Message

From: U.S. Environmental Protection Agency [usaepa@service.govdelivery.com]
Sent: 11/6/2018 4:28:10 PM
To: Bahadori, Tina [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=7da7967dcafb4c5bbc39c666fee31ec3-Bahadori, Tina]
Subject: "Cycle of Renewal" Air and Energy Research News, Fall Issue -- Nov. 2018

Fall Issue - November 2018

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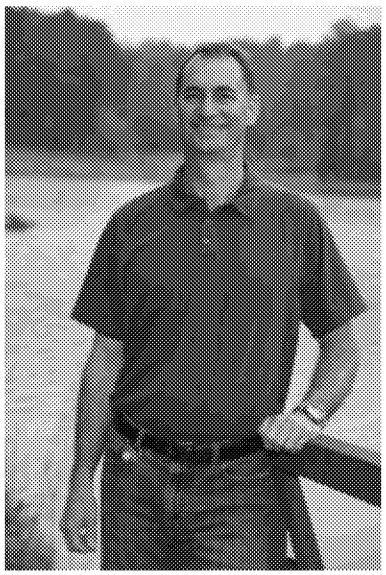
News from the Director



Life starts all over again when it gets crisp in the fall.

- F. Scott Fitzgerald

Fall marks a transition from exuberant growth during summer to preparing for winter's scarcity. Still, there's the promise of renewed growth on the horizon. In many ways we are at a similar state of transition. We continue to make progress revising the Air and Energy Strategic Research Action Plan (StRAP) and will soon be transitioning to putting it into action. Thanks to the many comments we received from EPA Program Offices, Regions and ORD's Labs and Centers we now have a version of the document that is being reviewed by our Board of Scientific Counselors (BOSC). We meet with our BOSC on November 13-14 in Research Triangle Park, NC. Following this meeting and receipt of their report in early 2019 we will put the final touches on the StRAP and begin the research to make the vision of the strategic plan a reality.

While we have been focused on developing a new StRAP, our scientists and grantees are making great strides in understanding the complexities of air pollution and its subsequent impact on public health and the environment. This issue of Air and Energy Research News contains a number of highlights from the program illustrating the progress we've made. Stay tuned for more as we bring 2018 to a close. With a new strategic plan in place we're excited about what the future holds!

Alan Vette, *Acting Director for Air and Energy Research Program*

Front Page News

Major Update to CMAQ Released

EPA researchers have released a major update to the Community Multiscale Air Quality (CMAQ) Modeling System (version 5.3) in beta; the full version of CMAQ 5.3 will be released in 2019. CMAQ is the EPA's premier global-to-local air quality modeling system, which has thousands of users in more than 50 countries. For more than two decades, EPA and states have used CMAQ—a powerful computational tool for translating fundamental atmospheric science principles—to support air quality management. CMAQ 5.3 includes the following major updates.

- A more detailed representation of the characteristics of particulate matter.
- Expanded chemistry for ozone and particulate matter formation from global-to-local scales.
- More complex land and atmosphere interactions to support both air quality and ecosystems applications.
- Increased emphasis on pollutants originating outside the U.S.
- Increased scientific consistency between meteorology and chemistry models.
- Greater computational efficiency and flexibility to support increasingly diverse uses of CMAQ.

Visit the CMAQ webpage

Read the CMAQ 5.3 fact sheet

Visit the CMAS Center for training opportunities

Contact: Rohit Mathur (mathur.rohit@epa.gov)

A-E Stakeholder Engagement

Four A-E RARE Projects Support Regions

Region 1 RARE Project – Exploring the Cause of Persistent High Ozone in Connecticut

This RARE project will use surface level and elevated ozone monitoring data collected on and over the Long Island Sound during the summer of 2018 to better understand the high ozone levels that are being transported into Connecticut, and to identify the factors that are most influential. The modeling analysis will provide an important complement to an extensive data collection effort being overseen by the Northeast States for Coordinated Air Use Management (NESCAUM).

Contact: Jon Pleim, Pleim.jon@Epa.gov and George Pouliot, pouliot.george@epa.gov

Region 3 RARE Project – State-Level Multi-Pollutant Planning Using GLIMPSE

This RARE project will seek input from state air quality management staff on GLIMPSE, a prototype decision support system that can be used to develop cost-effective and robust strategies to meet and maintain the National Ambient Air Quality Standards (NAAQS). The tool will be user friendly for

non-modelers and faster and more comprehensive than existing tools. GLIMPSE is being designed to account for co-benefits, potentially unforeseen consequences, uncertainties future population and economic growth and state-specific considerations.

Learn more about GLIMPSE

Contact: Dan Loughlin, Loughlin.dan@epa.gov and Chris Nolte, nolte.chris@epa.gov

Region 4 RARE Project – Southeast Prescribed Fire Experiment (SERX): Emissions Characterization of Common Fuels

In the Southeast, prescribed fires for land management control and to prevent wildfires are a common practice. Regional-specific emissions data from prescribed fires is needed to evaluate and develop models for use in protecting public health from smoke and to meet NAAQS requirements and regional haze goals. With support from states, this RARE project will collect samples of emissions from smoke plumes from ignited test plots using a novel aerial sampling system and remote ground monitoring.

Contact: Brian Gullett, gullett.brian@epa.gov

Region 5 (lead) and 6 (partner) Project – Advanced Fugitive Measurements of Ethylene Oxide Emissions

Ethylene oxide (EtO) is a highly reactive and cancer-causing compound that is widely used as a disinfectant for medical products and in hospitals. EPA recognizes the need for a more sensitive sampling and analytical procedure for measuring EtO in the air, following a 2016 IRIS assessment that determined the air toxic is an even more potent human carcinogen than formerly determined. This finding increased the unit risk estimate (URE) for EtO by 60 times the previously used value. With the new URE value, the National Air Toxics Assessment, released in August 2018, identified approximately 30 EtO-emitting facilities that may significantly contribute to cancer risks of greater than 100 in a million (equivalent to roughly 10 parts per trillion by volume or pptv). This RARE project will work toward development of a sampling method and detection approach for EtO at 50 pptv or lower, with the goal of single digit pptv measurements.

Contact: Tiffany L.B. Yelverton, Yelverton.tiffany@epa.gov

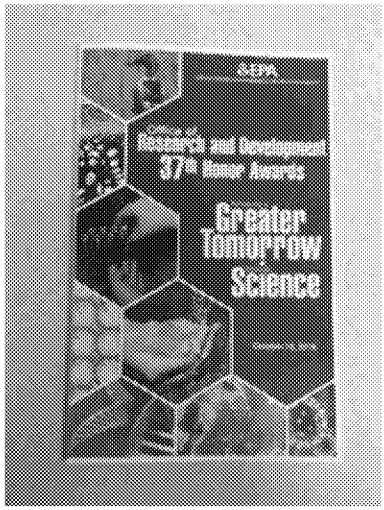
Moment of Science

"Moment of Science" presentations provide brief summaries of A-E studies and other activities to keep you informed. The presentations are provided at the start of each A-E Connections meeting, held the first and third Wednesdays of the month from 11:30 a.m. – 12:30 p.m. ET. Get the full schedule and view past presentations on **A-E Connections**.

Upcoming Presentations:

• **November 7** - Overview of Main Conclusions of the Draft Particulate Matter Integrated Science Assessment (Jason Sacks, NCEA)

ORD Awards



Congratulations to members of the Air and Energy National Research Program family and our Program and Regional partners who received awards for their contributions at the ORD 37th Honor Awards held on Oct.18, 2018.

Awards are listed below by team names and by individual for outstanding accomplishments in 2017. A full list is provided in the link below. The recipients were:

- Shared Administrative Resources Group
- The Integrated Science Assessment Team
- Urban Resilience Indicators Team
- The ORD Household Energy Research Team
- The Coweeta Flux Tower Collaboration Team
- Donna Schwede for supporting Programs and Regions by ensuring data from the National Atmospheric Deposition Program continues to be available to support EPA programs
- The Wildland Fire Team
- The Mississippi River Basin Modeling System Team

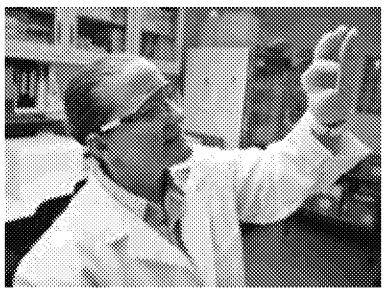
View the full list

NESCAUM Sends Thank You

On Oct. 18, Paul Miller, Deputy Director and Chief Scientist of Northeast States for Coordinated Air Use Management (NESCAUM) sent a letter to Luke Valin, a Post-Doc with the National Exposure Research Laboratory (NERL). The letter thanked Valin for efforts in the states of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont during the 2018 summer field campaign, which sought to better understand ozone pollution formation and transport as a part of the Long Island Sound Tropospheric Ozone Study (LISTOS). Miller reached out to specifically recognize Valin for coordinating the multiple daily activities involved in the field campaign, his knowledge of tools and participant capabilities, and his “understanding of the states’ science needs in support of their air quality planning efforts”.

Faces of A-E

Meet the Scientist: Samantha Snow



1. What study are you currently working on in your research area?

Our lab’s new project focuses on determining how community level stressors (i.e. noise, uncomfortable living conditions, confinement, fear, and other life stressors) can interact with air pollutants to increase susceptibility for immunological and metabolic disease.

Read the full story here

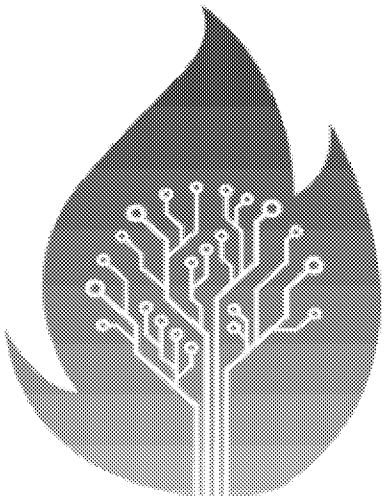
Scientist Supports Utah Wildfire with Air Resource Advisor Deployment

ORD's Gayle Hagler in the National Exposure Research Laboratory recently participated in a two-week deployment to Utah as an Air Resource Advisor (ARA) with the Wildland Fire Air Quality Response Program (WFAQRP). Hagler was deployed from late September through early October to Utah's Pole Creek and Bald Mountain fires, southeast of Salt Lake City. The fires, caused by lightning strikes, grew to cover approximately 120,000 acres of the Uinta-Wasatch-Cache National Forest. Hagler supported an Incident Management Team along with public information officers, fire behavior analysts and incident meteorologists, all collaborating to support incident response and address public health and safety concerns. Moving forward, Hagler believes EPA has much to offer the WFAQRP, particularly by advancing monitoring capabilities for future ARAs, and providing resources that support smoke-ready communities.

Learn about the WFAQRP and Air Resource Advisors

Featured Science

Sensors Challenge Advances Monitoring of Wildland Fire Smoke



ORD and federal partners announced the winners of a Wildland Fire Sensors Challenge on Sept. 12 at the Air Sensors International Conference in Oakland, California. The competition encouraged the development of innovative monitoring technologies to measure air pollutants from smoke during wildland fires.

The winners are:

- **First Place:** Jason Gu and Bryan Tomko with SenSevere/Sensit Technologies with R. Subramanian with Carnegie Mellon University, Pittsburgh, Pa. They received a $35,000 prize.
- **Second Place:** Scott Waller and Andrew Smallridge with Thingy LLC, Bellevue, Wash. They received a $25,000 prize.
- **Honorable Mention:** Javier Fernandez with Kunak Technologies®, Pamplona, Spain.

Learn more about the Sensors Challenge and winners

View a video

Read a newsletter article

Contact: Stacey Katz, katz.stacey@epa.gov and Gail Robarge, Robarge.gail@epa.gov

Mobile App Updated for Smoke Sense Study

The Smoke Sense app has been updated with new features to improve user experience. The app is available to the public and is being used in a study to understand the extent to which smoke from wildfires impacts human health and productivity; discover how people protect their health during smoke exposure; and develop effective strategies to communicate risks from smoke exposure. New features in the 2018 update include:

- Time of last measurement of two air pollutants present during wildfires—fine particulate matter and ozone;
- Access to the most current information about individual fires;
- Maps of hourly forecasts of smoke and ozone across the continental U.S.;
- Smoke Smarts module to test your knowledge of wildfire smoke exposure; and
- Upgraded graphics and streamlined tutorials and information buttons.

Learn more about Smoke Sense

Read an article

Read a blog for health care professionals

Contact: Ana Rappold, Rappold.ana@epa.gov, or SmokeSense@epa.gov

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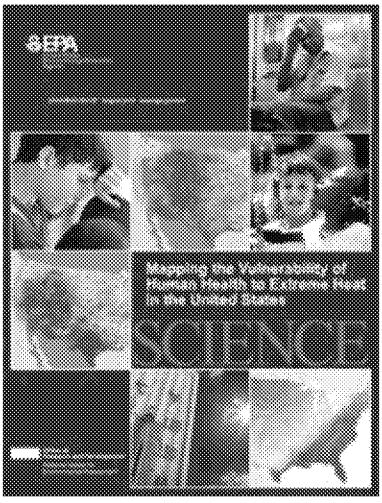
Studies Show Which Populations Are More Impacted by Air Pollution

Recent studies by three EPA-funded Air, Climate and Energy research centers (ACE Centers) have expanded understanding of the health effects of air pollutants and who is most vulnerable. Read an article linked below on the findings.

Read the article

Final report on Vulnerability Mapping Published



The new report "*Mapping the Vulnerability of Human Health to Extreme Heat in the United States*" identifies and characterizes methodologies for mapping the relative vulnerability of certain populations that can be used to assess impacts of extreme heat events and subsequently inform potential adaptation strategies. The real value of vulnerability mapping is to identify targeted areas for risk reduction to enhance adaptive capacity or improve resilience. This report will help users determine the most susceptible communities in which to invest resources.

Download the full report

Contact: Janet Gamble, Gamble.Janet@epa.gov

KORUS-AQ Formaldehyde Column Observations Reported

An article co-authored by EPA researchers looks at formaldehyde data collected during the 2016 Korea–United States Air Quality (KORUS-AQ) study. Data was concurrently collected via ground-based in situ observations of formaldehyde and by the NASA DC-8 research aircraft from a site in Seoul, Republic of Korea and a nearby site in a research forest. Results suggest that daily changes in formaldehyde surface concentrations can be reasonably estimated from the remote sensing equipment used in the study, though more research is needed to better understand the atmospheric interactions.

Read the article in *Atmospheric Measurement Techniques*

Contact: Andrew Whitehill, whitehill.andrew@epa.gov

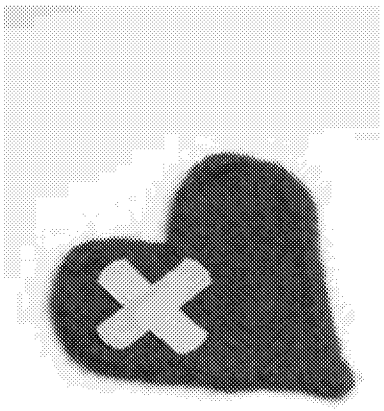
Low-Cost Air Sensors Tested in Colorado

An article by EPA scientists discusses a seven-month field evaluation of low-cost air pollution sensors for particulate matter, ozone and nitrogen dioxide, conducted in Denver, Colorado, to evaluate sensor performance in a cool, dry and high-altitude climate. The sensors from different manufacturers showed a range of correlation with reference monitors, from poor to high. The study showed different results for sensor performance than previous studies performed by EPA and others, which could be due to the different geographic location, meteorology, and aerosol properties. These results imply that continued field testing is necessary to understand emerging air sensing technology.

Read the article in *Ambient Measurement Techniques*

Contact: Stephen Feinberg, Feinberg.stephen@Epa.gov

The Health Burden of Air Pollution on the Cardiovascular System



In an article in the *North Carolina Medical Journal,* researchers observe that air pollution's cardiovascular effects pose an even larger public health burden than its respiratory effects. Yet, the authors note that only three percent of patients with heart disease discuss guidance to reduce exposure with a health professional as shown in a study by the Centers for Disease Prevention and Control (CDC).

The researchers explain the sources, exposures, and health effects of air pollution and discuss the potential for intervention strategies in the health care system to help reduce individual and population exposure and the attendant risk from the cardiovascular effects of air pollution.

Read the article in the *North Carolina Medical Journal*

Contact: Wayne Cascio, cascio.wayne@epa.gov and Tom Long, long.tom@epa.gov

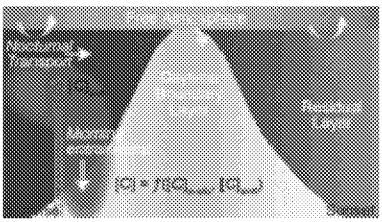
Measuring Lightning's Impact on Air Pollution Using CMAQ

Lightning-generated nitrogen oxides have a relatively small but potentially significant impact on ground-level ozone. While the potential contribution of lightning to air pollution has been recognized by researchers for a long time, large uncertainties remain regarding lightning strikes and lightning-generated nitrogen oxides in air quality models. To bridge this gap in understanding, EPA researchers added the capability to assess the impact of lightning-produced nitrogen oxides on air pollution to the Agency's Community Multiscale Air Quality Modeling System (CMAQ). A future research project is planned to perform a multi-year study to characterize the variability in lightning activity and its impact on simulated air quality.

Read the article in *Science Matters*

Contact: Daiwen Kang, Kang.Daiwen@epa.gov

Proposed Approach for an Aloft Air Quality Monitoring Network

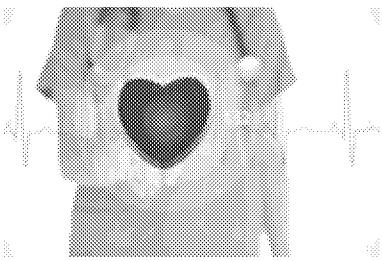


Air pollution doesn't observe state, county, or international borders. Once created, pollutants will disperse into the air, sometimes traveling great distances. How this factors into local air quality decisions and actions is a challenge for air quality managers. In a concept article, EPA atmospheric scientists propose a feasible "up in the air" monitoring network located on tall broadcast towers that could provide a greater understanding of background and transported air pollutants. EPA scientists and colleagues at the Carleton University, examined the need, feasibility and potential value of such a network. They explain the key atmospheric processes that must be better understood and present a cost-effective measurement strategy to quantify the amount of pollution imported to a location.

Read the article in *Environmental Science and Technology*

Contact: Rohit Mathur, Mathur.Rohit@epa.gov

$PM_{2.5}$ and Ozone-Related Mortality Burden Analyzed



A recent study assessed the trends in $PM_{2.5}$ and ozone-related mortality burdens in the U.S. under emission reductions from air quality regulations from 1990 to 2010. The study found that air quality improvements have significantly decreased the mortality burden, avoiding roughly 35,800 (38%) $PM_{2.5}$-related deaths and 4,600 (27%) ozone-related deaths in 2010. Researchers conclude the study illustrates the importance of past air pollutant reductions for public health in the U.S., and the need for continued air pollution controls to reduce air pollution-related mortality.

Read the article in *Atmospheric Chemistry and Physics*

Contact: Rohit Mathur, Mathur.Rohit@epa.gov

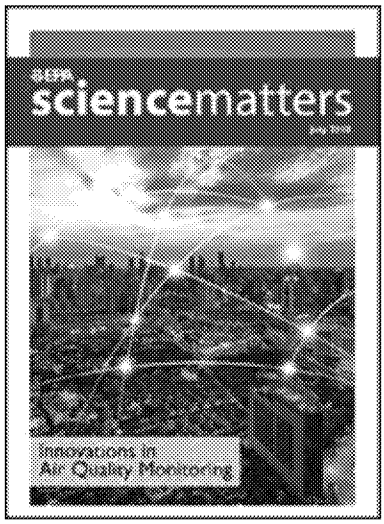
Draft PM ISA Released

ORD's National Center for Environmental Assessment (NCEA) released an external review draft of the PM ISA on Oct. 15. This document will be reviewed by the Clean Air Scientific Advisory Committee (CASAC) and is open to public comment. A CASAC meeting is being planned for December.

View the FR notice

Other News

Innovations in Air Quality Monitoring Newsletter Published



A special issue of EPA's *Science Matters* newsletter, entitled "*Innovations in Air Quality Monitoring,*" highlights some of the latest EPA research projects to advance the next generation of air measurement and monitoring. The publication has been posted on the web and is available to view at the link below.

Science Matters Special Edition: Innovations in Air Quality Monitoring

A-E Resources

- A-E's ORD@Work Page
- A-E Connections
- Past A-E Research News
- Air Research web page (external)
- Climate Change web page (external)

Do you have story ideas or news to share for future A-E News issues?
Contact: Ann Brown, brown.ann@epa.gov

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