Air Quality Assessment Division: Technical Updates

AAPCA Spring Meeting
May 2025

Air Quality Assessment Division
U.S. EPA Office of Air Quality Planning & Standards

Air Quality Assessment Division

Director: Karen Wesson

- Ambient Air Monitoring Group
- Air Quality Analysis Group
- Air Quality Modeling Group
- Emission Inventory & Analysis Group
- Measurement Technology Group

Ambient Monitoring

Source: GAO File Photo.

NAAQS Pollutant Monitoring

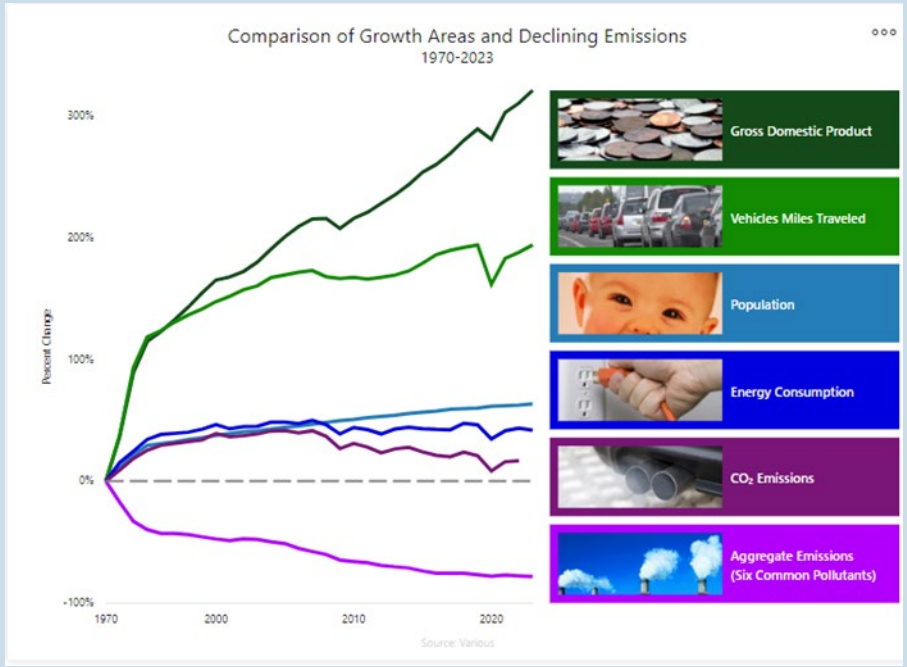
- EPA continues to engage state, local, and tribal (SLT) air agencies on technical air monitoring topics.
- EPA/AQAD attending AAPCA coordination meetings on monitoring related work
- Hosted a data certification webinar
  - Data certifications of SLT monitoring agency data for 2024 are due May 1, 2025
- Annual monitoring network plans are due July 1, 2025

National Monitoring Contracts & Costs

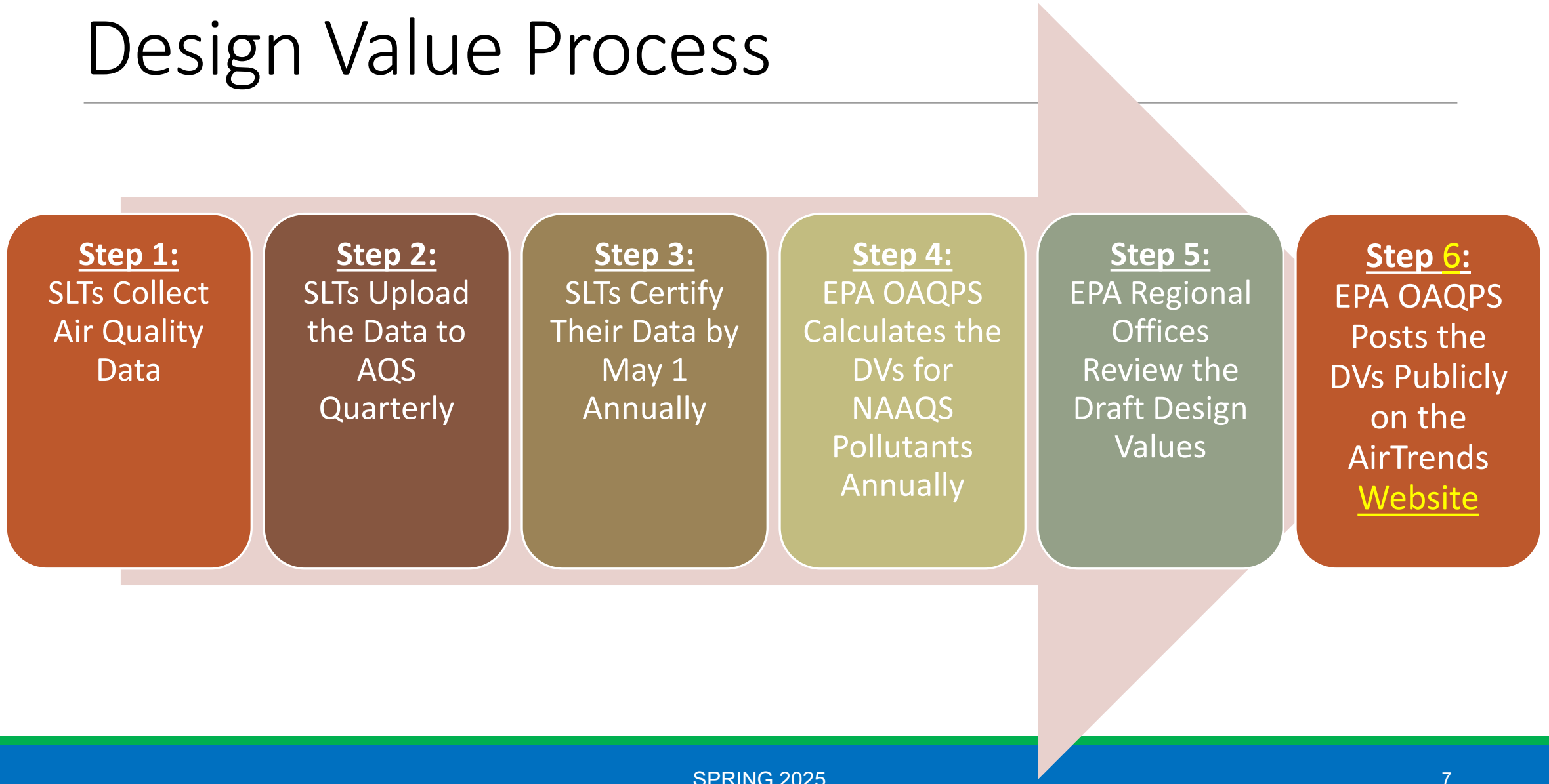
The Ambient Air Monitoring Group manages several national air monitoring contracts, including contracts supporting and/or operating Air Toxics/NATTS, CSN, PAMS; national QA activities; and sample shipment.

We are finalizing the FY25 STAG budget for air monitoring - we continue to communicate needs for national contracts to support SLTs.

Air Quality Analysis



Design Value Process



Design Value Resources

Design Value Reports

- Spreadsheets that provide design values and other supporting information.

Design Value Interactive Tool

- Allows users to filter on geographic areas and pollutants, and download data.

Design Value Interactive Map

- Allows users to view maps of current design values and monitor locations for all criteria pollutants.

2023 Design Value Reports
Carbon Monoxide Design Values, 2023 (xlsx) (319.32 KB, 6/12/2024)
Lead Design Values, 2023 (xlsx) (178.56 KB, 6/12/2024)
Nitrogen Dioxide Design Values, 2023 (xlsx) (420.8 KB, 6/12/2024)
Ozone Design Values, 2023 (xlsx) (807.18 KB, 6/12/2024)
PM10 Design Values, 2023 (xlsx) (581.98 KB, 6/12/2024)
PM2.5 Design Values, 2023 (xlsx) (1.74 MB, 8/9/2024)
Sulfur Dioxide Design Values, 2023 (xlsx) (378.27 KB, 6/12/2024)

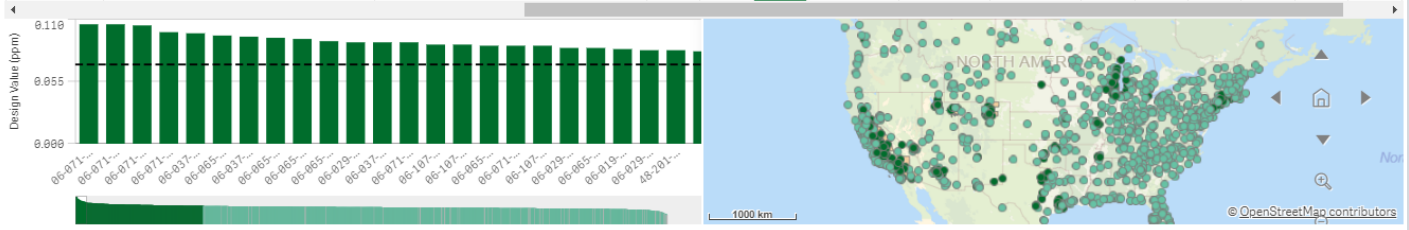
Design Value Resources

Design Value Interactive Tool

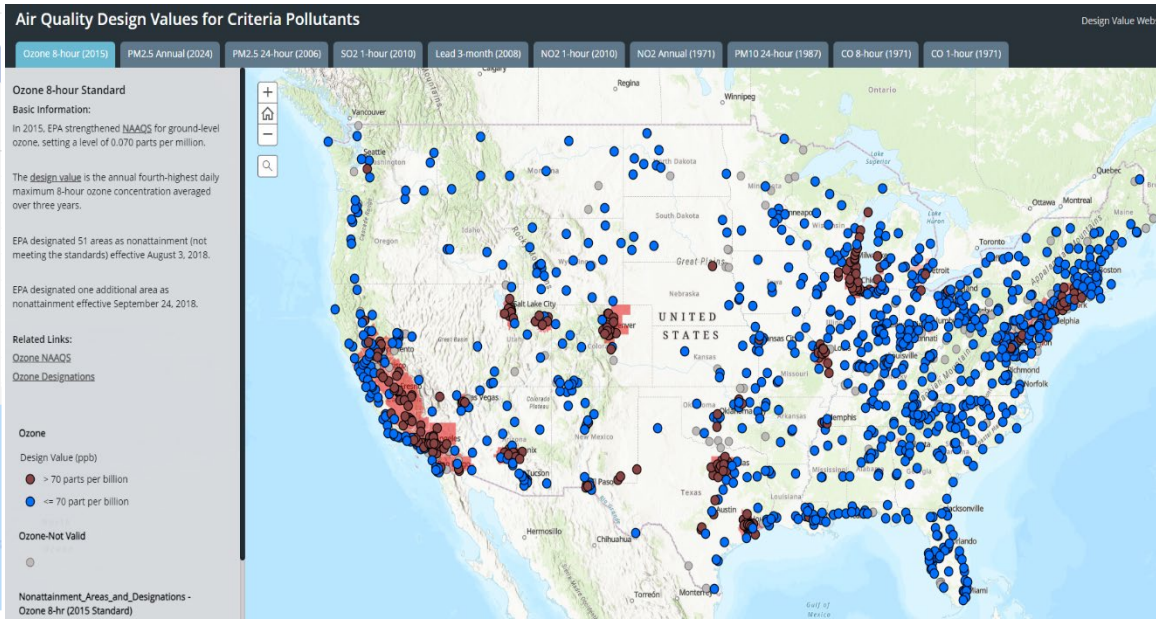
Overview | Ozone (2015 NAAQS) | PM2.5 Annual (2012 ... | PM 2.5 24 Hour (200... | SO2 (2010 NAAQS) | PM10 (1987 NAAQS) | Lead (2008 NAAQS) | NO2 1-Hour (2010 N... | CO 8-Hour (1971 NA...

Ozone Design Values

Site Details					Site Trends		NAA Trends			Violating Not In NAA					
AQS Site ID	Local Site Name	Street Address	Latitu...	Longi...	2023 Design Value	DV Valid	Exceeds Stand...	DV Year	2021-2023 Avera...	2021 Data Com...	2022 Data Com...	2023 Data Com...	2021 4th High...	2022 4th High...
06-071-0005	Crestline	Lake Gregory-Lake Dr, Crestline	34.2...	-117....	0.106	Y	Y	2023	97	95	100	97	0.107	0.105
06-071-4003	Redlands	500 N. Dearborn, Redlands, Ca. 92373	34.0...	-117....	0.106	Y	Y	2023	99	99	99	99	0.112	0.103
06-071-9004	San Bernardino	24302 4th St., San Bernardino, Ca.	34.1...	-117....	0.105	Y	Y	2023	98	98	98	99	0.105	0.103
06-071-2002	Fontana	14360 Arrow Blvd., Fontana	34.1...	-117....	0.099	Y	Y	2023	97	98	95	97	0.099	0.095
06-037-6012	Santa Clarita	22224 Placerita Canyon Rd, Santa Clarita	34.3...	-118....	0.098	Y	Y	2023	98	99	98	98	0.097	0.095
06-065-0012	Banning Airport	200 S. Hathaway St., Banning Ca	33.9...	-116....	0.096	Y	Y	2023	98	97	99	97	0.102	0.093
06-037-0016	Glendora	840 Laurel, Glendora	34.1...	-117....	0.095	Y	Y	2023	98	98	99	98	0.090	0.094
06-065-1016	Morongo Air Monitoring Station	12160 Santiago Rd. Banning, Ca 92220	33.9...	-116....	0.094	Y	Y	2023	96	96	93	99	0.089	0.095
06-065-8001	Rubidoux	5888 Mission Blvd., Rubidoux	33.9...	-117....	0.093	Y	Y	2023	95	93	96	96	0.091	0.092



Design Value Interactive Map

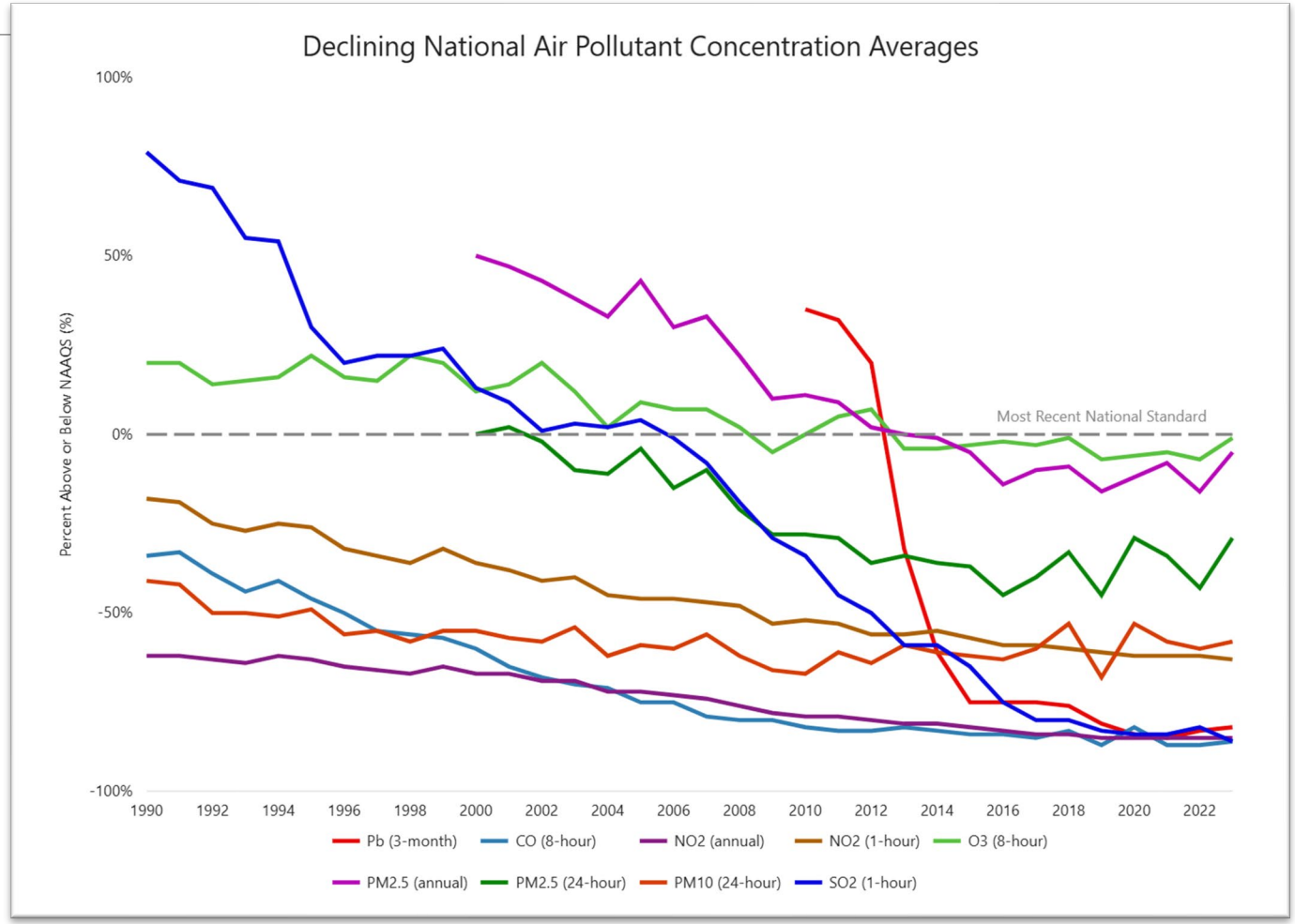


https://www.epa.gov/air-trends/air-quality-design-values

EPA's Air Trends Report

EPA releases an *interactive* annual report that summarizes the nation's air quality status and trends.

- https://www.epa.gov/air-trends



Exceptional Events Tools

EPA developed new products to assist with data screening and determining regulatory significance in support of exceptional events demonstration submissions.

$PM_{2.5}$ Tiering Tool

- Displays daily $PM_{2.5}$ concentrations along with tier levels based on the methodology in the $PM_{2.5}$ Wildland Fire Exception Events Tiering Document.

Exceptional Events Design Value Tool

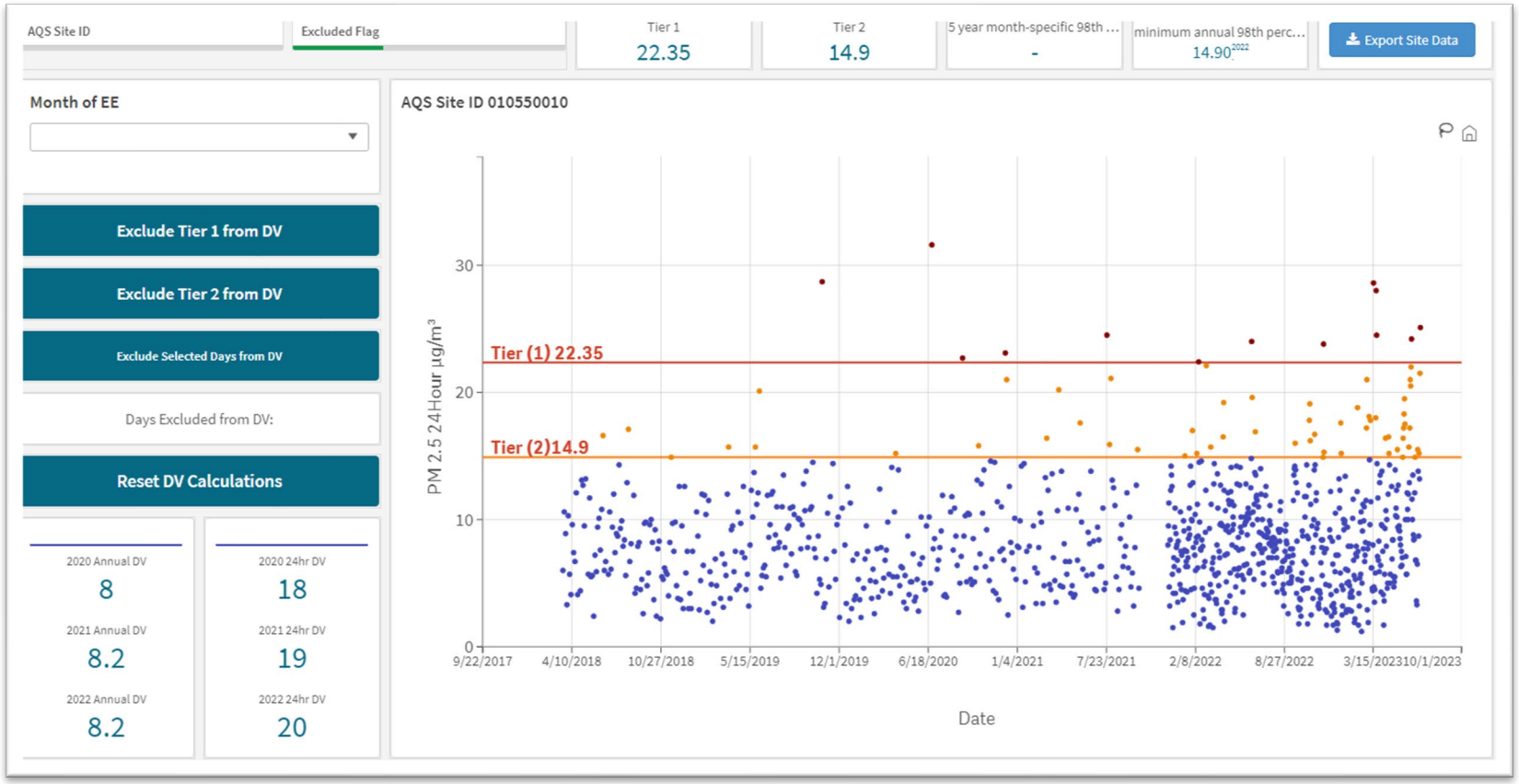
- Allows air agencies to determine the regulatory significance of ozone and $PM_{2.5}$ concentrations potentially impacted by exceptional events by excluding certain concentrations from the design value.

EMBER Dataset Tool

- Identifies and displays ozone monitoring days that may have been impacted by fire emissions in the summer of 2023.

https://www.epa.gov/air-quality-analysis/exceptional-events-analysis-and-visualization-tools

Exceptional Events Tools: PM2.5 Tiering Tool



- Identify days potentially impacted by exceptional events.
- Assess potential regulatory significance.
- Determine exceptional event tier category for your site(s).

Exceptional Events Tools: Expedited Modeling of Burn Events Results (EMBER)

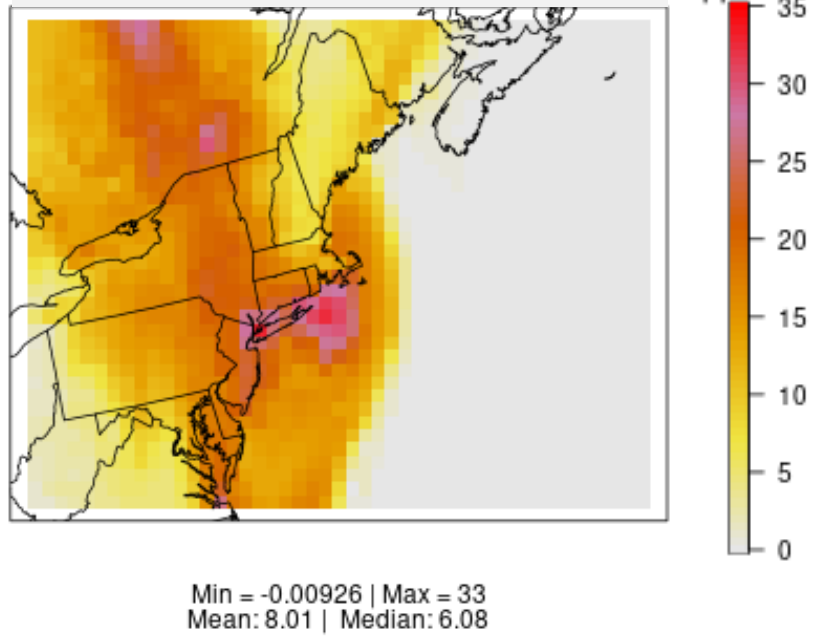
EPA developed a screening-level modeling dataset to characterize wildfire impacts on ozone in the US during the summer of 2023

- Leveraged existing and/or simplified model inputs and covered the entirety of North America to be inclusive of all potential fires for EE demonstrations

EMBER data can provide easily accessible and interpretable information to screen for days and locations that have substantial fire ozone contributions

Qlik application on EPA website allows easy browsing of EMBER dataset: tabulated results, maps of total ozone and fire impacts on ozone, timeseries plots: https://www.epa.gov/air-quality-analysis/expedited-modeling-burn-events-results-ember

Simulated Fire Impacts on MDA8 Ozone: June 30, 2023



AirNow Fire & Smoke Map

EPA has provided the AirNow Fire & Smoke Map in partnership with the U.S. Forest Service

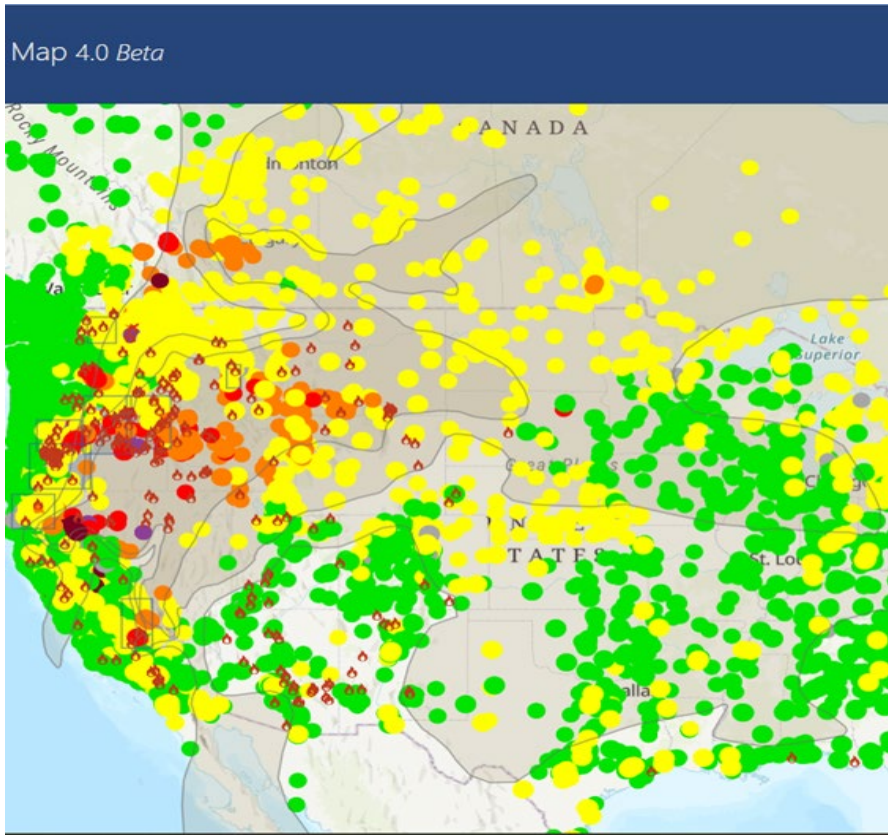
Heavy usage

- Nearly 67 million page views since initial release
- Over 13 million June through August 2023: Canadian Smoke event
- Nearly 4 million in January 2025: LA fires

Significant increase in number of sensors

- Roughly 7,500 for initial release
- Nearly 17,000 currently, including 1,000 in Canada

EPA, in partnership with USFS continue to work to further improve the map (e.g. increase spatial coverage by applying fused-surface and satellite technologies)



July 29, 2024

EPA's Air Data Website

Reminder: EPA's Air Data website provides access to recent and historical data through various data visualization and technical tools.

Download Data

- Pre-generated Data Files
- Download Daily Data
- Download Raw Data (API)

Data Viz Tools

- Daily Air Quality Tracker
- Tile Plot - Multiyear
- Tile Plot - Single Year
- AQI Plot
- Concentration Plot
- Concentration Map
- Ozone Exceedances

Monitor Locations

- Interactive Map of Air Quality Monitors

Summary Reports

- Air Quality Index Report
- Air Quality Statistics Report
- Monitor Values Report
- Monitor Values Report - Hazardous Air Pollutants
- Air Quality Index Daily Values Report

About Air Data

- Basic Information
- Frequent Questions about AirData
- Subscribe to RSS feed

Technical Tools

- Ozone Watch
- Ambient Air Toxics Trends Tool
- PM2.5 Continuous Monitor Comparability Assessments
- PM10 Continuous Monitor Comparability Assessments
- Single Point Precision and Bias Report
- Additional Air Monitoring Assessments

Emission Inventory Updates

Update on 2022 Emissions Platform

The Collaborative process to develop the 2022 platform

- Co-leads: Zac Adelman (LADCO), Mary Uhl (WESTAR), and OAQPS
- National report-out webinars are held quarterly – next call Wednesday May 7, 2025 @ 2 EDT
- The EPA 2022v1 web page has links to
  - 2022 and 2026 inventories, data summaries, plots, gridded emissions, etc.
  - Summary documentation (Full TSD is coming soon)
  - Data Retrieval Tool
  - 2022 Collaborative Wiki
  - Submitted comments and responses
- CMAQ and CAMx-ready emissions for 2022 and 2026 are posted on the AWS Open Data Program
- Progress also continues on an updated platform of 2022v2 base year emissions

National Emissions Inventory (NEI) Recent Milestones and Plans

Completed Fall 2024 through March 2025

- 2023 NEI reporting windows open for SLT submittals in the Emissions Inventory System (EIS)
- Draft versions of 2023 nonpoint tools (Wagon Wheel) and new EIS input templates & provided training to SLTs
- Updated release of 2022 NEI point inventory in EIS

Ongoing work supporting SLTs to review and complete 2023 submissions

This spring and summer, expect to work to complete and release 2023 NEI

NEI and EIS newsletter updates to stakeholders every 3-4 weeks

2023 NEI Emissions Science and Methods Updates Already Provided*

New national methods for:

Oil & Gas Abandoned wells

Residential Cooking

Pile burns, campfires, structural and motor vehicle fires (including Maui WUI fire from 2023)

Roofing asphalt

Non-agriculture NH_3 emissions

Method improvements:

Commercial cooking

RWC activity, emission factors, speciation, and methods to distribute emissions more towards rural areas

Road Dust

Road asphalt

Gasoline distribution

SPECIATE additions and improvements

*** SLTs can review and comment on new and revised methods by participating in the 2023 NEI process. Depending on timing and reviews, some new methods could be included in 2022 platform v2 inventories**

Combined Air Emissions Reporting System (CAERS) Update

- CAERS V6 re-release January 2025 with SLT-specific pollutants and feature for pollutants "not reporting this year"
- CAERS Product Design Team (PDT) always seeking new SLT members
- CAERS Users:
  - Current: AZ, DC, GA, ID, Pima AZ, ME, MS, RI
  - SLTs wanting to onboard: CO, MA, MT, TN
  - Additional SLTs have test accounts and provide us feedback
- Onboarding Process:
  - Get test account
  - Start CROMERR process ASAP
  - Discuss “must haves” with CAERS Team by May for onboarding the following calendar year
  - Trainings available for industry for SLTs and help desk assistance

AirToxScreen Updates

The Air Toxics Screening Assessment (AirToxScreen), part of EPA's ongoing review of air toxics in the US, is a screening tool for state, local and Tribal air agencies to help identify which pollutants, emission sources and places they may wish to study further to better understand any possible risks to public health from air toxics

2020 AirToxScreen was released Spring 2024

- Cancer Risk available via AirToxScreen Mapping Tool

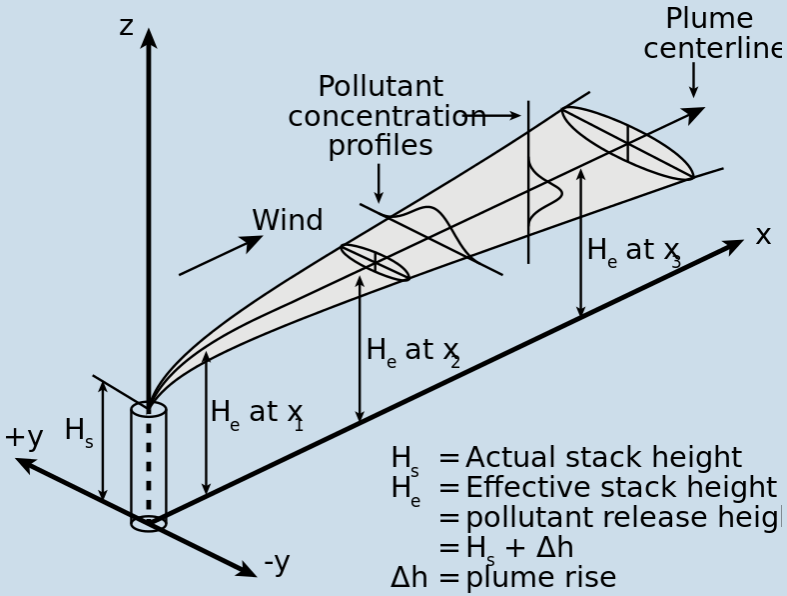
2021 AirToxScreen final risk previewed by SLTs Jan-Apr 2025

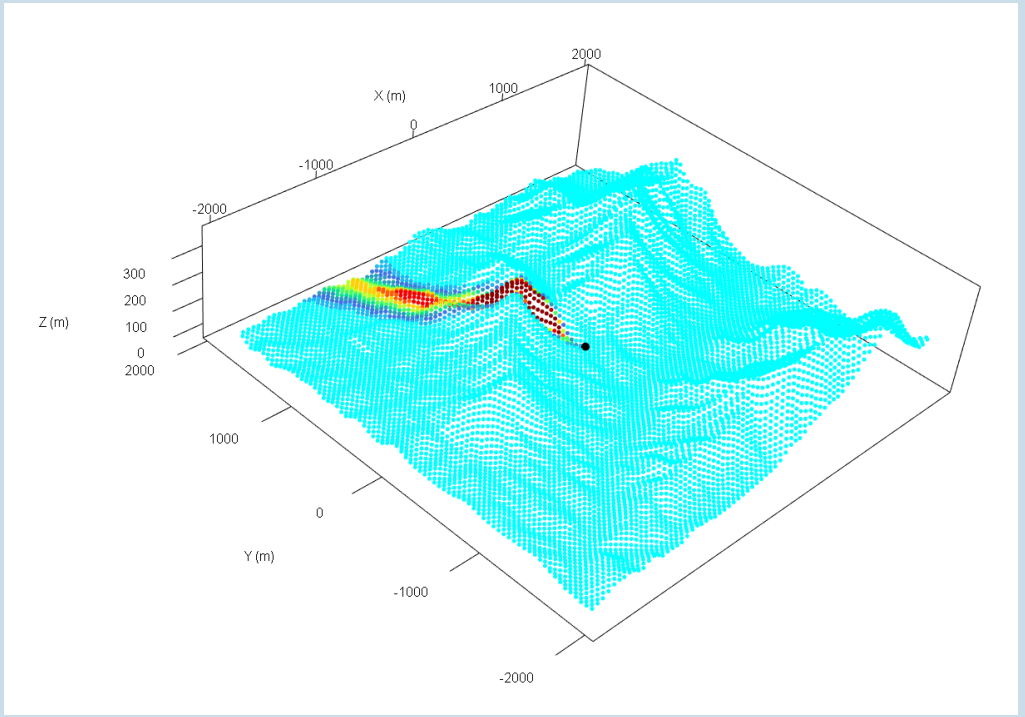
- Results are at the census-block level

2022 AirToxScreen point source emissions review completed Feb 2025

2023 AirToxScreen point source emissions review scheduled for Summer 2025

Air Quality Modeling





Guideline / AERMOD Final Rule

- "*Guideline on Air Quality Models*; Enhancements to the AERMOD Dispersion Modeling System" made final on November 20, 2024
  - The *Guideline on Air Quality Models* is published as "Appendix W" to 40 CFR Part 51
  - The *Guideline* has been incorporated into the EPA's regulations, satisfying a requirement under the Clean Air Act (CAA), for the EPA to specify, with reasonable particularity, models to be used in the Prevention of Significant Deterioration (PSD) program
  - The *Guideline* provides EPA-preferred models and other recommended techniques, as well as guidance for their use in predicting ambient concentrations of air pollutants
- On November 27, 2024, the final rule was published in the Federal Register.
  - 89 FR 95034: https://www.epa.gov/system/files/documents/2024-11/appendix_w-2024.pdf
  - EPA's SCRAM webpage for final rule: https://www.epa.gov/scram/2024-appendix-w-final-rule
  - Docket: https://www.regulations.gov/docket/EPA-HQ-OAR-2022-0872
- The effective date for this action was March 21, 2025, with a 1-year transition period that ends on November 29, 2025 *(one year from publication date)*

Guideline / AERMOD Final Rule (2)

- In this 2024 *Guideline* / AERMOD final rule, EPA revised the scientific formulation in the AERMOD Modeling System and revised the regulatory text of the *Guideline*:
  - Added three new non-default regulatory formulation options in the AERMOD Modeling System with corresponding revisions to the regulatory text specific to the use of these formulation options:
    1. Incorporation of COARE algorithms into AERMET for use in overwater marine boundary layer environments;
    2. Addition of a new Tier 3 detailed screening technique for NO_2 (GRSM); and
    3. Addition of RLINE as mobile source type.
    - Only added formulation options to the model system…
      …did not remove any existing option or impose any new requirements.
  - Refinement to the Section 8.3 recommendations regarding the determination of an appropriate background concentration for NAAQS implementation modeling
  - "Appendix A" to Appendix W shifted to "Addendum A" due to new Federal Register requirements.
- The revisions in the final rule are consistent with everything proposed in October 2023

Guideline / AERMOD Final Rule (3)

- At the same time as the final rule's signature, the EPA released the latest version of the AERMOD Modeling System (v24142) and the final Guidance on Developing Background Concentrations for Use in Modeling Demonstrations.
  - AERMOD Modeling System
    - Regulatory - AERMOD Modeling System (AERMOD, AERMET, AERMAP)
    - Nonregulatory - AERSURFACE, AERPLOT, and MMIF v4.1.1
    - https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod
  - Guidance on Developing Background Concentrations for Use in Modeling Demonstrations
    - https://www.epa.gov/system/files/documents/2024-11/guidance-on-developing-background-concentrations-for-use-in-modeling-demonstrations.pdf

AERMOD Modeling System

Stakeholders are interested in EPA improving:

- Shoreline fumigation
- Downwash Improvements (PRIME, BPIPPRM, Offshore Platforms)
- Roadside barrier algorithms (solid and vegetative)
- Aircraft plume rise
- Highly buoyant plumes
- Area meander
- Urban categorization
- Surface characteristics (refinements)
- Buoyant Line Improvements

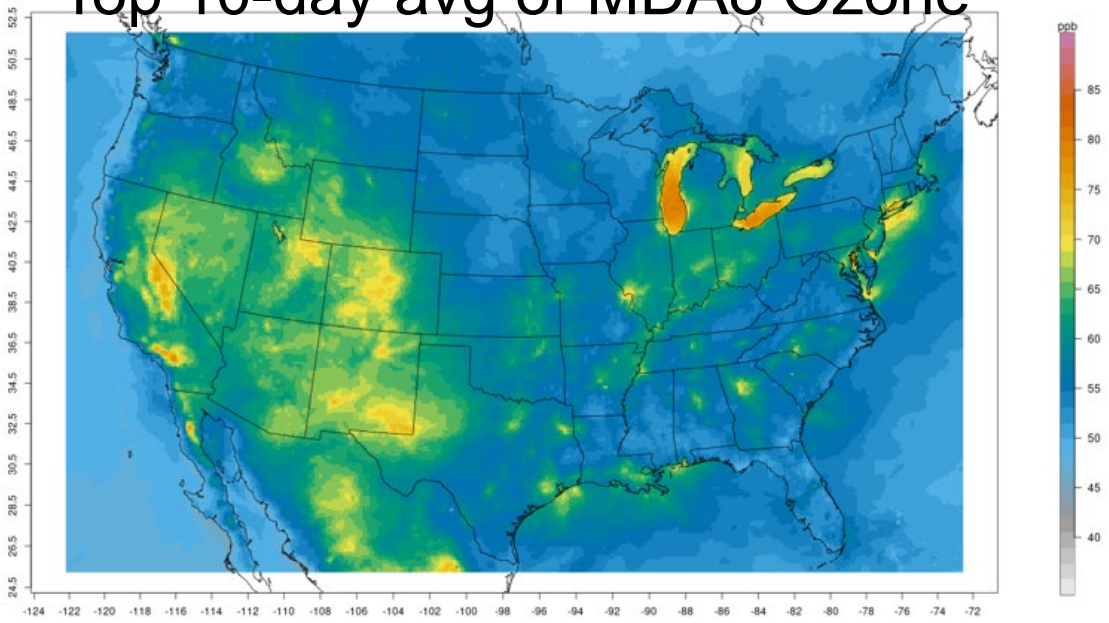
2022 Modeling Platform Update

- Generated and evaluated meteorological data for air quality model inputs
- Conducted global/hemispheric models; created and evaluated various boundary conditions (BCONs) for regional air quality models
- Interest in evaluating regional air quality models with alternative model configurations
  - CMAQ v5.4
  - CAMx v7.20
- Completing technical support document (TSD) for 2022 air quality modeling platform v1
- Expected Next Steps
  - Share the v1 CMAQ and CAMx model output* on AWS along with TSD
  - Re-run key model configurations using v2 emissions

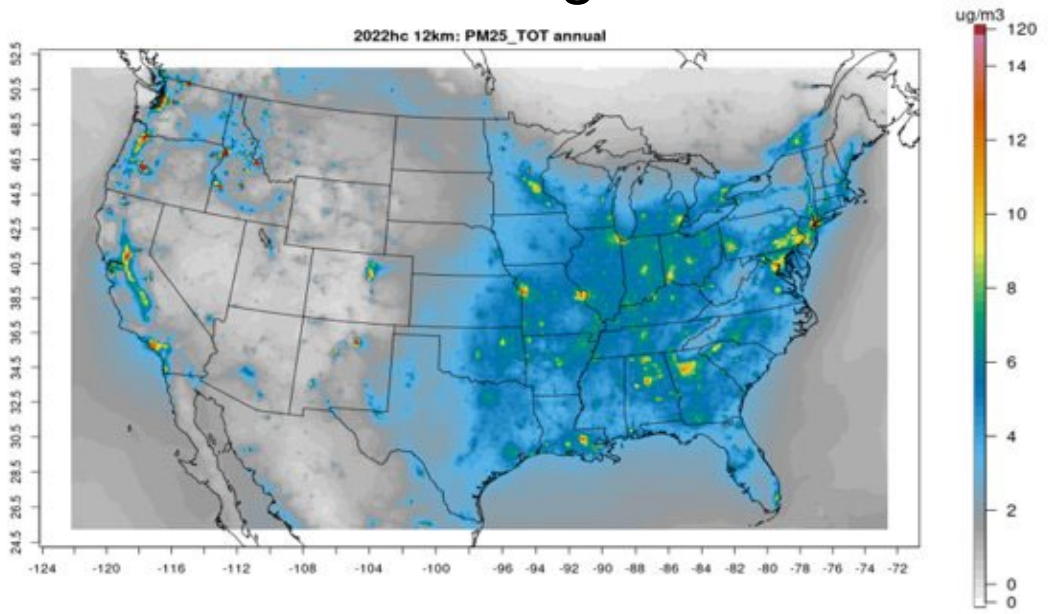
* Model outputs paired with monitoring observations at all monitoring sites for daily and hourly frequency.

2022 Modeling Platform: Initial CMAQ Results

Top 10-day avg of MDA8 Ozone



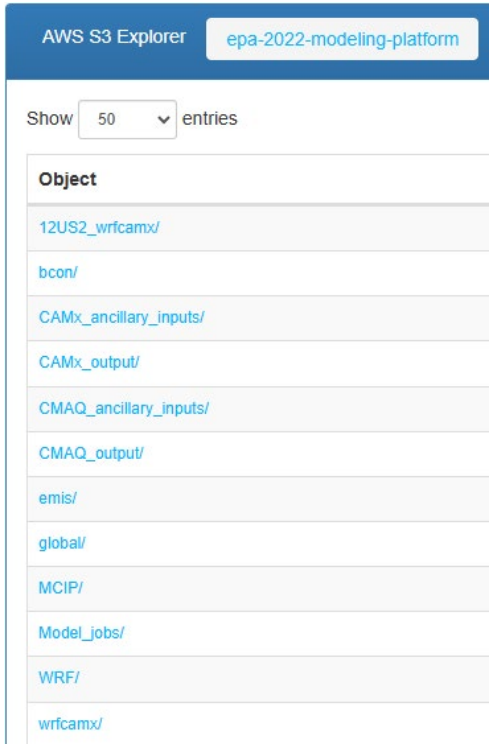
Annual Average PM2.5



- Average of top-10 days is reasonable surrogate for displaying annual 4th high with less spatial noise
- These spatial patterns are reasonable and consistent with previous modeling and analysis
- Model performance is generally consistent with previous platforms and credible for national applications

2022 Platform Data Distribution

- Data were posted online via the AWS Open Data Program
  - Meteorological Data (WRF, MCIP, wrfcamx)
  - CMAQ and CAMx model-ready emissions data
  - Global Model Outputs (CMAQ, GEOS-Chem)
  - Initial and Boundary Conditions (36- and 12-km)
  - CMAQ and CAMx reference output (One day at 36- and 12-km for users to compare)
  - Platform data available on AWS here:
    - https://registry.opendata.aws/epa-2022-modeling-platform/



Source Monitoring Updates

Wood Heater Updates

Precision study of integrated duty cycle (IDC) wood heater test method and measurement of PM

- EPA stakeholder meeting was held on October 16, in RTP
- New IDC version expected
- Follow up /confirmatory testing with new version (West coast lab) up next

Precision testing of hydronic heater IDC method – East coast testing complete

Precision testing of Pellet heaters using IDC method

Precision testing of forced-air furnaces – method development

IRA Grant of 8.8M to NESCAUM for wood heater testing/ranking

- https://www.epa.gov/grants/grant-funding-emissions-wood-heaters

Wood Heater NSPS Timeline

Small Business Review – Will precede NSPS proposal(s)

EPA has a consent decree for proposal and promulgation of both Wood Heater NSPS

NSPS Subpart AAA – Wood /Pellet heaters – Propose December 2026

- Finalize December 2027

NSPS Subpart QQQQ – Central heating appliances – Propose December 2027

- Finalize December 2028

New emissions standards – to be determined during NSPS process

Questions