

Modeling Configuration for Gateway Air Quality Predictions

Meteorological Predictions

- Pennsylvania State University/NCAR Mesoscale Model (MM5) Version 3.7
- Initial and boundary conditions from NCEP North American Model (NAM) 40-km forecast
- 129x165 Lambert Conformal grid with 36-km horizontal grid spacing and 29 vertical layers
- Simple Ice explicit moisture
- Gayno-Seaman planetary boundary layer scheme
- Kain-Fritsch cumulus parameterization
- Rapid Radiative Transfer Model (RRTM) radiation
- 5-layer soil model
- Meteorology-Chemistry Interface Processor (MCIP) version 3.1 post-processing

Anthropogenic and Biogenic Emissions

- SMOKE processing system version 2.3
- MOBILE6 for on-road mobile source emissions
- 2002 National Emission Inventory (NEI) version 3 projected to the current year using Economic Growth Analysis System (EGAS) version 4.0
- Biogenic Emissions Inventory System (BEIS) version 3.09 for biogenic emissions
- MM5 temperature predictions used in emission estimates for on-road mobile and biogenic sources.

Fire Emissions

- BlueSky Framework v3.0.0
- Fire inputs from the Satellite Mapping Automatic Reanalysis Tool for Fire Incident Reconciliation (SMARTFIRE)
- Fuel Characteristic Classification System (FCCS) fuel loading
- CONSUME fuel consumption
- Fire Emission Production Simulator (FEPS) emissions
- FEPS time profile
- Western Regional Air Partnership (WRAP) plume split
- Separate flaming and smoldering emission profiles
- Persistence modeling of future day fire emissions

Air Quality Predictions

- Community Multiscale Air Quality (CMAQ) model version 4.5.1 with modifications to support fire-related PM_{2.5} tracer species
- 112x148 Lambert Conformal grid with 36 km horizontal grid spacing and 17 vertical layers
- Carbon Bond-IV gas-phase chemistry with Euler Backward Iterative (EBI) solver
- AERO3 aerosol chemistry mechanism for secondary aerosol formation
- Aqueous and cloud chemistry invoked
- RADM cloud processor with asymmetric convective mixing (ACM)
- Yamartino advection scheme
- Multiscale horizontal diffusion scheme
- Vertical diffusion using eddy diffusivity theory