

NOUS41 KWBC 101140  
PNSWSH

Service Change Notice 19-84  
National Weather Service Headquarters Silver Spring MD  
740 AM EDT Thu Oct 10 2019

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From:         Bob Maxson  
              Acting Director  
              National Centers for Environmental Prediction

Subject: Upgrade NCEP Global Forecast Systems to v15.2.0: Effective on or about November 7, 2019

Effective on or about November 7, 2019, beginning with the 1200 Coordinated Universal Time (UTC) run, the National Centers for Environmental Prediction (NCEP) will upgrade the Global Forecast System (GFS) from version 15.1.0 to 15.2.0.

GFS version 15.1.0 was implemented into operations at the 12Z cycle on June 12, 2019. It was the first GFS implementation with the finite-volume cubed-sphere (FV3) dynamical core as the NWS's Next Generation Global Prediction System (NGGPS).

GFS version 15.2.0 is a minor upgrade that includes:

- Ingesting new and replacement of satellite observations for data assimilation
- Assimilating more Sea Surface Temperatures (SST) observations
- Adding new output files on NOAA National Operational Model Archive and Distribution System (NOMADS)
- Fixing a mask issue of several land surface fields
- Decommissioning legacy vessel icing and replace with high resolution
- Adding stations to Binary Universal Form for the Representation of meteorological data (BUFR) soundings

1) Assimilate new satellite observations

- GOES-17 Atmospheric Motion Vector (AMV): GOES-15 AMVs will no longer be assimilated at this time.

GOES-17 has already replaced GOES-15 as the operational GOES-West satellite. Distribution of GOES-15 products is expected to cease around December 2019 and active assimilation of GOES-17 AMVs is required to prevent a gap in data coverage.

- Metop-C Advanced Microwave Sounding Unit (AMSU) and Microwave Humidity Sounder (MHS):

- Metop-C is now the primary satellite in the 9:30 AM orbit.

Assimilation of these data provides additional impact as well as adding robustness to the system.

- Korea Multi-Purpose Satellite (KOMPSAT-5) GPS Radio Occultation provides additional robustness to the system.  
- Addition changes were made to Visible Infrared Imaging Radiometer Suite (VIIRS) AMV ingest code to allow continued use after an expected change to the BUFR format.

2) Assimilating all BUFR Buoy sea-surface temperature (SST) data format changes in the buoy network resulted in a reduction of available SST measurements from buoys to 10 percent or less of expected levels. This change will restore data counts to previous levels.

3) New product: Graphical Turbulence Guidance (GTG). Global Turbulence product generated using National Center for Atmospheric Research (NCAR) GTG algorithm will start being disseminated on NOMADS. The product will be available every three hours from F03 to F36, and horizontal resolution will be a quarter degree.

pub/data/nccf/com/gfs/prod/gfs.YYYYMMDD/CC/gfs.t{CC}Z.gtg.0p25.fFFF.grib2  
Where YYYYMMDD is year, month, day and CC is cycle, and FFF is forecast hour.

4) Update the Unified Post Processor (UPP) to address a mask issue of several land surface fields over water bodies in gridded binary version 2 (GRIB 2) products.

This update will make GFS.v15.2 pressure-grid products more consistent with GFS.v14 products and remove spurious soil moisture along coastlines. These land surface fields include Soil Moisture, Soil Temperature, Liquid Volumetric Soil Moisture, Water Equivalent of Accumulated Snow Depth (WEASD), Snow Depth, Water Runoff, Ground Heat Flux (GFLUX), Wilting Point (WILT), and Field Capacity (FLDCP).

Affected product files on NCEP Web Services:

gfs.t{CC}z.pgrb2.0p25.f{FFF}  
gfs.t{CC}z.pgrb2b.0p25.f{FFF}  
gfs.t{CC}z.pgrb2.0p50.f{FFF}  
gfs.t{CC}z.pgrb2b.0p50.f{FFF}  
gfs.t{CC}z.pgrb2.1p00.f{FFF}  
gfs.t{CC}z.pgrb2b.1p00.f{FFF}  
gfs.t{CC}z.sfluxgrbf{FFF}.grib2

Where CC is cycle for 00, 06, 12, 18 UTC, and FFF is forecast hour.

5) A new land-sea mask (named as LANDN sfc) based on bilinear interpolation will be added to pgrb2 files for GFS and Global Data Assimilation System (GDAS) products for all forecast hours on the NCEP Web Services.

6) The vessel icing program uses Optimum Interpolation Sea Surface Temperature (OISST) as input. A decision was made to move the vessel icing program within the Unified Post Processor (UPP) and use GFS forecast skin temperature as input.

The following vessel icing products will be terminated:

sice.tCCz.siceg.grib2  
sice.tCCz.siceg\_1x1.all.grib2  
sice.tCCz.siceg\_akw.grib2

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/omb/prod/sice.YYYYMMDD/>  
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/omb/prod/sice.YYYYMMDD>  
<https://www.ftp.ncep.noaa.gov/data/nccf/com/omb/prod/sice.YYYYMMDD>

Where YYYYMMDD is year, month and day

Users will find the replacement vessel icing product included as a variable (ICEG) in GFS pressure-grid products:

gfs.tCCz.pgrb2.0p25.fFFF  
gfs.tCCz.pgrb2.0p50.fFFF  
gfs.tCCz.pgrb2.1p00.fFFF

Available at 0.25, 0.5, and 1.0 degree resolutions. They will be disseminated to the public on the NCEP Web Services here:

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/gfs/prod/gfs.YYYYMMDD/CC>  
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/gfs/prod/gfs.YYYYMMDD/CC>  
<https://www.ftp.ncep.noaa.gov/data/nccf/com/gfs/prod/gfs.YYYYMMDD/CC>

Where YYYYMMDD is year, month, and day, where CC is cycle, and where FFF is the forecast hour

7) Add three stations to the GFS station time series BUFR soundings:  
006011 62.02N 6.76W TOR 00 Thorshvan, Denmark 54 User Request 4-19  
999913 15.51S 128.15E WYN 00 Wyndham aerodrome Australia 4 User Request 1-19  
999914 57.48N 7.36W EGPL 00 Benbecula, Scotland, UK 6 User Request 1-19

The output will be available on NCEP Web Services GFS directory with names:

gfs.tCCz.bufrsnd.tar.gz

Three additional files for the stations:

bufr.006011.YYYYMMDDCC  
bufr.999913.YYYYMMDDCC  
bufr.999914.YYYYMMDDCC

Where YYYYMMDD is year, month and day, and CC is cycle

8) Reduction of water temperature biases in small lakes. For small lakes, adequate observations do not always exist to support the analysis of lake surface temperature, often leading to significant departures from both the climatology and real-time observation. Two changes were introduced to ensure that lake temperatures do not deviate from the climatology when observations are not available. The first change replaces a surface mask file at 0.5-degree resolution with one on the T1534 Gaussian grid (~13 km) to prevent unrealistic SST climatology from being used to update the background of the near sea-surface temperature analysis over small water bodies, such as those in the Great Salt Lake.

The second change is to reduce the relaxation time scale of the SST to climatology in GDAS forecast step from 90 days to 10 days.

A static sample of the new output is available on para nomads:  
<https://para.nomads.ncep.noaa.gov/pub/data/nccf/com/gfs/para/>

For questions regarding these GFS system changes, please contact:

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National Service Change Notices are online at:  
<https://www.weather.gov/notification/>

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