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Public Information Statement 23-17 Updated
National Weather Service Headquarters Silver Spring MD
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From: Fanglin Yang, Chief
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Modeling and Data Assimilation Branch
NCEP/Environmental Modeling Center

Subject: Updated: Soliciting Comments on Upgrading the National Air Quality Forecast Capability (NAQFC) to the Air Quality Modeling (AQM) System Version 7.0 through October 28, 2023

Updated to begin a new comment period ending on October 28, 2023 as a result of the following changes:

- Recent updates to the Regional ABI and VIIRS fire Emissions (RAVE) for improved wildfire representation
- Inclusion of soil NOx emissions in springtime (March, April, and May)
- Expanded AirNow observational data set used for bias correction.

The National Weather Service (NWS) is seeking comments until October 28, 2023 on a proposed upgrade to the National Air Quality Forecast Capability (NAQFC) for the purpose of improving representation of wildfire impacts in air quality forecast guidance.

The Environmental Modeling Center (EMC) at the National Centers for Environmental Prediction (NCEP), in partnership with both the Air Resource Laboratory (ARL) and the Earth System Research Laboratory (ESRL) under NOAA's Oceanic and Atmospheric Research (OAR), is proposing to upgrade NAQFC to the Air Quality Modeling (AQM) system version 7.0. 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.

The proposed 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 higher 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)

- 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

The products for the three operational domains are generated from the forecasts over the unified large domain.

No changes are expected to the current operational products from this upgrade. However:

- The file size of each product may increase due to fewer missing values
- The description field for the model grid will be updated.

In preparation for the operational implementation of AQM v7.0, EMC is currently running a real-time parallel. Products including daily maximum 8-hour average surface ozone and 24-hour average surface PM2.5 concentrations and hourly averaged ozone and PM2.5 concentrations up to 72 hours of forecast can be found at:

https://ftp.emc.ncep.noaa.gov/mmb/aq/for_NDGD_5x_expr/

The real-time data will be available at best effort and with variable timing of output availability.

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

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For questions regarding the data flow, please contact:

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National Public Information Statements are online at:

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

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