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PNSWSH

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From: Tim McClung
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Subject: Changes to GFS-based Model Output Statistics (MOS)
Guidance December 17, 2014

On or about Wednesday, December 17, 2014, beginning with the 1200 Coordinated Universal Time (UTC) model run, the NWS Meteorological Development Laboratory (MDL) will implement a refresh of the Global Forecast System (GFS)-based Model Output Statistics (MOS) guidance to coincide with the GFS model upgrade. These changes will also impact the Localized Aviation MOS Program (LAMP) products beginning with the 1600 UTC cycle.

MDL has created a comparison webpage for the short-range and extended-range GFS-based MOS text bulletins. The following link will be active until on or about December 17:

http://www.mdl.nws.noaa.gov/~mos/mos/gfsmos_eval/moscomp.php

This update will include the following changes to GFS-based MOS text and BUFR products:

1. Updated cool season equations for the short-range (Days 1-4) MOS text and BUFR messages from the 0000, 0600, 1200 and 1800 UTC model runs. The updates will include the following elements:

- Daytime Maximum and Nighttime Minimum Temperature
- 2-meter Temperature
- 2-meter Dewpoint Temperature
- Wind Speed
- Wind Direction
- Conditional Probability of Freezing Precipitation
- Conditional Probability of Frozen Precipitation
- Precipitation Type Best Category
- 24-h Categorical Snowfall Amount

2. Updated cool season equations for the extended-range

(Days 1-7) MOS text and BUFR messages from the 0000 and 1200 UTC model runs. The updates will include the following elements:

Daytime Maximum and Nighttime Minimum Temperature
2-meter Temperature
2-meter Dewpoint Temperature
Wind Speed
Wind Direction
Conditional Probability of Freezing Precipitation Occurring (12-h)
Conditional Probability of Snow Occurring (12-h)
Conditional Probability of Rain/Snow Mix Occurring (12-h)
Precipitation Type Best Category (12-h)
24-h Categorical Snowfall Amount

3. Updated cool season maximum and minimum temperature equations for all cycles of the short-range and extended-range MOS COOP text message.

4. Updated cool season equations for the probability of precipitation occurrence on the hour (PoPO) and the probability of precipitation occurrence in a 3-h period (PoPO3) for all cycles of the short-range (days 1-4) MOS BUFR message.

5. Due to changes in reporting frequencies at some observing sites, some MOS stations no longer report sufficiently and some stations now have sufficient reports for statistical calibration. As a result, NWS will remove 15 stations and add 335 stations to the short-range and extended-range GFS MOS text bulletins (known by their AWIPS IDs MAV and MEX) and BUFR messages. The NWS will change the identifier used for one station in the GFS MOS text bulletins and BUFR messages: Tazewell City, VA, will change from K6V3 to KJFZ. This station has been included in the add and remove counts stated above.

6. NWS will remove 38 stations and add one station to the GFS MOS marine text message, known by the AWIPS ID MMG, and BUFR message.

7. NWS will remove 152 stations and add 197 stations to the GFS MOS River Forecast Center SHEF message known by its AWIPS ID FTP.

8. NWS will remove three stations from the short-range and extended-range GFS MOS Canadian text messages.

9. NWS will remove 1468 stations from the short-range and extended-range GFS MOS COOP messages. These stations have closed, stopped reporting or do not contain sufficient cases to develop a stable equation. Coop sites influence the Gridded MOS analysis for maximum and minimum temperature. The removal of these Coop sites is not expected to adversely impact the quality of the Gridded MOS maximum and minimum temperature guidance.

10. Stations will be added to existing regional equations for the following elements in the short-range and extended-range MOS text

and BUFR products:

Sky Cover
Probability of Precipitation
Quantitative Precipitation
Probability of a Thunderstorm
Conditional Probability of a Severe Thunderstorm
Ceiling Height
Visibility
Obstruction to Vision

These changes will slightly alter the format of the MAV, MEX, MMG and FTP messages because lines will be added or removed to accommodate the addition/removal of stations. The communication identifiers for the MOS text and BUFR products affected by these changes are shown in the tables below.

Due to a shorter sample of cool season retrospective model data being available for the 0600 and 1800 UTC cycles, users are advised that the MOS guidance for these cycles is not tuned as well to the new version of the GFS and may be somewhat degraded. In addition, guidance for Mesonet sites was not updated and as a result may be degraded. Until guidance for Mesonet stations can be redeveloped, steps are being taken to reduce the influence of these sites on the Gridded MOS analysis for temperature and wind. Text-based MOS products are not produced for Mesonet sites.

A web page outlining the station changes and equation updates is available at:

<http://www.nws.noaa.gov/mdl/synop/2014refresh/gfsmos2014.php>

This update will include the following changes to GFS-based LAMP text and BUFR products:

1. NWS will remove 15 stations from the LAMP text bulletin (known by the AWIPS ID LAV) and BUFR messages. In addition, the NWS will change the identifier used for one station in the LAMP text bulletins and BUFR messages: Tazewell City, VA, will change from K6V3 to KJFZ. K6V3 is included in the list of the 15 stations being removed and KJFZ is being added to the text bulletin and BUFR messages. No other stations are being added to the LAMP text bulletins at this time.

2. The GFS MOS changes above will slightly alter the format of the LAV messages because lines will be added in response to additions or removals of GFS MOS guidance for some elements. The communication identifiers for the LAMP text and BUFR products affected by these changes are shown in the tables below.

A web page outlining the LAMP station changes is available at:

http://www.nws.noaa.gov/mdl/gfslamp/docs/change_notice_Dec2014.shtml

Table 1: Communication identifiers for the GFS-based MOS public text products affected by the changes. For Air Force MOS messages with WMO headers FOUS30 and FEUS30, FXX = F01...F29

WMO HEADING (SHORT RANGE)	AWIPS ID	WMO HEADING (EXTENDED RANGE)	AWIPS ID
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

Table 2. Communication identifiers for the GFS-based Marine MOS text products affected by the changes

WMO HEADING	AWIPS ID
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 3. Communication identifiers for the GFS-based River Forecast Center MOS text products affected by the changes

WMO HEADING	AWIPS ID
FOUS12 KWNO	FTPCIN
FOUS12 KWNO	FTPHFD
FOUS12 KWNO	FTPKRF
FOUS12 KWNO	FTPMSR
FOUS12 KWNO	FTPPTR
FOUS12 KWNO	FTPRHA
FOUS12 KWNO	FTPRSA
FOUS12 KWNO	FTPSLR
FOUS12 KWNO	FTPTUR
FOAK12 KWNO	FTPACR

Table 4. Communication identifiers for the GFS-based Canadian MOS text products affected by the changes

WMO HEADING	WMO HEADING
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(SHORT RANGE) (EXTENDED RANGE)

FOCN20 KWNO FECN21 KWNO

Table 5. Communication identifiers for the GFS-based MOS BUFR products affected by the changes.

WMO HEADING WMO HEADING REGION
(SHORT RANGE) (EXTENDED RANGE)

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 6: Communication identifiers for the GFS-based LAMP public text product affected by the changes

WMO HEADING AWIPS ID

FOUS11 KWNO LAVUSA

Table 7: Communication identifiers for the GFS-based LAMP BUFR products affected by the changes

WMO HEADING REGION

JSMF10 KWNO	PACIFIC REGION
JSMF11 KWNO	NORTHEAST CONUS
JSMF12 KWNO	SOUTHEAST CONUS
JSMF13 KWNO	NORTH CENTRAL CONUS
JSMF14 KWNO	SOUTH CENTRAL CONUS
JSMF15 KWNO	ROCKY MOUNTAIN CONUS
JSMF16 KWNO	WEST COAST CONUS
JSMF17 KWNO	ALASKA

For questions regarding the updates to the GFS MOS guidance and station changes please contact:

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Links to the MOS products and descriptions are online at:

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

NWS national TINs are online at:

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

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