tar.gz
  nam.tCCz.awip32tiles_fFF.grib2.tar.gz
  tiles.tCCz directory
    NOTE: Users who wish to obtain a subset of NAM grids can generate then directly using the grid sub setting option on the NCEP NOMADS server at http://nomads.ncep.noaa.gov (click on "grib filter" option)
  nam.tCCz.grb5fmFF.tm00.grib2
  nam.tCCz.grb_fmFF.tm00.grib2
    NOTE: Users can replace these with the 90 km North American

polar stereographic grid #104: nam.tCCz.grbgrdFF.tm00.grib2
  nam.tCCz.smartconusFF.tm00.grib2
  nam.tCCz.smartakFF.tm00.grib2
    NOTE: Users should instead be using the higher resolution
2.5/3km NAM DNG products

2) The following will be discontinued from the NWS servers:
  fh.00FF_tl.press_gr.awp218
  fh.00FF_pa.sw10m_tl.press_gr.awip12
  fh.00FF_tl.press_gr.awip20
  fh.00FF_tl.press_gr.awip3d
  fh.00FF_tl.press_gr.awp211
    NOTE: Users can access these data sets on the NCEP servers
as direct grib output or by using NOMADS grib filter. Please
reference this page for file name changes:
  http://www.nco.ncep.noaa.gov/pmb/products/nam/

3) The ndas.YYYYMMDD directories on the NCEP servers will be
discontinued. All grids and BUFR observation files from the
NAMv4 6-h assimilation cycle will be written into the
nam.YYYYMMDD directory. Since the 12-h NDAS will be replaced by
a 6-h data assimilation cycle with hourly analyses, the grid
#212 files from the current NDAS, for example:
./ndas.YYYYMMDD/ndas.tCCz.awip3d(00|01|02|03).tm12|09|06|03.grib
2 will be replaced by:
./nam.YYYYMMDD/nam.tCCz.awip3d(00|01).tm06|05|04|03|02|01.grib2
where YYYYMMDD is the cycle date, CC the cycle time

4) All DGEX model output from the NCEP servers under
dgex/prod/dgex.YYYYMMDD will be discontinued. The DGEX model
will no longer be run within the NCEP model suite.
  Where YYYYMMDD is year, month, day

5) Remove the NAM grid 215 products under directory
"PT.grid_DF.bb/" on the NWS web servers.

NOAAPORT PRODUCT TERMINATIONS

NCEP solicited public feedback through PNS 16-34 NAM Removals.
After balancing user comments with the code management of the
production suite the following changes will be made:

http://www.nws.noaa.gov/om/notification/pns16-
34nam_removalaaa.htm

1) 00z and 12z cycle FAX charts
Description   WMO Headers
00 Hour 200MB Isobar/Temp QHUA17 KWBC
00 Hour 500MB Isobar/Temp QHTA11 KWBC
00 Hour 700MB Isobar/Temp QHTA07 KWBC
00 Hour 850MB Isobar/Temp QHUA04 KWBC
Analysis 300MB Isobar   QHUA15 KWBC
This legacy code can no longer be supported on the next
generation supercomputer. If users are interested in the code to

create the charts, please contact EMC below. NCEP will also investigate the possibility of the MAG creating replica charts.

Please see the link below for the exact WMO headers for items 2-4:
http://www.nco.ncep.noaa.gov/pmb/changes/nam_TIN_AWIPS_grids.shtml

2) Removal of the lower resolution only for: NAM NDFD 5km CONUS (grid 197) and 6km Alaska grids (grid 198)

3) Removal of grid 217, 22 km Alaska region Polar Stereographic

4) Removal of grid 215, 20km Regional CONUS

4) Removal of all DGEX products

PARALLEL DATA:

A consistent parallel feed of data is available on the NCEP server via the following URLs:
http://para.nomads.ncep.noaa.gov/pub/data/nccf/com/nam/para
http://para.nomads.ncep.noaa.gov/pub/data/nccf/noaaport/nam

For more general information about the NAM, please see:

http://www.emc.ncep.noaa.gov/?branch=NAM

NCEP urges all users to ensure their decoders can handle changes in content order, changes in the scaling factor component within the product definition section (PDS) of the GRIB files, and volume changes. These elements may change with future NCEP model implementations. NCEP will make every attempt to alert users to these changes before implementation.

Any questions, comments or requests regarding this implementation should be directed to the contacts below. We will review any feedback and decide whether to proceed.

For questions regarding the science aspects, please contact:

Eric Rogers
NCEP/EMC/Mesoscale Modeling Branch
College Park, MD
301-683-3682
eric.rogers@noaa.gov

For questions regarding the data flow aspects of these datasets, please contact:

Carissa Klemmer
NCEP/NCO Dataflow Team Lead
College Park, Maryland 20746
301-683-0567

ncep.list.pmb-dataflow@noaa.gov

NWS National Technical Implementation Notices are online at:

http://www.nws.noaa.gov/os/notif.htm

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