Proposal: Termination of Eta-Based MOS Products

1. Introduction

On June 20, 2006, the National Weather Service (NWS) replaced components of data assimilation, forecast model, and model output statistics used in the North American Mesoscale (NAM) portion of the NWS operational forecasting suite. The 3DVAR data assimilation system was replaced by Grid-point Statistical Interpolation data assimilation and the Eta model was replaced by the Non-hydrostatic Mesoscale version of the Weather Research Forecast model. For further information about the data assimilation and model changes, please see the following Technical Implementation Notice: http://www.nws.noaa.gov/om/notification/tin05-68aaa_eta_replacement.txt .

Prior testing showed that output from the non-hydrostatic mesoscale model could not be used in the Eta-based Model Output Statistics (MOS) forecast equations without degrading the accuracy of the MOS guidance. Consequently, at the same time the NAM changes were made, the NWS began running an interim 32-km Eta model with NAM initial conditions. This version of the Eta is run only during 0000 and 1200 UTC cycles to produce the Eta MOS guidance. Please see the following notice for further details: http://www.nws.noaa.gov/mdl/synop/tin/txt/tin06-40eta_mos_nmm_final.txt .

Since MOS guidance currently available from the Global Forecast System (GFS) is found to be generally more accurate than the Eta MOS guidance, and computational resources are limited, the NWS proposes to terminate all Eta MOS guidance products.

2. Reason for Changes

One of the underlying principles of the MOS approach used in the NWS is that the operational forecast equations need to be applied to nearly the same analysis and prediction system from which they were developed. The modifications to the data assimilation and model components of the NAM are so extensive that this underlying principle is violated. Verifications for the period of March 1, 2006, through May 31, 2006, support this hypothesis. During that period, test guidance was generated by applying the Eta-based MOS equations to output from the revised NAM suite running in a real-time parallel mode at NCEP. Comparisons between the accuracy of MOS guidance generated by this method and the operational Eta MOS guidance showed degradation significant enough to provide misleading information to the user community. Details about the verification can be found at: http://www.weather.gov/mdl/synop/wrfmoseval.htm. This result implies nothing about the quality of the new NAM forecasting system, but simply reflects that model characteristics and systematic errors explained by the Eta-based MOS equations are not the same for the non-hydrostatic mesoscale model.

Verifications and subjective assessments indicate the GFS-based MOS guidance products are more accurate generally; thus, the GFS-based MOS products provide a rea-

sonable replacement for the Eta-based guidance. In addition, the GFS-based MOS products are available from all four forecast cycles of the GFS, that is, 0000, 0600, 1200, and 1800 UTC, unlike the Eta-based MOS guidance which is available from the 0000 and 1200 UTC model runs only.

In order to provide time for users to transition to the GFS-based MOS, NWS is running an interim 32-km Eta model with NAM initial conditions during both the 0000 and 1200 UTC cycles. Output from this interim Eta model is being used to generate the Eta MOS guidance. NWS lacks the bandwidth resources to disseminate the direct model output from the 32 km Eta. Other resource limitations preclude running the interim 32-km Eta beyond early 2007.

It is proposed that dissemination of Eta-based MOS products be terminated 3 months following the approval of this proposal (after public comment and review). Alternatives to the proposed termination are not feasible because of limited resources within the NWS and the higher priority of continuing the expansion of gridded MOS based on the GFS.

3. List of Eta MOS Products Terminated/Proposed GFS MOS Replacements

All Eta MOS Products proposed for termination have equivalent products available from GFS MOS as described in the following sections on alphanumeric products, alphanumeric marine products, BUFR products, graphics products, and GRIB products.

i. Alphanumeric Messages – note that, for NWS forecasters, the products proposed for termination below will eliminate all MET messages in the AWIPS database.

Eta MOS WMO Header	Eta MOS AWIPS Identifier	Guidance Area	GFS MOS WMO Header	GFS MOS AWIPS Identifier
FOAK47 KWNO	METAJK	Southeast Alaska	FOAK37 KWNO	MAVAJK
FOAK48 KWNO	METAFC	Central Alaska	FOAK38 KWNO	MAVAFC
FOAK49 KWNO	METAFG	Northern Alaska	FOAK39 KWNO	MAVAFG
FOPA40 KWNO	METPA0	Hawaiian Islands	FOPA20 KWNO	MAVPA0
FOUS44 KWNO	METNE1	Northeast Contiguous U.S.	FOUS21 KWNO	MAVNE1
FOUS45 KWNO	METSE1	Southeast Contiguous U.S.	FOUS22 KWNO	MAVSE1
FOUS46 KWNO	METNC1	North Central Contiguous U.S.	FOUS23 KWNO	MAVNC1
FOUS47 KWNO	METSC1	South Central Contiguous U.S.	FOUS24 KWNO	MAVSC1
FOUS48 KWNO	METRM1	Rocky Mountains -- Contiguous U.S.	FOUS25 KWNO	MAVRM1
FOUS49 KWNO	METWC1	West Coast -- Contiguous U.S.	FOUS26 KWNO	MAVWC0

The interested user can find a description of the Eta-based MOS guidance at: http://www.nws.noaa.gov/mdl/synop/smbpublications.html or by downloading MDL Technical Procedures Bulletin 05-06 from the following address: http://www.nws.noaa.gov/mdl/synop/tpb/mdltpb05-06.pdf . Description of the GFS-based MOS guidance can be found at the same publications site or by downloading MDL Technical Procedures Bulletin 05-03 from the following address: http://www.nws.noaa.gov/mdl/synop/tpb/mdltpb05-03.pdf .

ii. Alphanumeric Marine Messages – note that, for NWS forecasters, the products proposed for termination below will eliminate all MME messages in the AWIPS database. Unlike the MOS messages for traditional land-based observing sites, messages for these marine locations contain guidance for only a few weather elements, namely, wind direction, wind speed, temperature, and, at selected sites, dew point.

Eta MOS WMO Header	Eta MOS AWIPS Identifier	Guidance Area	GFS MOS WMO Header	GFS MOS AWIPS Identifier
FQAK47 KWNO	MMEAK1	Alaska	FQAK37 KWNO	MMGAK1
FQPA40 KWNO	MMEHI1	Hawaiian Islands	FQPA20 KWNO	MMGHI1
FQUS41 KWNO	MMENE1	Northeast U.S. Coast	FQUS21 KWNO	MMGNE1
FQUS42 KWNO	MMESE1	Southeast U.S. Coast	FQUS22 KWNO	MMGSE1
FQUS43 KWNO	MMEGL1	Great Lakes	FQUS23 KWNO	MMGGL1
FQUS44 KWNO	MMEGF1	Gulf of Mexico	FQUS24 KWNO	MMGGF1
FQUS45 KWNO	MMENW1	Northwest U.S. Coast	KQUS25 KWNO	MMGNW1
FQUS46 KWNO	MMESW1	Southwest U.S. Coast	FQUS26 KWNO	MMGSW1

The interested user can find a description of the MOS marine guidance at: http://www.nws.noaa.gov/mdl/synop/marinedesc.htm .

iii. BUFR Messages – these products contain all of the MOS guidance available in the alphanumeric products as well as guidance for additional weather elements and projections.

Eta MOS WMO Header	Guidance Area	GFS MOS WMO Header
JSML10 KWNO	Hawaiian Islands	JSML30 KWNO
JSML11 KWNO	Northeast Contiguous U.S.	JSML31 KWNO
JSML12 KWNO	Southeast Contiguous U.S.	JSML32 KWNO
JSML13 KWNO	North Central Contiguous U.S.	JSML33 KWNO
JSML14 KWNO	South Central Contiguous U.S.	JSML34 KWNO
JSML15 KWNO	Rocky Mountains -- Contiguous U.S.	JSML35 KWNO
JSML16 KWNO	West Coast -- Contiguous U.S.	JSML36 KWNO
JSML17 KWNO	Alaska	JSML37 KWNO

More information about the BUFR messages can be found at the following:

http://www.nws.noaa.gov/mdl/synop/bufr.html . The interested user can also find detailed information about the stations contained in both the alphanumeric and BUFR messages at the following address: http://www.nws.noaa.gov/mdl/synop/stadrg.html .

iv. Graphics Products

No graphics products based on the Eta MOS guidance are disseminated via the traditional communications networks. However, on the following web page:
http://www.nws.noaa.gov/mdl/forecast/graphics/MET/
a large number of Eta-based MOS graphics are available. These will be terminated at the same time as the alphanumeric and BUFR messages.

In lieu of the Eta graphics, the user can go to the following web page and view a comparable set of GFS-based MOS graphics for the contiguous U.S.:
http://www.nws.noaa.gov/mdl/forecast/graphics/MAV/ . The user can also go to the following web page to view GFS-based MOS graphics for Alaska:
http://www.nws.noaa.gov/mdl/forecast/graphics/MAVAK/ .

v. Gridded Products

A large number of gridded Eta MOS products are available in GRIB format on the NWS tgftp server. All of these products, with the exception of the thunderstorm probabilities, are available on a 95.25-km grid (AWIPS grid 213) covering the contiguous U.S. The thunderstorm probabilities are available on AWIPS grid 212 (a resolution of approximately 40 km). All of the Eta-based GRIB products will be terminated at the same time as the alphanumeric and BUFR messages.

A comparable set of gridded GFS MOS products with the same resolution are also available on the NWS tgftp server. For additional details about the gridded products, see the following: http://www.nws.noaa.gov/mdl/synop/docs.htm .

As the GFS-based gridded MOS system is implemented, sets of MOS products encoded in GRIB2 and available over the contiguous U.S. will be disseminated on the Satellite Broadcast Network. Initially, these products will be valid for the 5-km NDFD grid. Additional information on the gridded MOS system and the attendant products may be found at: http://www.nws.noaa.gov/mdl/synop/gmos.html .

At this time, gridded MOS products for a number of weather elements are available on the NWS tgftp server. See:
ftp://tgftp.nws.noaa.gov/SL.us008001/ST.opnl/DF.gr2/DC.ndgd/GT.mosgfs/AR.conus/
for the data or http://www.nws.noaa.gov/mdl/synop/gmos/griddedmos_ftp.htm for further details.

4. Important Dates

The period for comment on this proposal will be 60 days from the date that this request for comments is issued.

The proposed date for termination of the Eta MOS guidance is 3 months after a final decision to terminate is made (following review of comments received).

5. Notification

The termination of the Eta MOS guidance will be announced by issuance of a formal Technical Implementation Notice, as well as by a mail message sent to subscribers to the MOS mailing list. See the following web page for the status on upcoming changes to the MOS system or for information on signing up to receive notices of those changes: http://www.nws.noaa.gov/mdl/synop/changes.htm .

6. **Point of Contact**

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