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PNSWSH

Service Change Notification 25-34
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To: Subscribers
-NOAA Weather Wire Service
-Emergency Managers Weather Information Network
-NOAAPORT
Other NWS Partners, Users and Employees

From: Geoff Manikin
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Meteorological Development Laboratory

Subject: Upgrade of National Blend of Models guidance effective May 20, 2025

On or about Tuesday, May 20, 2025, beginning with the 1200 Universal Time Coordinated (UTC) model run, the NWS Meteorological Development Laboratory (MDL) will implement an update to the National Blend of Models (NBM) guidance over the Contiguous United States (CONUS) and OCONUS (Alaska (AK), Hawaii (HI), Puerto Rico (PR), Guam (GU), and Oceanic (OC)) National Digital Forecast Database (NDFD) domains.

In the event that the implementation date is declared a Critical Weather Day (CWD), an Enhanced Caution Event, or other significant weather is occurring or is anticipated to occur, implementation of this change will take place at 1200 UTC on the next weekday not declared a CWD and when no significant weather is occurring.

1. Background

This upgrade primarily introduces improvements to the NBM tropical cyclone feature-matched wind products, along with incorporating updates to Storm Prediction Center’s (SPCs) probabilistic severe weather products that are disseminated through the NBM.

NBM Tropical Cyclone Feature-Matched wind improvements were planned for inclusion in NBMv4.2, which was implemented in May 2024, but the proposed changes were not ready in time, so they were deferred to NBMv5.0. The scope of NBMv5.0, however, has significantly expanded, and this implementation is now scheduled for Spring 2026. Given a need to have NBM tropical wind improvements in operations for the 2025 tropical season, a smaller upgrade of the NBM, namely NBMv4.3, has been planned to include the tropical wind improvements along with other small fixes associated with NBMv4.2. In addition, updated severe weather products from the Storm Prediction Center, which just

missed being ready for NBMv4.2, will also be included in this upgrade.

Comments/feedback on this upgrade were previously solicited publicly in a PNS from December 16, 2024 through January 21, 2025:
https://www.weather.gov/media/notification/pdf_2023_24/pns24-75_nbm_v4.3_comments.pdf

2. Summary of Product Enhancements

(A) Improvements to the featured-matched tropical cyclone wind products

I. A fix that addresses the issue of feature-matched tropical cyclone dropouts at random forecast projections.

II. Land/Water adjustments of Direct Model Output (DMO) wind speed and u-v wind components when displaced to match the WTCM center. These adjustments are made using the surface roughness values from the Hurricane Analysis and Forecast System (HAFS).

III. Replacement of the existing tropical wind direction with the derived 10m wind direction from tropical feature-matched 10m u- and v- components.

(B) Updated SPC probabilistic severe weather products

I. Probabilistic severe hazards for tornado, hail, thunder, and wind are expanded out to Day 2 and are now calibrated from a GEFS/HREF blend. (Usage of the SREF to compute these probabilities is terminated.) New cycles for these severe hazards are 0000 UTC and 1200 UTC to complement the existing products available for the 0300, 0600, 1500, and 1800 UTC cycles.

II. New SPC guidance for combined hazard severe weather probabilities for each day during the Days 3-8 period, available for the 06Z and 18Z cycles.

(C) Minor updates to the Cobb melting technique, used in computation of snow accumulation and snow-to-liquid ratio, to account for the possibility of the computed wet-bulb temperatures being slightly too warm. This change was made last winter in ForecastBuillder, a tool used in National Weather Service Forecast Offices to generate the official NWS gridded forecast. This change in the NBM makes the NBM winter code consistent with the computation in ForecastBuilder.

(D) An update to the computation of wet-bulb globe temperature (WBGT) to be consistent with the WBGT computation used in the National Digital Forecast Database (NDFD).

(E) Corrected improper handling of temporally interpolated 1-hour quantitative precipitation amounts for the ECMWF Ensemble Prediction System used in the 1-hour snow and ice accumulations.

(F) Fixed issue with quantile-mapped 18-hour maximum and minimum temperature computations when a portion of the inputs is missing during that 18 hour window.

(G) In operations, a check is performed against the sky cover field, and if sky cover is greater than 57% at a gridpoint with no ceiling, the cloud base height field is used to build a ceiling at that point. An additional check has been added in v4.3 to not allow that ceiling value to be lower than 13,000 feet.

(H) Addition of a consistency check so that the deterministic 10-meter wind gust value can no longer be less than the wind speed. In instances in which the gust is lower than the speed, the gust is now set to 1.08 times the speed value.

It is anticipated that these upgrades will benefit the NWS in its mission towards better Impact-based Decision Support Services (IDSS).

3. NBM Runtime Changes

During periods of increased tropical activity, the tropical wind products could arrive up to 15 minutes earlier, relative to arrival times for tropical wind products in NBMv4.2.

4. Changes to SBN/NOAAPORT Dissemination

While the NBM runs hourly and produces output to 264 hours for each cycle, as with NBM v4.2, only a subset will be disseminated across the Satellite Broadcast Network (SBN) and NOAAPORT due to bandwidth limitations. NBM v4.3 data will be disseminated in GRIB2 format and will contain grouped WMO headers, as is done in NBM v4.2.

With the implementation of NBM v4.3, the notable SBN/NOAAPORT dissemination changes can be summarized as follows:

New weather elements added:
- SPC Post Days 3-8 Severe Probabilities (Total Severe and Unconditional Significant Severe)
- Expansion of SPC 4-hour and 24-hour Threat Probabilities (Hail, Wind, and Tornado)
- PoP06 and QPF06 in the Oceanic Domain

Changes to SBN data as requested:
- Removal of 24 hour Maximum Wind Speed and Gust Percentiles to avoid conflict with instantaneous wind speed and gust grids

A detailed listing of NBM v4.3 weather elements to be disseminated on the SBN/NOAAPORT as a function of cycle time and

domains can be found in the following hyperlink:

https://vlab.noaa.gov/web/mdl/nbm-data-availability-v4.3

Unique originating center IDs have been assigned to each geographic region.

List of originating center IDs (CCCC) for NBM products:

Geographic Region	Originating Center (CCCC)
CONUS and Oceanic	KWEA, KWEB, KWEI, KWEO
Alaska	KWEC, KWED, KWEJ, KWEP
Hawaii	KWEE, KWEF, KWEK
Puerto Rico	KWEG, KWEH, KWEL
Guam	KWEM, KWEN, KWEQ
Global	KWER

The NBM text bulletin WMO header information for each of the five bulletins to be disseminated every hour on the SBN is listed below.

WMO header information for NBM text products:

WMO Header	NBM Text Bulletin Description
FOUS15 KWNO	Hourly bulletin (1-24 hours)
FOUS16 KWNO	Short-range bulletin (6-66 hours)
FEUS16 KWNO	Extended bulletin (12-192 hours)
FEUS17 KWNO	Extra-extended bulletin (204-264 hours)
FEUS18 KWNO	Probabilistic extended bulletin (12-192 hours)

A. NBM v4.3 SBN/NOAAPORT Header Additions and Removals:

A detailed listing of NBM WMO headers that have been modified (by NBM domain) to be added over the SBN/NOAAPORT can be found below:

CONUS Domain:
https://www.weather.gov/media/mdl/nbm/docs_v43/headers_added_v4.3_co.pdf

Oceanic Domain:
https://www.weather.gov/media/mdl/nbm/docs_v43/headers_added_v4.3_oc.pdf

A detailed listing of NBM WMO headers that have been modified (by NBM domain) to be removed from the SBN/NOAAPORT can be found below:

CONUS Domain:
https://www.weather.gov/media/mdl/nbm/docs_v43/headers_removed_v4.3_co.pdf

NBM v4.3 GRIB2 header identifiers delineated by weather element and domain can be found here:

https://www.weather.gov/media/mdl/nbm/docs_v43/NBM_v4.3_Header_Scheme.pdf

B. Text Bulletins on SBN/NOAAPORT:

NBH, NBS, NBE, NBX, and NBP will continue to be hosted on the SBN/NOAAPORT as in NBM v4.2. This station-based guidance covers 12-hour periods for projections 24-192 hours and has an identical format to the NBM v4.2 deterministic NBM extended ASCII text bulletins. Note that wind speed percentile information found for all stations in the text bulletins are from the forecasts made in the Oceanic Domain, and not the Quantile Mapping system. This is unchanged from the previous version.

Header information for the probabilistic and deterministic text bulletin files are identical to that of NBM v4.2. For reference, that header information can be found here:

https://www.weather.gov/media/mdl/nbm/docs_v43/NBM_V4.3_Text_Product_WMO_Header_Scheme.pdf

5. NCEP Web Services (NOMADS/FTPPRD) Dissemination

On implementation day, all GRIB2 master (Core and QMD) files, index files, and NBM text messages will continue to be hosted on NCEP web services. Please follow any one of the three subsequent hyperlinks to access this data:

https://nomads.ncep.noaa.gov/pub/data/nccf/com/blend/prod/
https://ftpprd.ncep.noaa.gov/data/nccf/com/blend/prod/
ftp://ftp.ncep.noaa.gov/data/nccf/com/blend/prod/

Please note that the naming convention and directory structure for the Master GRIB2 files remain unchanged and delineate between the core NBM products and those derived from the QMD process.

File Naming Convention:
core/blend.tCCz.core.fHHH.rg.grib2 and
qmd/blend.tCCz.qmd.fHHH.rg.grib2,
where CC=NBM cycle time, HHH=forecast projection, and rg=NBM domain that includes: co, ak, hi, pr, oc, gu, global (core only)

Changes to existing files on NOMADS/FTPPRD:

These links detail the elements added to or removed from output that is hosted on NOMADS/FTPPRD:

https://www.weather.gov/media/mdl/nbm/docs_v43/NBM_v4.3_NOMADS_Changes-Core.pdf

Approximately 30 days prior to implementation, users will find parallel NBM data for download here:

https://nomads.ncep.noaa.gov/pub/data/nccf/com/blend/para/

NCEP encourages users to ensure their decoders are flexible and are able to adequately handle changes in content order, changes in the scaling factor component within the product definition section (PDS) of the GRIB files, and any volume changes that may be forthcoming. These elements may change with future NCEP model implementations. NCEP will make every attempt to alert users to these changes prior to any implementations.

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 implementation of NBM guidance or data available on Amazon Web Services, please contact:

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For questions regarding the data flow for NWS/NCEP services, please contact:

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A web page describing the NBM can be found at:

https://vlab.noaa.gov/web/mdl/nbm

National Service Change Notices are online at:

http://www.weather.gov/notification

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