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PNSWSH

Technical Implementation Notice 16-31 Amended  
National Weather Service Headquarters Washington DC  
850 AM EDT Tue Oct 18 2016

To: Subscribers:  
-NOAA Weather Wire Service  
-Emergency Managers Weather Information Network  
-NOAAPORT  
Other NWS Partners, Users and Employees

From: Tim McClung  
Portfolio Manager  
Office of Science and Technology Integration

Subject: Amended: Changes to GFS-based Model Output  
Statistics (MOS) Guidance effective on or about  
November 15, 2016

Amended to postpone the implementation date from Thursday,  
November 3, 2016, to Tuesday, November 15, 2016.

On or about Tuesday, November 15, 2016, beginning with the  
1200 Coordinated Universal Time (UTC) model run, the NWS  
Meteorological Development Laboratory (MDL) will implement  
changes to the Global Forecast System (GFS)-based Model Output  
Statistics (MOS) station-based and gridded guidance. These  
changes will include:

1. Updated cool and warm season equations for certain elements  
contained in the short-range GFS MOS text (MAV) and BUFR  
messages for the 0000, 0600, 1200 and 1800 UTC cycles. These  
updates will include the following elements:

- Daytime Maximum and Nighttime Minimum Temperature
- 2-meter Temperature
- 2-meter Dewpoint Temperature
- Wind speed
- Wind direction
- 6-/12-h probability of precipitation
- 6-/12-h categorical precipitation amount

2. Updated cool and warm season equations for certain elements  
contained in the medium-range GFS MOS text (MEX) and BUFR  
messages for the 0000 and 1200 UTC cycles. These updates will  
include the following elements:

- Daytime Maximum and Nighttime Minimum Temperature
- 2-meter Temperature
- 2-meter Dewpoint Temperature
- Maximum sustained surface wind (12-h)

12-/24-h probability of precipitation  
12-/24-h categorical precipitation amount

3. Updated cool and warm season maximum and minimum temperature guidance for all cycles of the short-range and extended-range Cooperative Observer Program (COOP) maximum and minimum temperature messages, known by their AWIPS IDs MCG and MCX, respectively.

4. Updated cool and warm season equations for all cycles of the marine MOS message, known by its AWIPS ID: MMG. These updates include the following elements:

- Air temperature
- Dewpoint temperature
- Wind speed
- Wind direction

For changes 1-4 above, current equations will be retained for a small number of stations that did not have a sufficient sample to develop new equations. There are no stations being dropped from the MAV, MEX, MMG, MCG or MCX messages at this time.

5. Adding 910 stations to the GFS-based short-range and extended-range COOP maximum and minimum temperature messages. A list of the stations being added can be found at:

[http://www.mdl.nws.noaa.gov/~mos/mos/gfsmos\\_eval/changes/new\\_sites2016.php#coop](http://www.mdl.nws.noaa.gov/~mos/mos/gfsmos_eval/changes/new_sites2016.php#coop)

6. Updated cool and warm season mesonet guidance for the 0000 and 1200 UTC cycles. These updates will include the following elements:

- Daytime Maximum and Nighttime Minimum Temperature
- 2-meter Temperature
- 2-meter Dewpoint Temperature
- Wind Speed
- Wind Direction

Mesonet guidance is used in the GFS MOS River Forecast Center (RFC) SHEF message (known by the AWIPS IDL: FTP) and also influences the Gridded MOS analysis for temperature and wind. No new sites are being added to the FTP message at this time. New mesonet sites will be added to the Gridded MOS analysis in a future upgrade.

7. Expansion of dissemination grid for 2.5-km CONUS Gridded MOS products. The output grid for 2.5-km CONUS Gridded MOS will be expanded northward by 220 grid lengths (~340 miles) to provide coverage for the full Northwest RFC domain. The dimensions of the output grid will change from 2145 X 1377 to 2145 X 1597. Other grid characteristics (grid projection and grid resolution) will be unchanged. This change will affect all 2.5 km CONUS

Gridded MOS products disseminated over the Satellite Broadcast Network, NOAAPORT, to the NCEP FTPPRD server and to TGFTP/NDGD. Users can find comparison graphics for parallel and operational 2.5-km CONUS Gridded MOS at the following link (This page is not operationally supported and guidance may not be current):

[http://www.mdl.nws.noaa.gov/~mos/gmos/conus25\\_all/view\\_gmos\\_comp.php](http://www.mdl.nws.noaa.gov/~mos/gmos/conus25_all/view_gmos_comp.php)

8. Replacing hi-res MOS (HRMOS) probability of precipitation (PoP) and quantitative precipitation amount (QPF) with the standard PoP/QPF in the CONUS Gridded MOS analysis. This change will provide coverage for the Northwest RFC domain and will incorporate the latest updates to the station-based PoP/QPF equations.

9. Adding new terrain and land-water mask to the Gridded MOS analysis for CONUS. This new mask and terrain set is the result of a coordinated effort between MDL, EMC and the AWIPS program to generate a single terrain and land/water dataset for use in the Real Time Mesoscale Analysis/UnRestricted Mesoscale Analysis (RTMA/URMA), Gridded MOS, National Blend of Models, and AWIPS/GFE.

10. Expanding gridded MOS guidance coverage over Alaska. The forecast extent of Gridded MOS guidance over Alaska will be expanded eastward to cover the Yukon River Basin and will be expanded northward to include offshore Arctic marine zones. The coverage expansion will affect the following Alaska Gridded MOS elements:

- Daytime Maximum and Nighttime Minimum Temperature
- 2-meter Temperature
- 2-meter Dewpoint Temperature
- Wind speed, wind direction, wind gust
- 6-/12-h probability of precipitation
- 6-/12-h quantitative precipitation amount
- Relative humidity
- Total sky cover

This expansion only affects the extent to which Gridded MOS forecasts are produced. Guidance will continue to be disseminated on the NDFD Alaska grid. Forecast coverage for elements not listed above is not being expanded at this time. Users can find graphics for the expanded Alaska Gridded MOS at the following link (This page is not operationally supported and guidance may not be current.):

[http://www.mdl.nws.noaa.gov/~mos/gmos/conus25\\_all/view\\_gmos\\_AK\\_para.php](http://www.mdl.nws.noaa.gov/~mos/gmos/conus25_all/view_gmos_AK_para.php)

11. GFS MOS text, GRIB and BUFR products that currently reside on the NCEP FTPPRD server in the gfs.YYYYMMDDCC directory will be moved to a new directory named gfsmos.YYYYMMDD as follows

(YYYYMMDD denotes run date, CC is the cycle):

Old FTPPRD directory:

<http://ftpprd.ncep.noaa.gov/data/nccf/com/gfs/prod/gfs.YYYYYMMDDC>  
C

New FTPPRD directory:

<http://ftpprd.ncep.noaa.gov/data/nccf/com/gfs/prod/gfsmos.YYYYYMMDD>  
DD

12. Moving GFS MOS text products that currently reside on TGFTP to the NCEP FTPPRD server as follows:

Old TGFTP paths for GFS MOS text products:

<http://tgftp.nws.noaa.gov/SL.us008001/DF.anf/DC.mos/DS.mav>  
<http://tgftp.nws.noaa.gov/SL.us008001/DF.anf/DC.mos/DS.mavaf>  
<http://tgftp.nws.noaa.gov/SL.us008001/DF.anf/DC.mos/DS.mcg>  
<http://tgftp.nws.noaa.gov/SL.us008001/DF.anf/DC.mos/DS.mcx>  
<http://tgftp.nws.noaa.gov/SL.us008001/DF.anf/DC.mos/DS.mex>  
<http://tgftp.nws.noaa.gov/SL.us008001/DF.anf/DC.mos/DS.mexaf>

New path for GFS MOS text products (YYYYMMDD denotes run date):

<http://ftpprd.ncep.noaa.gov/data/nccf/com/gfs/prod/gfsmos.YYYYYMMDD/>

New filenames for each GFS MOS text product that will reside in the gfsmos.YYYYYMMDD directory on FTPPRD (CC denotes cycle):

mdl\_gfsmav.tCCz Short-range GFS MOS text product  
mdl\_gfsafmav.tCCz Short-range GFS MOS Air Force text product  
mdl\_gfsmcg.tCCz Short-range COOP text product  
mdl\_gfsmcx.tCCz Medium-range COOP text product  
mdl\_gfsmex.tCCz Medium-range GFS MOS text product  
mdl\_gfsafmex.tCCz Medium-range GFS MOS Air Force text product

The expected benefits of changes 1-10 include:

1. MOS station guidance will be better-tuned to the new version of the GFS model.
2. Northward expansion of 2.5 km CONUS Gridded MOS output grid will provide coverage for all of the Northwest RFC domain.
3. Replacement of HRMOS PoP/QPF with standard PoP/QPF analysis in Gridded MOS will provide coverage for the Northwest RFC domain.
4. Updated terrain and land-water masks give a better representation of topography and improve consistency with observational analysis datasets.
5. Expansion of Alaska Gridded MOS will provide coverage over the Yukon River Basin and Arctic offshore waters.

Tables 1-5 below list the communication identifiers for the affected products.

Due to the migration to a new computing platform, there will be

a slight change in dissemination times for GFS MOS products. Some products will be disseminated sooner, while most others will be delayed by no more than 5 minutes. The following Gridded MOS products for Alaska will be delayed by up to 10 minutes from their current dissemination time: extended-range precipitation potential index (PPI) and extended-range predominant weather. WMO headers for the affected Alaska Gridded MOS products are listed in Table 6 below.

Beginning approximately 1 month prior to the implementation date, users may find parallel data for download on NOAA's Parallel Operational Model Archive and Distribution System (NOMADS) at the following link:

<http://para.nomads.ncep.noaa.gov/pub/data/nccf/noaaport/gfsmos>

Table 1: Communication identifiers for the GFS-based MOS public text products affected by the updated station guidance: for Air Force MOS messages: xx = 01...29

WMO HEADING (SHORT RANGE)	AWIPS ID	WMO HEADING (EXTENDED RANGE)	AWIPS ID
FOCN20 KWNO	N/A	FECN21 KWNO	N/A
FOUS10 KWNO	MCGUSA	FEUS10 KWNO	MCXUSA
FOPA20 KWNO	MAVPA0	FEPA20 KWNO	MEXPA0
FOUS21 KWNO	MAVNE1	FEUS21 KWNO	MEXNE1
FOUS22 KWNO	MAVSE1	FEUS22 KWNO	MEXSE1
FOUS23 KWNO	MAVNC1	FEUS23 KWNO	MEXNC1
FOUS24 KWNO	MAVSC1	FEUS24 KWNO	MEXSC1
FOUS25 KWNO	MAVRM1	FEUS25 KWNO	MEXRM1
FOUS26 KWNO	MAVWC0	FEUS26 KWNO	MEXWC0
FOUS30 KWNO	MAVFxx	FEUS30 KWNO	MEXFxx
FOAK37 KWNO	MAVAJK	FEUS37 KWNO	MEXAJK
FOAK38 KWNO	MAVAFC	FEUS38 KWNO	MEXAFC
FOAK39 KWNO	MAVAFG	FEUS39 KWNO	MEXAFG
FQPA20 KWNO	MMGHI1		
FQUS21 KWNO	MMGNE1		
FQUS22 KWNO	MMGSE1		
FQUS23 KWNO	MMGGL1		
FQUS24 KWNO	MMGGF1		
FQUS25 KWNO	MMGNW1		
FQUS26 KWNO	MMGSW1		
FQAK37 KWNO	MMGAK1		

Table 2: Communication identifiers for the GFS-based MOS BUFR products affected by the updated station guidance

WMO HEADING (SHORT RANGE)	WMO HEADING (EXTENDED RANGE)	REGION
JSML30 KWNO	JSMT30 KWNO	PACIFIC REGION
JSML31 KWNO	JSMT31 KWNO	NORTHEAST CONUS
JSML32 KWNO	JSMT32 KWNO	SOUTHEAST CONUS

JSML33 KWNO	JSMT33 KWNO	NORTH CENTRAL CONUS
JSML34 KWNO	JSMT34 KWNO	SOUTH CENTRAL CONUS
JSML35 KWNO	JSMT35 KWNO	ROCKY MOUNTAIN CONUS
JSML36 KWNO	JSMT36 KWNO	WEST COAST CONUS
JSML37 KWNO	JSMT37 KWNO	ALASKA

Table 3: WMO superheaders for each 2.5 km CONUS Gridded MOS element affected by the output grid expansion

Listed below are representations of the superheaders where ii=98 for short-range guidance (days 1-3) and ii=97 for medium-range guidance (days 4-7). Elements indicated by (\*\*) include ii=96 for extra extended-range (days 8-11).

WMO SUPERHEADER	ELEMENT
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MAUZii KWBQ	Cond. prob. freezing precip.
MBUZii KWBQ	Cond. prob. frozen precip.
MCUZii KWBQ	Cond. prob. liquid precip.
YAUZii KWBQ	Total sky cover
YBUZii KWBQ**	Wind direction
YCUZii KWBQ**	Wind speed
YDUZii KWBQ**	12-h prob. of precipitation
YEUZii KWBQ**	2-meter temperature
YFUZii KWBQ**	2-meter dew point temperature
YGUZii KWBQ**	Daytime maximum temperature
YHUZii KWBQ**	Nighttime minimum temperature
YIUZii KWBQ	6-h quantitative precipitation
YJUZii KWBQ	6-h prob. of a thunderstorm
YLUZii KWBQ	Precipitation type best category
YMUZii KWBQ	Precipitation potential index
YNUZii KWBQ	Prob. of precip. occurrence
YRUZii KWBQ**	Relative humidity
YSUZii KWBQ	24-h snowfall amount
YUUZii KWBQ	6-h prob. of precipitation
YVUZii KWBQ	12-h quantitative precipitation
YWUZii KWBQ	Wind Gusts
YXUZii KWBQ	12-h prob. of a thunderstorm
YYUZii KWBQ	3-h prob. of a thunderstorm
YZUZii KWBQ	Predominant weather

Table 4: WMO superheaders for each Alaska Gridded MOS element affected by the coverage expansion

Listed below are representations of the superheaders where ii=98 for short-range guidance (days 1-3) and ii=97 for medium-range guidance (days 4-7). Elements indicated by (\*\*) include ii=96 for extra extended-range (days 8-11).

WMO SUPERHEADER	ELEMENT
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LARZii KWBQ	Total sky cover
LBRZii KWBQ**	Wind direction
LCRZii KWBQ**	Wind speed

LDRZii KWBQ**	12-h prob. of precipitation
LERZii KWBQ**	2-meter temperature
LFRZii KWBQ**	2-meter dew point temperature
LGRZii KWBQ**	Daytime maximum temperature
LHRZii KWBQ**	Nighttime minimum temperature
LIRZii KWBQ	6-h quantitative precipitation
LRRZii KWBQ**	Relative humidity
LURZii KWBQ	6-h prob. of precipitation
LVRZii KWBQ	12-h quantitative precipitation
LWRZii KWBQ	Wind Gusts

Table 5: WMO superheaders for CONUS Gridded MOS elements affected by the replacement of HRMOS PoP/QPF with the standard PoP/QPF analysis

Listed below are representations of the superheaders where ii=98 for short-range guidance (days 1-3) and ii=97 for medium-range guidance (days 4-7). Elements indicated by (\*\*) include ii=96 for extra extended-range (days 8-11).

WMO SUPERHEADER	ELEMENT
YDUZii KWBQ**	12-h prob. of precipitation
YIUZii KWBQ	6-h quantitative precipitation
YUUZii KWBQ	6-h prob. of precipitation
YVUZii KWBQ	12-h quantitative precipitation

Table 6. WMO superheaders and corresponding tgftp filenames for the Alaska Gridded MOS products that will be delayed by up to 10 minutes from their current dissemination time.

WMO SUPERHEADER	ELEMENT	TGFTP FILENAME
LMRZ97 KWBQ	Precip. Potential Index	ds.ppi.bin
LZRZ97 KWBQ	Predominant weather	ds.wx.bin

For questions regarding the changes to GFS-based MOS guidance please contact:

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For questions regarding the data flow, please contact:

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A Web page outlining the gridded MOS guidance can be found at:

<http://www.nws.noaa.gov/mdl/synop/gmos.php>

Links to MOS products and descriptions are online at:

<http://www.nws.noaa.gov/mdl/synop>

NWS national Technical Implementation Notices are online at:

<http://www.weather.gov/os/notif.htm>

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