



OAQPS Technical Updates: Monitoring, Modeling & Emissions

AAPCA Spring Meeting

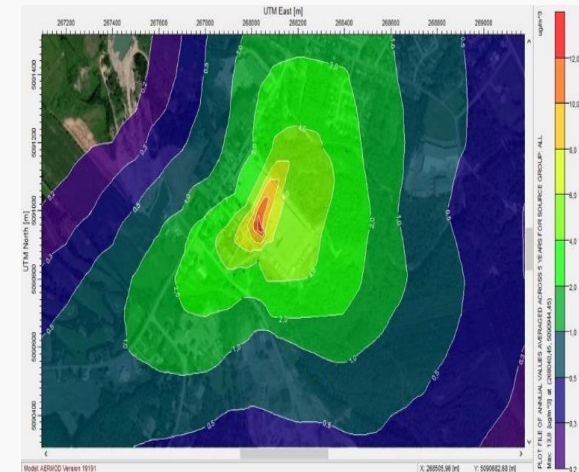
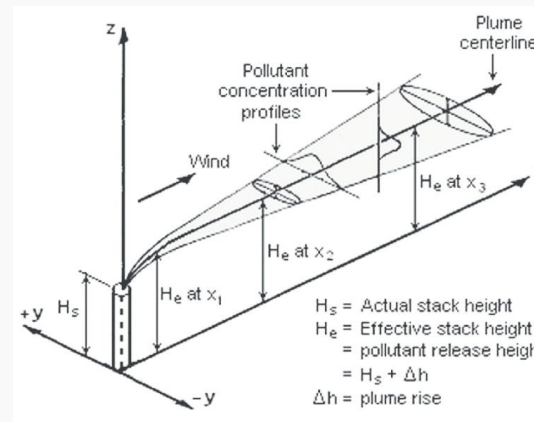
April 22, 2021

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U.S. EPA OAQPS

Key Topics



- Ambient Air Monitoring
 - GAO Monitoring Report
 - American Rescue Plan
 - PAMS Network
 - Air Toxics
 - Sensors & Satellites
- Modeling Tool Improvements
 - Guidance
 - Model Updates
- Emission Inventory
 - 2020 NEI
 - CAERS
- Wood Heaters
- Other Topics/Questions





Ambient Air Monitoring

GAO Monitoring Report/American Rescue Plan



- GAO released a report : “Air Pollution” Opportunities to Better Sustain and Modernize the National Air Quality Monitoring System.”(November 2020)
<https://www.gao.gov/products/GAO-21-38>
 - Recommendation #1: “The [EPA]...in consultation with state and local agencies, should develop, make public, and implement an asset management framework for consistently sustaining the national ambient air quality monitoring system. EPA generally agreed with this recommendation.
 - Recommendation #2: “The [EPA]...in consultation with state and local agencies and other relevant federal agencies, should develop and make public an air quality monitoring modernization plan to better meet the additional information needs of air quality managers, researchers, and the public. EPA generally agreed with this recommendation.
 - Next Steps: Engage stakeholders to review existing documentation and discuss asset management and modernization including identification of necessary resources.



Ambient Air Monitoring Update: PAMS



- PAMS

- PAMS start date for new sites is this June 1, 2021
- EPA holds monthly calls with monitoring agencies to exchange information and experiences
 - A general PAMS call on the 4th Wednesday of the month
 - AutoGC calls on the 4th Thursday of the month
- EPA is planning training events for April and May to include an overall PAMS training (including QA/QC), a data validation training, and a Technical Systems Audit training.
- EPA's national contract is available to provide PAMS support to monitoring agencies; contact cavender.kevin@epa.gov for more information on how to use the national contract to get PAMS support and for more information on training opportunities and to get included in meeting invites

Air Toxics Monitoring



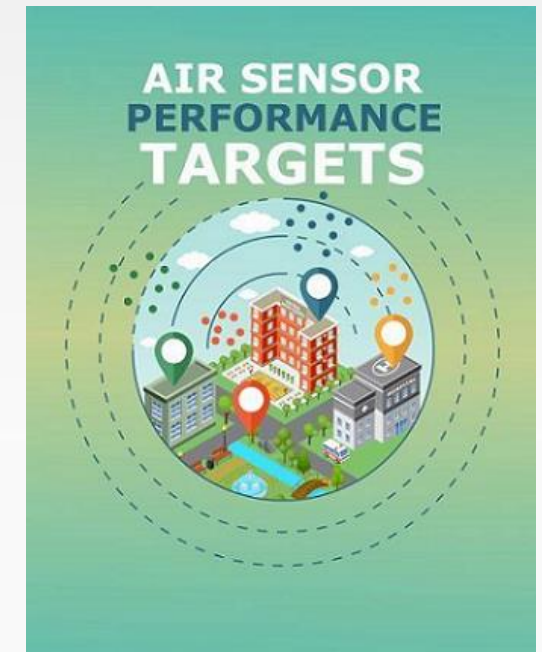
- **National Air Toxics Trends Network (NATTS)**
 - NATTS Network - Total number of active NATTS sites: 26, including 2 new sites (Tulsa, OK and Pittsburgh, PA) added in 2020
 - Underway: 3rd NATTS network assessment
- **Community Scale Air Toxics Air Monitoring (CSATAM) Grants**
 - 11 applications were selected for award with total funding: \$5 Million using FY20 and FY21 funds
- **Ethylene Oxide (EtO)**
 - Further evaluation of EtO measurements by TO-15/TO-15A & incorporation into NATTS TAD
 - April 15, 2021 webinar on method analytical considerations, resources, and challenges of TO-15/TO-15A
 - Sampling challenges with sampling media and sampling devices
 - Intended to inform and communicate challenges and progress associated with the TO-15/TO-15A method using canisters as sampling media and GC/MS as the analytical instrument for Ethylene Oxide (EtO) measurements.
 - Technical memorandum - *Use of Stand-Alone Timers for Volatile Organic Compound (VOC) Sample Collection in Canisters*
 - Identifies cautions and issues related to timer use
 - Suggests best practices if an organization chooses to use these devices

Air Sensor Project Updates



- General Updates

- EPA’s Office of Research and Development released air sensor performance targets and test protocols for PM_{2.5} and O₃ in February 2021 (<https://www.epa.gov/air-sensor-toolbox/air-sensor-performance-targets-and-testing-protocols>)
- EPA’s Office of Research and Development (ORD) continues to evaluate new sensors in RTP, NC and is analyzing data from a field study to better understand the long-term performance of various sensors across regions and environmental conditions
- EPA’s Office of Air and Radiation addressed questions from state and local air agencies regarding EPA’s position on the use of air sensor data for National Ambient Air Quality Standard (NAAQS) compliance
 - Released a [memo](#) on June 22, 2020
 - Describes steps Agency is taking to better understand the data quality, interpretation, and management of sensor data in the ambient environment

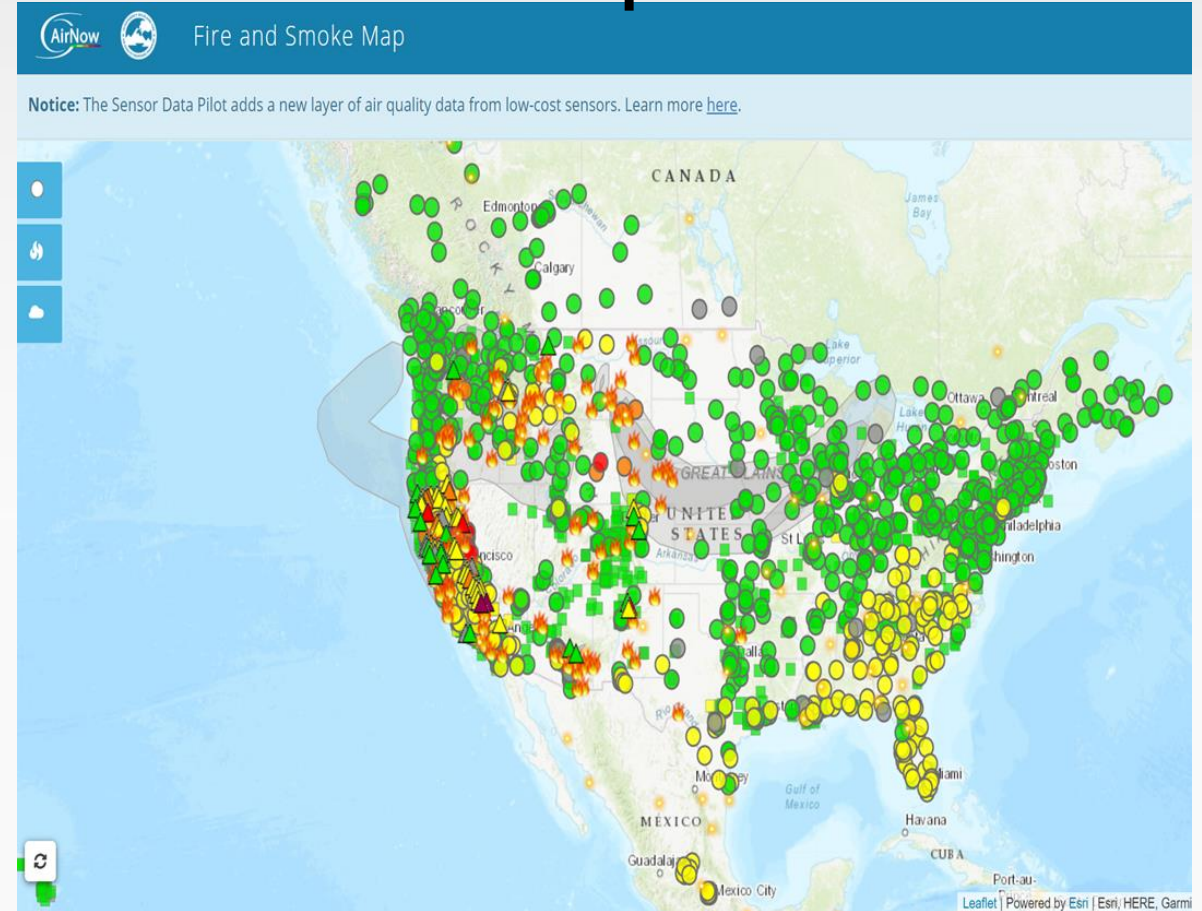


AirNow Sensor Data Pilot

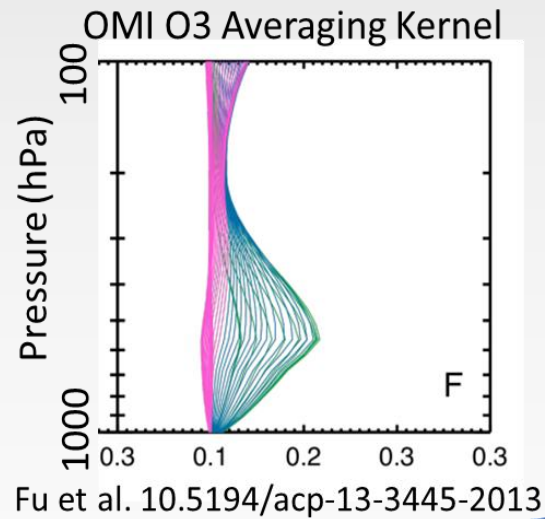


- New sensor data layer added to existing [Wildfire and Smoke Map](#) on Airnow.gov that integrates publicly available PM_{2.5} data from the PurpleAir sensors
- Provides the public with additional air quality information they can use to protect their health during wildfires
- Improves coverage where monitors do not exist
- For 2021 plan to provide improvements around:
 - Underlying functionality of the website
 - Ability of users to find FAQs
 - Ease of navigation
 - Mobile usability
 - Updated correction factors
- Will remain as a pilot for the purposes of testing ways of delivering information to the public
- Publish new version before next fire season, targeting late July 2021

Fire and Smoke Map



What about Satellites?



Not a substitute for monitoring data

- Most often total column measurement with low sensitivity to the surface for some species.
- Requires model “priors” and “kernels” or “assimilation” for interpretation to ground level.

Meteorological Model Inputs

- Land use/Land Cover, Digital Elevation Maps
- GHR Sea Surface Temperatures
- Data assimilation (e.g., GEOS, CAMS, GDAS, WRF)

Emissions Inputs

- e.g., MEGAN, FINN, GFED, BueSky
- Fire detection, land area burned

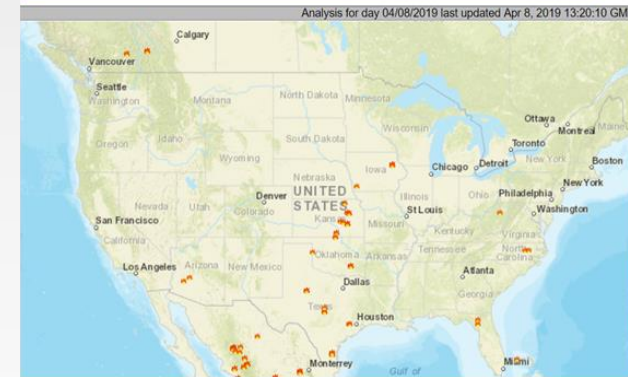
Air Quality Model Inputs

- Land use/Land Cover, Digital Elevation Maps
- TOMS/OMI Ozone columns to adjust photolysis

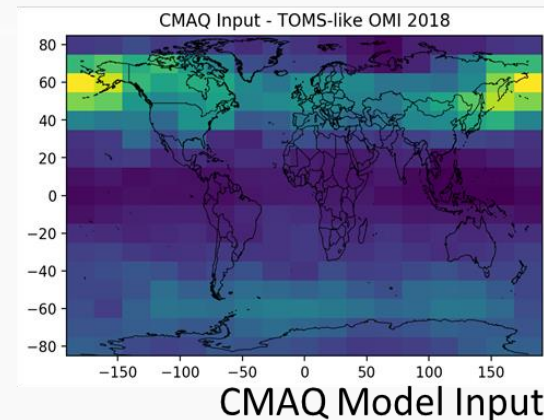
Air Quality Model or Emissions Evaluation

- OMI Nitrogen Dioxide Tropospheric Columns
- OMI Ozone Tropospheric Columns
- OMI Formaldehyde Columns
- MODIS Aerosol Optical Depth
- CRIS Ammonia

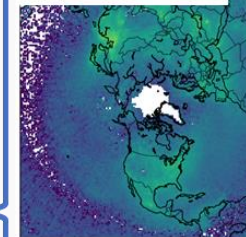
Moving towards assimilation!



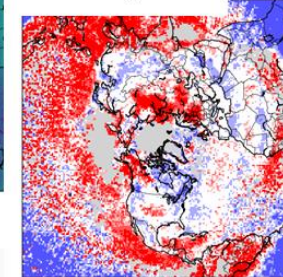
Fires from NOAA's Hazard Mapping System



OMI NO2



CMAQ Bias



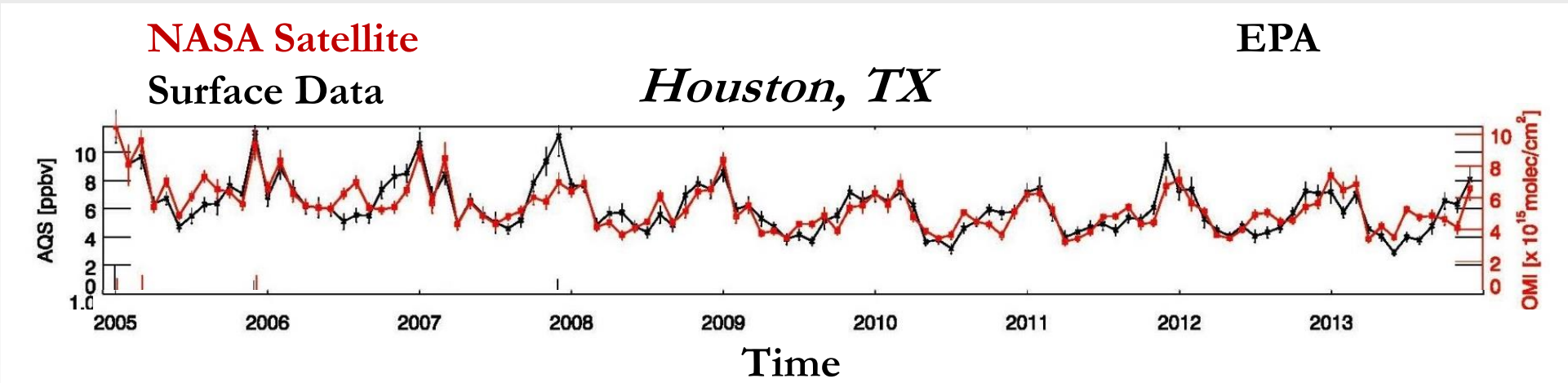
OMI Nitrogen Dioxide

2020 Ozone Policy Assessment

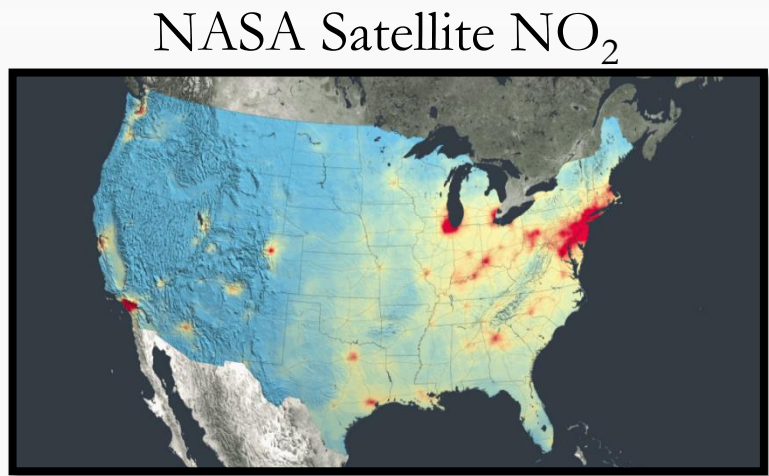
Satellite / Monitor Comparison



Slide from Bryan Duncan, NASA



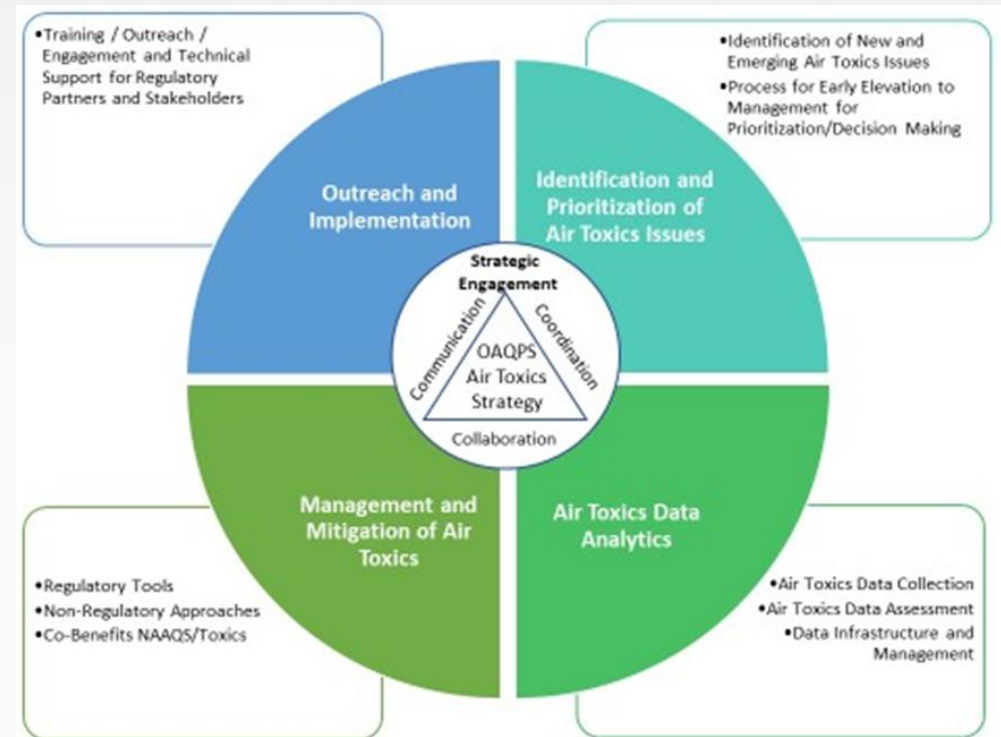
Techniques to convert satellite data to familiar quantities are improving over time!



OAQPS Air Toxics Strategy



- A focus of the strategy is to provide structure to the air toxics program so that we can more effectively address air toxics issues, including associated environmental justice issues. At the core of the strategy is coordination, collaboration, and communication within OAQPS (and within EPA) and with our regulatory partners and stakeholders.
- Expected Outcomes:
 - Proactively identify and address air toxics issues.
 - Achieve better outcomes (due to addressing air toxics issues in a systematic manner).
 - Improve public health protection and outcomes for communities, including minority, low-income, and indigenous communities.
 - Develop approaches that are appropriately scaled to the issue and coordinated, as necessary, nationally.
 - Improve efficiencies in the regulatory program, with smarter rules and targeted emission reductions.





Air Quality Modeling

O₃ and PM_{2.5} Permit Modeling Guidance



- Draft released on February 10, 2020 with an informal comment period
 - This guidance is intended to replace the 2014 Guidance on PM_{2.5} Permit Modeling
 - Majority of the comments received were supportive, providing grammatical suggestions, or asking for clarifications
 - https://www3.epa.gov/ttn/scram/guidance/guide/Draft_Guidance_for_O3_PM25_Permit_Modeling.pdf
- OMB Interagency Review
 - Given an OMB significance determination in January 2021, the draft guidance must go through a federal interagency review process that typically takes 60-90 days
 - With the Administration change, new OAR senior management must be briefed on all guidance and regulatory packages still in queue for final action
 - Once we have senior management sign-off, we will re-submit the guidance package to OMB so it will be mid-2021 before a final guidance can be released
- EPA recommends use of the February 2020 in the interim

AERMOD Development: Short-term



- Updates to AERMOD / AERMET v19191
 - Anticipating the next AERMOD Modeling System release in late April / early May 2021
 - New AERMOD Alpha Options: Low Wind, Downwash, Tier 2 and 3 NO₂ Methods, RLINE barrier update
 - Miscellaneous AERMET/AERMOD bug fixes
 - Draft Overhaul of AERMET Code
- No planned updates to AERSCREEN v16216, AERMAP v18081, or AERSURFACE v20060



AERMOD Development: Short-term



- Reminder, ALPHA / BETA scheme for model formulation development
 - ALPHA: experimental; typically, early in the development process; often lacking peer-review and/or prerequisite model performance documentation; not ready for regulatory use
 - BETA: matured and peer-reviewed model formulation option; potentially ready for consideration as alternative model(s) and future regulatory promulgation



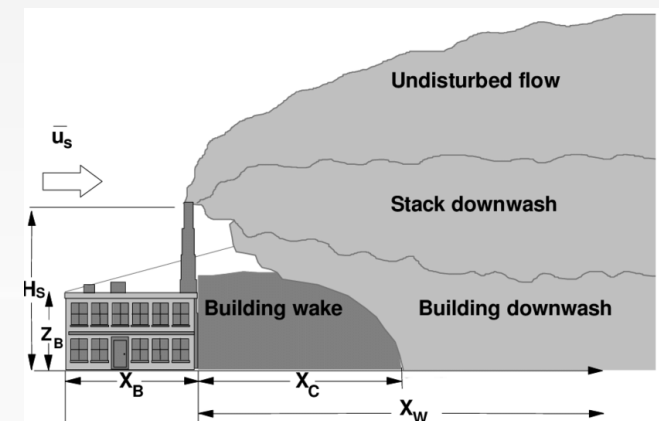
AERMOD Development: Longer term



- Model development over the next few years will focus on promoting beta options for the several key areas as defined by AERMOD White Papers and was focus of expert panels at the 12th Conference on Air Quality

Models:

- Building downwash
 - Beta downwash option to consider proposing as regulatory update to PRIME
- Overwater modeling
 - Progress towards replacing OCD with AERMOD
 - Beta platform downwash option to consider proposing as regulatory update
 - Methodology for processing prognostic overwater meteorology
 - Implement a shoreline fumigation algorithm
- Low wind conditions
 - Beta low wind option(s) to consider proposing as regulatory update



AERMOD Development: Longer term



- Continued...
 - NO2 modeling techniques
 - Beta Tier 2 and Tier 3 options to consider proposing as regulatory update
 - Mobile source modeling
 - RLINE introduced into AERMOD v19191 as BETA option to consider proposing as regulatory option
 - ALPHA options for urban environments, solid barriers, and depressed roadways within RLINE
 - Deposition
 - Deposition is an area of focus for model development given interest in PFAS
 - 12th Conference on Air Quality Models
<https://www.epa.gov/scram/12th-conference-air-quality-modeling>
 - AERMOD Modeling System Development / White Papers
<https://www.epa.gov/scram/aermod-modeling-system-development>

R/S/L Modeling Workshop



- Planning a virtual 2021 RSL Modelers' Workshop
 - Overwhelming support for a virtual workshop this year
 - We do NOT plan for 3 days of constant virtual sessions and presentations
 - Instead, considering non-consecutive morning / afternoon sessions across a couple of weeks
- Tentative looking at portions of the weeks of June 21st and July 12th
 - There will be a stakeholder session in addition to co-regulatory only sessions
 - Given a virtual format, we can expand to include more topics and presenters, including both dispersion and photochemical modeling related
 - Still mapping out the session blocks and planning for the workshop
 - We hope to be back to an in-person workshop format in 2022
 - Minneapolis, MN is still a strong possibility in the late Spring / early Summer





Emission Inventory & Analyses

2020 National Emission Inventory Year



- Competing interests for 2020 as an inventory year
 - Some question it as a good “planning year” for SIPs
 - Science stakeholders interested in modeling this “natural experiment”
- 2020 inventory year is regulatory requirement as per the Air Emissions Reporting Rule (40 CFR 51, Subpart A)
 - State, local, and tribal air agencies should be prepared to comply with the AERR for 2020
- OAQPS is committed to creating a 2020 inventory and temporally/spatially resolved 2020 modeling platform that reflects available information about COVID-19 impacts

A screenshot of the EPA website's "Air Emissions Inventories" page. The page features the EPA logo and navigation links for "Environmental Topics", "Laws & Regulations", and "About EPA". A search bar is present with the text "Search EPA.gov". The main heading is "Air Emissions Inventories", with links for "CONTACT US", "SHARE", and social media icons. Below the heading is a large image collage showing various industrial and natural scenes. A text box explains that the National Emissions Inventory (NEI) is a detailed estimate of air emissions. To the right, there is an "Inventory News" section with a link to a "2017 NEI January release posted (2/2021)". At the bottom, there are three main sections: "Reports and Summaries" with a link to "New Interactive 2017 NEI", "Data and Documentation" with a link to "Current and recent NEIs", and "Data Submission Program" with a link to "Air Emissions Reporting".

2020 National Emissions Inventory Plans



- **March 8, 2021:** CAERS open for 2020 emissions reporting
- **Spring through Fall 2021:** Virtual trainings planned
 - Plan to use recorded materials in a group setting, and stop for Q&As
 - Send topics to Snyder.Jennifer@epa.gov
- **Now through 2022:** State, local, tribal (SLT) collaboration on emissions methods development - provides great value to the process
- **June 30, 2021:** EIS open for reporting 2020 emissions using updated schema for improved emissions controls reporting
- **Dec. 31, 2021:** Reporting deadline to EPA for most data (2-week grace period extends until January 15, 2022)
- **April 2022:** Final feedback reports sent to Air Directors
- **Fall 2022:** Releases of data categories as they are completed
- **March 2023:** Full public release

A calendar grid for the year 2021, showing the days of the week (S, M, T, W, T, F, S) and the dates for each month from January to December. The calendar is presented in a compact, grid-like format with the year "2021" centered at the top.

Air Emissions Reporting Rule (AERR)



- EPA is evaluating the AERR for possible updates for the 2023 inventory reporting cycle
- Two listening sessions with state/local/tribal agencies on concerns and problems with the current AERR and the level of effort that it takes to comply for annual reporting:
 - April 6th, 2-4pm Eastern
 - April 8th, 3-5pm Eastern
- Other listening sessions may be held
- Additional input can be sent to the POC listed below



- CAERS (Combined Air Emissions Reporting System) opened for Inventory Year 2020 reporting on March 8th.
 - Participating State/Local/Tribal (SLT) agencies are GA, DC, RI, Pima AZ, and Lincoln-Lancaster NE.
- AZ, MT, and MN are next in line to onboard with CAERS for reporting in 2022 and 2023.
- We are recruiting SLTs on an ongoing basis:
 - “Paper” SLTs who want to adopt CAERS “as-is” can onboard any time.
 - EPA is looking to develop CAERS out to be open source, increasing the ways we can work with our SLT partners.
 - Interested SLTs who aren’t on our Product Design Team (PDT) can join any time to provide input towards the continued development of CAERS.



Residential Wood Heating: Wood Stove Certifications



Alaska & NESCAUM Wood Heater Test Report Review

- Report released March 15, 2021 highlighting concerns around the enforcement and implementation of the NSPS as well as some of the provisions themselves based on an audit of over 240 test reports
- EPA has been working closely with Alaska and NESCAUM since October when this was first brought to our attention
- Concerns raised include flexibility in the test method, incomplete reports, and incomplete tests in addition to other issues
- After initially having no stoves available for use in Alaska, through further evaluation and investigation, Alaska has developed a list of between 40-50 stoves that they find acceptable.



Ongoing Efforts by EPA

- Further review/evaluation of test reports
 - Review of reports listed in the NESCAUM audit for discrepancies that can be addressed with more information
 - Review of reports that have more substantial issues
 - Review of new test reports recently submitted beyond those in the audit report
- Review and subsequent approval of Broadly Approvable Alternative Test Method (ATM) for the Integrated Duty Cycle (IDC) protocol submitted by Alaska.
- Letters sent to the testing laboratories and 3rd party certifiers detailing concerns in test protocols and procedures identified by the NESCAUM audit and requesting corrective action.



Ongoing Efforts by EPA

- In addition to evaluating all the test reports, work continues on the development of a new EPA cord wood test method
 - Evaluation of TEOM sampling for PM – Precision study
 - Conducted at EPA with ORD partnership
 - Evaluation of Integrated Duty Cycle method – Precision study
 - Two EPA Approved test labs with side-by-side identical appliances
 - Goal is to understand test variability and performance
 - Intend to propose a new cord wood PM test method in 2023



Thank
you! ☺