NASA Health and Air Quality
remote sensing for public health

Volume 44
July – September 2025

LAUNCH OF NASA HAQ 2025-2028

The NASA Health and Air Quality (HAQ) Applications 2025-2028 ROSES selections were announced in July 2025. The HAQ team coordinated a virtual HAQ Team Welcome & Orientation session in August 2025, as an opportunity to showcase 10 robust scientific projects and teams. To learn more about HAQ activities, please review the past newsletters and the HAQAST website.

NASA Health and Air Quality (HAQ) Applications, 2025-2028

Paul Block (University of Wisconsin-Madison)
Ivan Gutiérrez-Avila (Icahn School of Medicine at Mount Sinai)
Tracey Holloway (University of Wisconsin-Madison)
Daniel Jaffe (University of Washington)
Antarpreet Jutla (University of Florida)
Daniel Katz (Cornell University)
Tatiana Loboda (University of Maryland-College Park)
Sheryl Magzamen (Colorado State University)
William Pan (Duke University)
Michael Wimberly (University of Oklahoma)

NASA CELEBRATES INTERNATIONAL DAY OF CLEAN AIR FOR BLUE SKIES

Each year on September 7th, the International Day of Clean Air for Blue Skies aims to increase awareness about air quality. This year, the NASA HAQ and Communications (**Sofie Bates, NASA GSFC; Jocelyn Argueta, JPL**) Teams supported a social media campaign through a NASA Earth Facebook post and X post. This campaign highlighted the TEMPO (Tropospheric Emissions: Monitoring of Pollution) mission, NASA Air Quality resources, and the Faces of Technology: Laura Judd video.

Social media post on NASA Earth Facebook on September 7, 2025

HEALTH AND AIR QUALITY APPLICATIONS
EARTH ACTION PROGRAM

JOHN HAYNES
PROGRAM MANAGER
HEADQUARTERS

HELENA CHAPMAN
ASSOCIATE
HEADQUARTERS/BAH

LAURA JUDD
ASSOCIATE
LANGLEY RESEARCH CENTER

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TEMPO-GEMS JOINT SCIENCE TEAM WORKSHOP

In August 2025, the TEMPO/GeoXO ACX Joint Science Team workshop was held at the Smithsonian Astrophysical Observatory in Cambridge, MA. The four-day workshop consisted of science and application sessions and a TEMPO training session, with 250 participants (including 100 online). **John Haynes (NASA HQ), Laura Judd (NASA LaRC), Aaron Naeger (NASA MSFC),** and **Jenny Bratburd (Univ. of Wisconsin-Madison)** offered scientific talks, and TEMPO Early Adopters discussed plans for integrating TEMPO data into their operations for improving air quality monitoring at their agencies. More information can be found on the TEMPO Meetings website.

TEMPO/GeoXO ACX Joint Science Team workshop attendees. Credits: NASA

ADDITIONAL TEMPO UPDATES

The TEMPO mission publicly released updated data products in September 2025. These include:

1) Improved version 4 NO_2, formaldehyde, total ozone data products;
2) First public release of the ozone profile product;
3) Version 2 near real-time NO_2 and formaldehyde products with a data latency of approximately 2 hours, compared to data latency of the standard NO_2 and formaldehyde products of 5-6 hours.

Data can be downloaded on NASA Earthdata. Over the coming months, the data archive for version 4 products will be backfilled to TEMPO's First Light on August 2, 2023. Version 3 products (NO_2, formaldehyde, total ozone), prior to September 17, are available for download.

Additionally, in August 2025, an in-person ARSET training on TEMPO data was coordinated with WESTAR and CIRA in Fort Collins, CO. The training included a total of 34 participants, including U.S. air quality managers from 12 different local, state, or regional air agencies. Attendees learned tools to facilitate the integration of TEMPO's hourly daytime information into decision-making activities and workflow.

Workshop attendees (left) and Aaron Naeger presenting a TEMPO talk. Credits: NASA

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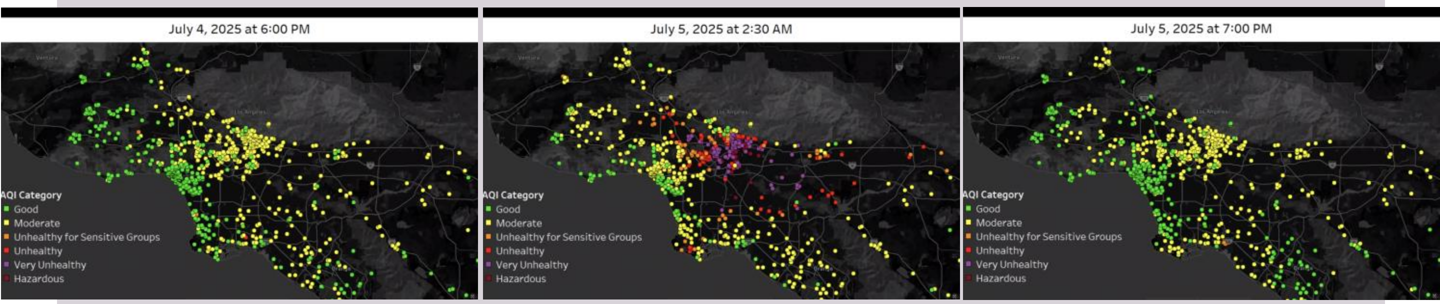
FIREWORKS AND AIR QUALITY

As an integral part of the overall MAIA project, data from the Surface Monitoring Network illustrates a powerful example of air pollution and potential health effects, even during the most celebratory moments. During the Independence Day celebrations in 2025, air pollution was observed by the network over the Los Angeles Basin. On July 4, firework shows began around 8-9pm PDT, and the highest $PM_{2.5}$ levels were observed in the central part of the Basin overnight (Anaheim, East LA, Long Beach). By the evening on July 5, $PM_{2.5}$ levels returned to typical background levels.



Snapshots of the surface network AQ illustrate increased $PM_{2.5}$ levels after the firework shows (July 4) and typical levels within 24 hours (July 5). Credits: Sina Hasheminassab

RECENT HAQ COMMUNITY ENGAGEMENT

The NASA HAQ team (**John Haynes, NASA HQ; Helena Chapman, NASA HQ/BAH**) presented talks and webinars that introduced the HAQ program, TEMPO mission, and key examples of using Earth observations for public health applications.

- **Georgetown University**: J. Haynes and H. Chapman gave lectures on *From Sky to Earth: Spatialization and Dynamics of Infectious and Vector-borne Diseases*, as part of the Seminars on Global Infectious Diseases course (12 graduate students).

HEALTH & AIR QUALITY

NASA HAQ INVESTIGATOR AND TEAM UPDATES

- **Laura Judd (NASA LaRC):** She was featured in the Faces of Technology series in July 2025.
- **Daniel Tong (George Mason Univ.):** He shared insight to the delegates of the UN High-Level Sand and Dust Storm Meeting, at the UN General Assembly Meeting in New York, in July 2025.
- **Jun Wang (Univ. of Iowa):** He published the article entitled, Is that wildfire smoke plume hazardous? New satellite tech can map smoke plumes in 3D for better air quality alerts at neighborhood scale, in *The Conversation*, in July 2025.
- **GLOBE:** The GLOBE Community Poem – Celebrating 30 Years of GLOBE was launched in July 2025.

GEO HEALTH COMMUNITY OF PRACTICE HOLDS BIWEEKLY TELECONS

The Group on Earth Observations (GEO) **Health Community of Practice** (CoP) – led by **John Haynes (NASA HQ)** and **Didier Davignon (ECCC)** – continues to coordinate community teleconferences that leverage expertise and share Earth observation data and tools to support health decision-making. On average, 40 attendees participate in each telecon. Below is a synopsis of each meeting.

- **July 2025:** The GEO BON webinar on Biodiversity and Health Indicators provided a space to describe One Health and biodiversity indicators (70 attendees).
- **August 2025**: The *Special Edition: The Americas* telecon offered 12 flash talks on air quality, heat, infectious diseases, and environmental health (50 attendees). Also, CoP members organized two workshops: *Satellite Data for Medical Students* (in Spanish) (75 attendees) and *Utilizing Earth Observations for the Prediction of Vibrios in the Americas* (25 attendees).

The leads of the CoP Work Groups – Heat, Air Quality, Infectious Diseases, Food Safety and Security, Health Care Infrastructure, and Animal Health – have continued to coordinate telecons with CoP members, offering valuable opportunities for scientific exchange and networking. Also, three GEO blog articles – How Earth observations link biodiversity to biosurveillance; Wildfire without borders: Why we need smarter early warning and risk response; and 12 innovative Earth observation applications for health in the Americas – were published in July 2025.

AMERIGEO WEEK 2025

In August 2025, the NASA HAQ Team contributed to AmeriGEO Week 2025, hosted by Colombia's Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) and Agustín Codazzi Geographic Institute (IGAC), in Bogota, Colombia. They collaborated with Colombia Ministries of Health and Environment, Colombia National Academy of Sciences, Humboldt Institute, and medical student organizations, to organize two One Health activities, with more than 150 in-person attendees (YouTube Recording). Panelists focused on data integration as a first step toward transforming data into meaningful information for decision-making and multilateral cooperation for optimal health outcomes.

- The *Promoting Earth Science Applications for One Health Partnerships* session – facilitated by **John Haynes (NASA HQ), Didier Davignon (ECCC)**, **Helena Chapman (NASA HQ/BAH),** and **Anna Stewart-Ibarra (IAI)** – demonstrated how Earth science applications can strengthen health surveillance and how innovative approaches can enhance data integration and interoperability to address regional health priorities.
- The *Marine Biodiversity and Blue One Health in the Americas* session – led by **Alice Lau (NOAA)**, **Morgan Zabow (NOAA)**, and **Nikia Gooding (Institute of Marine Affairs, Trinidad & Tobago)** – highlighted that Earth observations can offer critical solutions to monitor and predict aquatic ecosystem health risks while promoting sustainability.

One Health panelists at AmeriGEO Week 2025. Credits: AmeriGEO

As part of the AmeriGEO Week 2025's award ceremony, AmeriGEO leadership presented the **Team Excellence Award 2025** to the CoP, showcasing the dedicated efforts of six Work Groups to bring Health (specifically, One Health) to the forefront of AmeriGEO dialogue.

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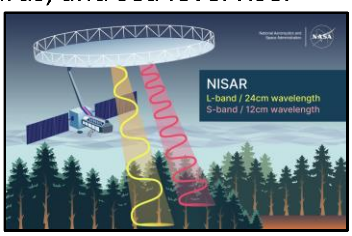
SUCCESSFUL NISAR LAUNCH ON JULY 30

On July 30, at 8:10 a.m. EDT, the NISAR (NASA-ISRO Synthetic Aperture Radar) satellite, developed by NASA and the Indian Space Research Organization (ISRO), was launched aboard an ISRO Geosynchronous Satellite Launch Vehicle rocket from Satish Dhawan Space Centre in Sriharikota, Andhra Pradesh, India. This instrument includes the L-band and S-band synthetic aperture radar (SAR) systems to track movement of Earth's ice and land surfaces, including ecosystem disturbances, ice-sheet collapse, natural hazards, and sea level rise.



Credits: NASA Earthdata

LOOKING AHEAD

Trainings:

Remote Sensing for Climate-Sensitive Infectious Diseases
October 7-9, 2025

Meetings:

American Public Health Association Annual Meeting & Expo
November 2-5, 2025
Washington, DC

HAQAST Missouri
November 6-7, 2025
St. Louis, MO

American Geophysical Union Annual Meeting
December 15-19, 2025
New Orleans, LA

RECENT COMMUNICATIONS

NASA

- 5 Things to Know about Powerful New U.S.-India Satellite, NISAR (Jet Propulsion Laboratory)
- NASA-ISRO Satellite Lifts Off to Track Earth's Changing Surfaces (Jessica Taveau)
- US-French SWOT Satellite Measures Tsunami after Massive Quake (Jet Propulsion Laboratory)
- NASA-NOAA Satellites Show Smoke Complicates Wildfire Lightning Risk (James Riordon)
- NASA Scientists Map Plant Productivity with Data from Ocean Satellite (Cathy Ching & James Riordon)
- NASA Data, Trainings Help Uruguay Navigate Drought (Melody Pederson & Rachel Jiang)
- NASA-ISRO Satellite Sends First Radar Images of Earth's Surface (Gerelle Dodson)

NASA Earth Observatory

- Advanced U.S.-India Radar Mission Lifts Off
- Dust Engulfs Coastal Peru
- Wildfire Sweeps through Southern France
- Wildfire Smoke Billows over Northern California and Fires Rage in Arizona
- Widespread Smoke from Canadian Fires and Smoky Skies in the Pacific Northwest

NASA Earthdata

- Study Shows Citizen Scientists are Crucial for Observing Rain and Snow during Storms (Charlie Plain)
- Now That NISAR Launched, Here's What You Can Expect From the Data (Angela Leroux-Lindsey)
- TROPOMI Near Real-Time Products Support the Air Quality and Operations Communities (Jenny Hewson)

NASA Earth Action

- NASA Products for the Flooding in Texas, July 2025

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PUBLICATIONS

Fine Particulate Matter and Interstitial Lung Disease in Systemic Autoimmune Rheumatic Diseases. *European Respiratory Journal.* (N. Zhao…**R.V. Martin**, D. Assayag, C.A. Pineau, S. Bernatsky)

Advancing New Metrics for Wildfire Smoke Exposure: Case Study in Alaska to Bridge Public Health, Climate Adaptation, and Fire Management. *Environmental Research Letters*. (M.B. Hahn… **J. Mao**, L.J. Mickley)

TROPOMI NO_2 for Urban and Polluted Areas Blobally from 2019 to 2024. *EGUsphere*. (D.E. Huber, G.H. Kerr…**S.C. Anenberg**, **D.L. Goldberg**) (Pre-print)

Hybridization Capture Sequencing for Vibrio spp. and Associated Virulence Factors. *Mbio*. (K.D. Brumfield… **A.S. Jutla**… **R.R. Colwell**)

PAST

ARSET Trainings:

Airborne Data Applications for Invasive Species Mapping
September 30, 2025

Meetings:

AmeriGEO Week
August 11-15, 2025
Bogota, Colombia and Virtual

TEMPO/GeoXO ACX Joint Science Team Meeting
August 19-22, 2025
Cambridge, MA

Inclusion of Biomass Burning Plume Injection Height in GEOS-Chem-TOMAS: Global-Scale Implications for Atmospheric Aerosols and Radiative Forcing. *Journal of Advances in Modeling Earth Systems*. (N.A. June… **J.R. Pierce**)

Satellite Detection of NO_2 Distributions using TROPOMI and TEMPO and Comparison with Ground-Based concentration Measurements. *Atmospheric Chemistry and Physics*. (S. Acker, **T. Holloway**, M. Harkey)

Satellite-Based Analysis of CO_2 Emissions From Global Cities: Regional, Economic, and Demographic Attributes. *AGU Advances*. (D.Y. Ahn, **D.L. Goldberg**, F. Liu, **D.C. Anderson**, et al.)

Dust Aerosol Optical Centroid Height (AOCH) Over Bright Surface: First Retrieval From TROPOMI Oxygen A and B Absorption Bands. *IEEE Geoscience and Remote Sensing Letters*. (X. Chen, **J. Wang**, X. Xu, M. Zhou)

Exposure to Daily Mean and Maximum 1-hour PM2.5 Concentrations and Pediatric Respiratory Mortality in the Mexico City Metropolitan Area. *Environmental Epidemiology*. (**I. Gutiérrez-Avila** et al.)

Will Assimilating VIIRS AOD Data Improve New Delhi’s Air Pollution Forecasts as much as Assimilating MODIS AOD? *Atmospheric Environment*. (**R. Kumar**, S. Meech, P.P. Yadav, et al.)

A Health Impact Assessment of Changes in NDVI on All-Cause Mortality across 1,041 Global Cities. *Environmental Research Letters*. (G.K. Martin, J.D. Stowell, P.L. Kinney, **S.C. Anenberg**)

Effects of Fire Plume Height on the Geophysical Estimation of Surface Fine Particulate Matter from Satellite Aerosol Optical Depth during North American Wildfires. *ACS ES&T Air*. (I. Singh, **R.V. Martin**, et al.)

Source Attribution and Health Burden of $PM_{2.5}$ in Mainland Thailand. *GeoHealth*. (W. Thongsame, D.K. Henze, M. Barth, G. Pfister, **R. Kumar**, et al.)

Compound Drought and Heatwave Extreme Weather Events: Mortality Risk in Individuals with Chronic Respiratory Disease. Environmental Epidemiology. (A. Rau, A.K. Baldomero, **J.E. Bell**, et al.)