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PNSWSH

Service Change Notice 24-40 Updated
National Weather Service Headquarters Silver Spring MD
450 PM EDT Thu May 2 2024

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From: Mike Farrar, Director
 National Centers for Environmental Prediction

Subject: Updated: Upgrade of the National Air Quality Forecast Capability (NAQFC) to the Air Quality Modeling (AQM) System Version 7.0: Effective on or about May 14, 2024

Updated for changes to directory structure.

Effective on or about Tuesday, May 14, 2024 with the 1200 Coordinated Universal Time (UTC) cycle, the National Centers for Environmental Prediction (NCEP) Central Operations (NCO) will be updating the National Air Quality Forecast Capability (NAQFC) to the Air Quality Modeling (AQM) system version 7.0.

In the event that the implementation date is declared a Critical Weather Day (CWD), an Enhanced Caution Event (ECE), 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.

Comments/feedback on this upgrade were previously solicited publicly from February 28, 2024 through March 28, 2024:

https://www.weather.gov/media/notification/pdf_2023_24/pns24-14_aqm_v7_product_removal.pdf

AQM version 7.0 will be NCEP's first regional air quality prediction system built upon the Unified Forecast System (UFS) to become operational. This system integrates an up-to-date version of NCEP's atmospheric model – based on the Finite-Volume Cubed-Sphere Dynamical Core (FV3) and the Common Community Physics Package (CCPP) – and an air quality component generating atmospheric chemistry predictions through the embedded U.S. Environmental Protection Agency (EPA) Community Multiscale Air Quality Model (CMAQ) version 5.2.1. The atmospheric and air quality components are coupled online for a more accurate representation of the impact of meteorology on atmospheric chemistry.

AQM version 7.0 is expected to improve representation of wildfire and meteorological impacts in air quality forecast guidance.

This upgrade includes:

- Upgrading AQM from version 6.1 to version 7.0, transitioning from a GFS-CMAQ offline-coupled system to a UFS-based online-coupled atmosphere-air quality system embedding CMAQ version 5.2.1
- Replacing individual model domains for CONUS, Alaska, and Hawaii at about 12km horizontal resolution with a single unified domain at 13km horizontal resolution
- Increasing the model's vertical resolution from 35 to 65 levels and extending the model's top from 60 hPa to 0.2 hPa
- Replacing daily Blended Global Biomass Burning Emissions Product (GBBEPx) inputs with hourly Regional ABI and VIIRS fire Emissions (RAVE) data at a high horizontal resolution (0.03 degrees) to improve diurnal variation, intensity, and vertical distribution of wildfire emissions
- Replacing the Biogenic Emissions Inventory System (BEIS) with aerosol and gaseous emissions estimated using the Model of Emissions of Gases and Aerosols from Nature (MEGAN)
- Including soil NOx emissions in springtime (March, April, and May)
- Applying the Kalman Filter Analog (KFAN) bias correction technique over the large unified domain to improve near-surface ozone (O3) and fine particulate matter (PM2.5) predictions. Bias correction will be based on expanded AirNow observational data sets.

Products for the three operational domains including CONUS, Alaska, and Hawaii are generated from forecasts over the single unified North American domain.

The following changes are made to the current operational products from this upgrade.

The directory structure will change from:

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domain.PDY/  
To:  
aqm.PDY/CC/
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Where domain is (ak, cs, hi), PDY is the forecast date and CC is the forecast cycle (06, 12).

Products on the Lambert Conformal 12-km grid (G148) will no longer be available on the NOAA Operational Model Archive and Distribution System (NOMADS).

- aqm.t{CC}z.pm25.f{HH}.148.grib2
- aqm.t{CC}z.pm25_bc.f{HH}.148.grib2

where:

CC = 00, 06, 12, 18 UTC cycle;

HH = 01-06 forecast hours for 00 and 18 UTC cycles;

HH = 01-72 forecast hours for 06 and 12 UTC cycles.

Hourly averages for the 00Z and 18Z cycles will no longer be disseminated to NOMADS.

- aqm.t{CC}z.ave_1hr_{VARB}.227.grib2
- aqm.t{CC}z.ave_1hr_{VARB}_bc.227.grib2

where:

CC = 00, 18 UTC cycle;

VARB = pm2.5 or o3 for fine particulate matter and ozone, respectively.

The file size of each product may increase due to fewer missing values.

Current model data is available here:

<https://nomads.ncep.noaa.gov/pub/data/nccf/com/aqm/prod/>
<https://ftp.ncep.noaa.gov/data/nccf/com/aqm/prod/>
<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/aqm/prod/>

A real-time parallel feed of the AQMv7.0 has been made available on NOMADS/FTP/PRD web services at:

<https://nomads.ncep.noaa.gov/pub/data/nccf/com/aqm/para/>
<https://ftp.ncep.noaa.gov/data/nccf/com/aqm/para/>
ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/aqm/para

Please submit comments, questions, or requests on the upgrade to:

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For questions regarding the data flow, please contact:

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National Service Change Notices are online at:

<https://www.weather.gov/notification/>

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