

QUARTERLY HAQ PROJECT HIGHLIGHT:

ENHANCING AIR QUALITY DECISION-MAKING ACTIVITY IN INDIAN MEGACITIES THROUGH ASSIMILATION OF EARTH OBSERVATIONS

Supported through a 2021 HAQ grant, Rajesh Kumar (NSF NCAR), Sachin Ghude (Indian Institute of Tropical Meteorology), Vijay Kumar Soni (India Meteorological Department), and their team have developed high-resolution (400m to 2km) 72-hour air quality forecasting systems for Indian megacities. They created a Decision Support System to [forecast](#) the contribution of different emission sources and sectors to air pollution in Delhi. These forecasts are [disseminated](#) to the public and decision-makers (Figure 1). This website has been accessed by ~947,000 (~200,000 Indian) visitors, so far reflecting global interest in this website. The Commission for Air Quality Management ([CAQM](#)) uses these forecasts to implement and revoke temporary emission control measures, as defined in their Graded Response Action Plan.

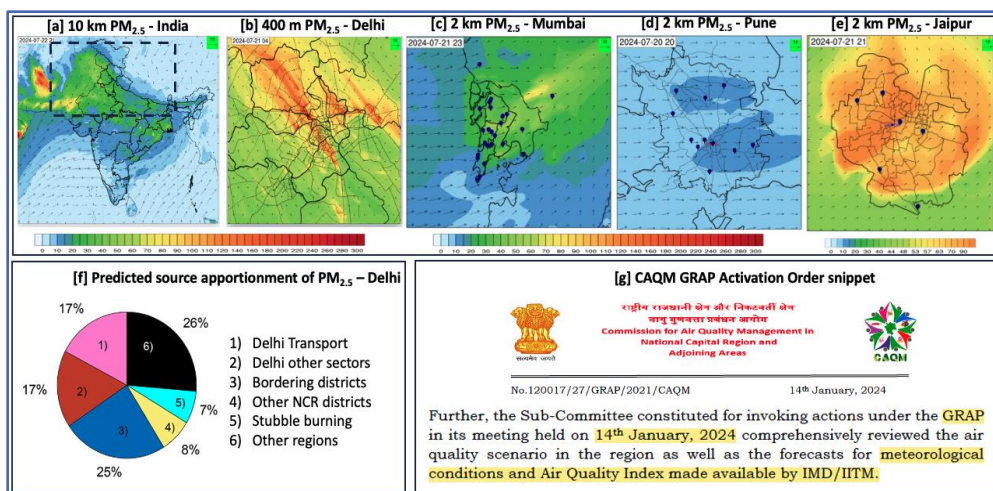
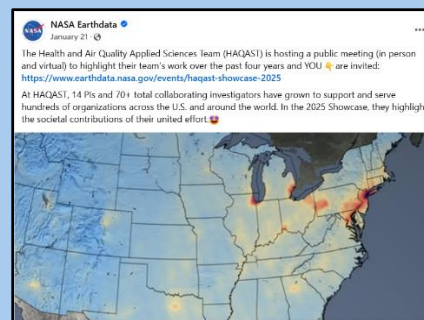


Figure 1. [Snapshot](#) of daily PM_{2.5} ($\mu\text{g m}^{-3}$) forecasts over India, Delhi, Mumbai, Pune, and Jaipur, constrained by MODIS AOD assimilation (Top). Example of PM_{2.5} source apportionment prediction in Delhi (Bottom Left). CAQM GRAP activation order issued on 14 January 2024 (Bottom Right).

ONE HEALTH AWARENESS MONTH

Each year, January 2025 is recognized as U.S. National One Health Awareness Month. To promote One Health activities, the HAQ and Communications Teams (**Andi Brinn Thomas** and **Angela Leroux-Lindsey**, NASA GSFC/SSAI) launched a social media campaign on NASA [Earthdata website](#) and NASA Earthdata [Facebook/X](#) posts to highlight the NASA HAQAST Showcase 2025.



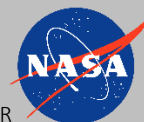
Social media post on [NASA Earthdata Facebook](#)

HEALTH AND AIR QUALITY APPLICATIONS EARTH ACTION PROGRAM

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NASA HAQAST SHOWCASE 2025

In January 2025, the NASA Health and Air Quality Applied Sciences Team ([HAQAST](#)), led by **Tracey Holloway (U. of Wisconsin, Madison)**, supported the HAQAST Showcase with 14 HAQAST Principal Investigators, researchers, and stakeholders. Held in Washington, DC, this meeting highlighted success over the last four years, including increasing public engagement with NASA data, measuring health risks in unmonitored regions and improving regulatory decision-making tools for environmental health and air quality communities. The event included a total of 322 attendees (including 150 in-person). The event recording is available on the HAQAST Showcase [website](#).



Prior to the HAQAST Showcase, the [TEMPO Information and Training Session](#) was held at the George Washington University. A total of 45 participants from air agencies and academia learned about TEMPO mission updates, applications, tools, and services and participated in an interactive hands-on training demonstration focused on the Remote Sensing Information Gateway (RSIG) tool for quick analyses of TEMPO and regulatory monitor data. Participant feedback noted the event as being highly beneficial and informative. This training was followed by a social networking event at the [Earth Information Center](#), located at the Smithsonian National Museum of Natural History.



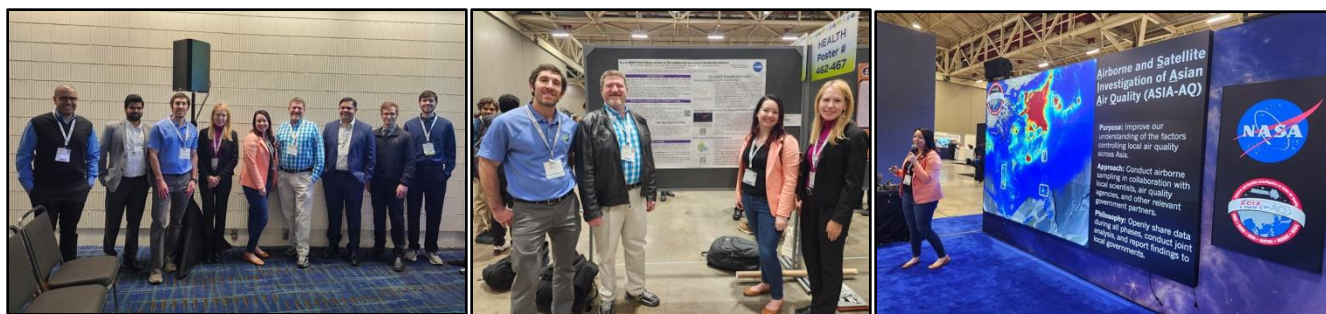
HAQAST TEMPO Training and Information Session (Left) and HAQAST Showcase 2025 (Middle/Right). Credits: NASA

NASA INVESTIGATOR UPDATES

- ❑ **Susan Anenberg (George Washington Univ):** She was [interviewed](#) about the public health risks (aerosol and particulate matter exposure) of California wildfire smoke on CNN This Morning Weekend on January 11. She highlighted the use of satellite data, novel technologies, and operational tools to enhance air quality monitoring and forecasting.
- ❑ **Jesse Bell (Univ. of Nebraska Medical Center):** His team launched the [2024 Annual Report](#) of the UNMC Water, Climate, and Health Program in February 2025.
- ❑ **John Haynes (NASA HQ):** He served on the *Innovation in Climate Research* panel at the Association of Schools and Programs of Public Health (ASPPH) conference in March 2025.
- ❑ **Tracey Holloway and Jenny Bratburd (Univ. of Wisconsin-Madison):** They were [inducted](#) into the UW-Madison Open Hall of Fame, recognizing their HAQAST leadership to advance open science, in March 2025.
- ❑ **Jun Wang (Iowa Univ.):** He was [elected](#) as an AMS Fellow in January 2025.

NASA HAQ TEAM HOSTS SCIENTIFIC SESSIONS AT AMS 2025

At the American Meteorological Society (AMS) 2025, **Laura Judd (NASA LaRC)** and **Helena Chapman (NASA HQ/BAH)** coordinated the scientific session titled, *Exploring How Earth Science Applications Enhance Environmental Health Decision-Making*, at the 16th Conference on Environment and Health in New Orleans, LA. Over 55 attendees heard **John Haynes (NASA HQ)**, **Hazem Mahmoud (NASA LaRC)**, **Rajesh Kumar (NCAR)**, **Alqamah Sayeed (Univ. of Alabama in Huntsville)**, and **Brian Smoliak (Weathervane Labs)**, discuss air quality modeling and deep learning algorithms using satellite data (including TEMPO) and personal weather intelligence to address health and air quality challenges. **L. Judd** and **Aaron Naeger (NASA MSFC)** presented talks in the Regional Air Quality and Responsive Science sessions. Also, the HAQ team supported the *Using NASA Earth Observations to Strengthen Environmental Health Surveillance* poster and presented talks at the NASA Hyperwall exhibit.



AMS 2025 presenters at the NASA HAQ session (Left), HAQ poster (Middle), and L. Judd presents her Hyperwall talk. Credits: NASA

NASA HAQ TEAM HOSTS SYMPOSIUM AT AMCA 2025

In March 2025, the HAQ team coordinated the *Data Connections: NASA Earth Science Applications and Innovative Technologies to Monitor Vector Habitats* Symposium at the American Mosquito Control Association (AMCA) Annual Conference in San Juan, Puerto Rico. Moderated by **Laura Judd (NASA LaRC)**, 50 attendees heard **John Haynes (NASA HQ)**, **Helena Chapman (NASA HQ/BAH)**, **Assaf Anyamba (NASA GSFC/UMBC)**, and **Russanne Low (Institute for Global Environmental Strategies)** describe projects incorporating satellite and other environmental datasets to forecast risk of vector-borne disease transmission (e.g. dengue, malaria, Rift Valley Fever, West Nile virus) and enhance community stakeholder engagement with citizen science applications. **H. Chapman** also presented the talk, *NASA Satellite Data for Vector Surveillance Toolkits* (in Spanish), as part of the Latin American Symposium, with 40 attendees. Notably, the HAQ team gave a seminar entitled, *Using Earth Observations to Inform Air Quality Management and Public Health Surveillance*, to 14 students and faculty at the University of Puerto Rico's Medical Sciences Campus.



NASA HAQ session panelists at AMCA2025 (Top), and Pablo Méndez-Lázaro with HAQ team (Bottom). Credits: NASA

GEO HEALTH COMMUNITY OF PRACTICE & REGIONAL NETWORKS



The Group on Earth Observations (GEO) Health Community of Practice (CoP) – led by **John Haynes (NASA HQ)** and **Juli Trtanj (NOAA)** – coordinates community teleconferences to leverage expertise across sectors and geographies and share Earth observation data and tools to support health decision-making. As each teleconference has engaged about 40 participants, new CoP members have joined and presented their research applications to the wider community.

In March 2025, CoP and AfriGEO leadership coordinated the [CoP/AfriGEO Special Edition Telecon](#) to showcase ongoing Earth science applications addressing emerging health challenges across Africa. With 105 attendees, 15 flash talks highlighted air quality, water- and vector-borne diseases, health surveillance, and emergency response. Panelists represented institutions in Germany, Italy, Kenya, Malawi, Netherlands, Nigeria, South Africa, United Arab Emirates, and USA. Moving forward, CoP and AfriGEO leadership seek to strengthen these global research and applications networks that address these environmental health priorities. Also, the **Air Quality Work Group (Leads: Carl Malings / Nathan Pavlovic)** published the [How Earth Intelligence can Help Improve Air Quality and Respiratory Health](#) article on the GEO Blog.

ASIA-AQ

In February 2025, the **ASIA-AQ (Airborne and Satellite Investigation of Asian Air Quality)** team launched the [video](#) that illustrates this multinational effort to examine air quality and atmospheric composition across Southeast Asia (Philippines, Republic of Korea, Taiwan, Thailand). The team, led by **Jim Crawford (NASA LaRC)**, coordinated a series of scientific flights to collect high-resolution data on air pollution sources, transport, and chemical transformations in the region.



Credits: [ASIA-AQ website](#)

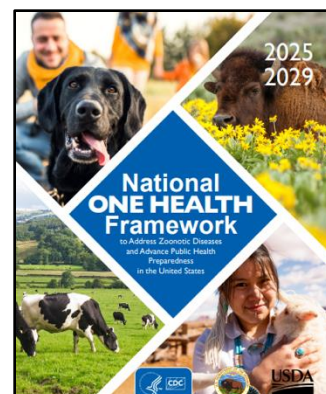


Credits: Obie Cambaliza

LAUNCH OF NATIONAL ONE HEALTH FRAMEWORK

In January 2025, three U.S. government agencies (CDC, USDA, DOI) [launched](#) the *National One Health Framework to Address Zoonotic Diseases and Advance Public Health Preparedness in the United States (2025-2029)*, as directed in the 2023 Consolidated Appropriations Act.

This framework aims to inform One Health collaboration across the U.S. government, aligning goals for key federal partners in addressing zoonotic diseases within the United States.

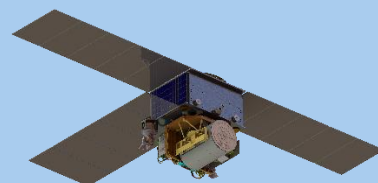


Credits: CDC

MAIA MISSION UPDATES

The NASA Jet Propulsion Laboratory (JPL)'s Multi-Angle Imager for Aerosols ([MAIA](#)) mission continues to deploy surface monitoring equipment to collect particulate matter (PM) samples, as part of the Surface Particulate Matter Network (SPARTAN). In 2024, a region in central Chile was upgraded to a MAIA Primary Target Area (PTA), with funding support provided by the Earth Action Program. As the only MAIA PTA in South America, this region is valuable to the MAIA health impacts investigation because a significant fraction of PM emissions in the Santiago metropolitan area comes from power generation and industrial activities. Notably, wood smoke from residential heating and cooking has a larger contribution in the southern region.

Also, MAIA Co-Investigator **Sina Hasheminassab (Jet Propulsion Laboratory)** is currently [collaborating](#) with the State of California to collect data at the site of the January 2024 Eaton Fire, along with two newly established monitoring locations, to assess the impact of post-fire cleanup activities on local air quality. An air quality monitoring facility on the JPL campus – established as part of MAIA's surface particulate matter monitoring network – recorded critical data during the January 2024 Eaton Fire.



MAIA. Source: [MAIA website](#)

TEMPO MISSION & EARLY ADOPTER PROGRAM ACTIVITIES

The TEMPO mission continues to operate successfully and efficiently with the [public release](#) of the TEMPO User Guides and Algorithm Theoretical Basis Documents (ATBDs), which describe the data products in the provisional V03 release. In January 2025, [SciBite: Your Daily Dose of Discovery](#) highlighted the TEMPO sensor to monitor changes in air pollution due to wildfires over Los Angeles. Key highlights, scientific insights, and expert quotes from **Aaron Naeger (NASA MSFC)** and **Laura Judd (NASA LaRC)** were discussed. More information can be found on the NASA Earth Observatory web feature ([Unhealthy Skies over Los Angeles County](#)) from January 2025.

A. Naeger was invited to present at two application-focused meetings in 2025:

- ❑ **Air Quality and Community Health Research Subcommittee (ACRS) monthly meeting:** He shared a presentation on the TEMPO mission status, use case demonstrations, and data services, which highlighted the use of TEMPO data for monitoring air pollutants from wildland fires and power plants.
- ❑ **NASA FireSense webinar:** He presented TEMPO data products and demonstrations of how data have been used in various applications such as wildfires and prescribed burning events to 37 attendees, including FireSense management and implementation team scientists.



TEMPO. Source: [TEMPO website](#)

HAQ COMMUNITY ENGAGEMENT



HEALTH & AIR QUALITY

The NASA HAQ team (**John Haynes, NASA HQ; Helena Chapman, NASA HQ/BAH; Laura Judd, NASA LaRC**) presented webinars and engagements that introduced the HAQ program and key examples of using Earth observations for public health applications to public health students and faculty.

- ❑ **Mount Sinai:** As part of the *Public Health Grand Rounds*, J. Haynes and H. Chapman presented an overview of the HAQ focus area and selected HAQ projects in February 2025 (28 attendees).
- ❑ **George Washington Univ. (Virtual):** H. Chapman gave an invited lecture for the *Risk Management and Communication* course on One Health and projects using Earth observations for health applications in February 2025 (14 attendees).
- ❑ **UT Health Science Center at Houston (Virtual):** L. Judd and H. Chapman presented talks for the *Environmental Epidemiology* course on selected HAQ projects and airborne campaigns in March 2025 (15 attendees).

LOOKING AHEAD

ARSET Trainings:

[Introduction to NASA Earth Observations and Tools for Wildfire Monitoring and Management](#)

April 16-30, 2025

[Introduction to the Integration of Animal Tracking and Remote Sensing](#)

May 20-22, 2025

Meetings:

[World Medical Association Council Session](#)

April 24-27, 2025

Montevideo, Uruguay

[American Thoracic Society International Conference](#)

May 16-21, 2025

San Francisco, CA

[Air & Waste Management Association's Annual Conference & Exposition](#)

June 9-12, 2025

Raleigh, NC

RECENT COMMUNICATIONS

NASA

- ❑ [Temperatures Rising: NASA Confirms 2024 Warmest Year on Record](#) (Roxana Bardan)
- ❑ [How New NASA, India Earth Satellite NISAR Will See Earth](#) and [NASA-ISRO Mission Will Map Farmland From Planting to Harvest](#) (Jet Propulsion Laboratory)
- ❑ [NASA Analysis Shows Unexpected Amount of Sea Level Rise in 2024](#) (Jet Propulsion Laboratory)

NASA Earth Observatory

- ❑ [Happy 2025 from NASA Earth Observatory!](#)
- ❑ [2024 Was the Warmest Year on Record](#) (Sally Younger)
- ❑ [Fuel for California Fires](#) (Emily Cassidy)
- ❑ [Sweater Weather in North America](#) (Adam Voiland)
- ❑ [Summer Heat Wave in South America](#) (Kathryn Hansen)
- ❑ [Storm Brings a Potpourri of Hazards to the U.S.](#) (Adam Voiland)
- ❑ [Dusty Inferno Hits Oklahoma](#) (Adam Voiland)

NASA Earthdata

- ❑ [Wildfires in Los Angeles, California](#)
- ❑ [FIRMS Releases New Features to Identify Active Fires by Type](#)

PUBLICATIONS

[Economic Costs of Wind Erosion in the United States](#). *Nature Sustainability*. (I.Y. Feng, T.E. Gill, R.S. Van Pelt, N.P. Webb, **D.Q. Tong**)

[TROPOMI Satellite Data Reshape NO₂ Air Pollution Land-Use Regression Modeling Capabilities in the United States](#). *ACS ES&T Air*. (M.O. Nawaz, **D.L. Goldberg**, G.H. Kerr, **S.C. Anenberg**)

[Observing Lower-Tropospheric Ozone Spatiotemporal Variability With Airborne Lidar and Surface Monitors in Houston, Texas](#). *Journal of Geophysical Research: Atmospheres*. (M.A.G. Demetillo, **L.M. Judd**, et al.)

[Respiratory and Cardiovascular Medical Emergency Calls Related to Indoor Heat Exposure through a Case-Control Study in New York City](#). *Journal of Urban Health*. (E. Gonsoroski, J.D. Tamerius, G. Asaeda...**C.K. Uejio**)

[Associations of Fire Smoke and Other Pollutants With Incident Rheumatoid Arthritis and Rheumatoid Arthritis-Associated Interstitial Lung Disease](#). *Arthritis & Rheumatology*. (V.L. Kronzer...**J.R. Pierce**, et al.)

[bneR: A Collaborative Workflow for Air Pollution Exposure Modeling and Uncertainty Characterization using the Bayesian Nonparametric Ensemble](#). *Journal of Environmental Management*. (J. Benavides... **R.V. Martin**, **A.M. Fiore**, M-A Kioumourtzoglou)

[Elevated Atmospheric Lead Levels During the Los Angeles Urban Fires — California, January 2025](#). *Morbidity and Mortality Weekly Report*. (H.D. Baliaka...**A.G. Russell**, et al.)

[Impact of a 10-year Shift in Ambient Air Quality on Mortality in Canada: A Causal Analysis of Multiple Pollutants](#). *Lancet Planetary Health*. H. Chen...**R. V. Martin**, et al.)

[Black Carbon Emissions Generally Underestimated in the Global South as Revealed by Globally Distributed Measurements](#). (Y. Ren...**R.V. Martin**) (Preprint)

[Satellite Detection of NO₂ Distributions and Comparison with Ground-Based Concentrations](#). (S. Acker, **T. Holloway**, M. Harkey) (Preprint)

PAST

ARSET Trainings:

[Fundamentals of Remote Sensing](#)

February 18 – December 31, 2025

[The Application of Earth Observations for Assessing Waterborne Disease Risk](#)

March 25-27, 2025

Meetings:

[American Meteorological Society Annual Meeting](#)

January 12-16, 2025

New Orleans, LA

[American Mosquito Control Association Annual Meeting](#)

March 3-7, 2025

San Juan, Puerto Rico