

LAUNCH OF THE EARTH INFORMATION CENTER

In June 2023, the [Earth Information Center](#) was launched, with the support of founding partners of EPA, FEMA, NOAA, USAID, USDA and USGS. This exhibit integrates research data from federal agencies and industry partners to observe changes in Earth's systems in six key areas: sea level rise and coastal impacts, health and air quality, wildfires, greenhouse gases, sustainable energy, and agriculture. This information helps support decision makers as they develop tools for addressing environmental challenges, adaptation, and response. We invite you to visit the exhibit located at NASA HQ or the [virtual exhibit](#) with informative videos ([How NASA Observes Air Quality in DC](#)) and [data dashboards](#).



Credits: NASA/Joel Kowsky

"From firefighters that rely on NASA data for wildfire management to farmers who need to know when and where to plant crops, the Earth Information Center will help more people make informed decisions every day."

– Bill Nelson, NASA Administrator

"The Earth Information Center benefits humanity by providing easily accessible and readily usable Earth information – helping people see our home planet the way NASA sees it."

– Kate Calvin, NASA Chief Scientist and Senior Climate Advisor

NASA CELEBRATES EARTH DAY 2023: INVEST IN OUR PLANET

On April 22, 2023, the world celebrated the 53rd anniversary of **Earth Day**. NASA promoted [Earth Science in Action](#) by reflecting on how Earth-observing satellites help monitor the natural systems and impact of human activity on the planet's climate, atmosphere, land, and oceans. NASA invited the public to celebrate Earth Day by attending local events (such as [Union Station](#) in Washington DC), downloading [Earth Day 2023 Posters](#) in English and Spanish, and viewing Earth through [NASA Worldview](#).



Credits: NASA

With support from the Communications team, the HAQ team (**John Haynes, NASA HQ**) shared insight on Earth Day with several local television stations, including [FOX17 West Michigan](#), [KOIN Portland](#), [First Coast News Jacksonville](#), [KSAT12](#) (San Antonio, TX), [KOIN](#) (Portland, OR), and [AccuWeather](#).

HEALTH AND AIR QUALITY APPLICATIONS APPLIED SCIENCES PROGRAM

JOHN HAYNES
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HEADQUARTERS

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LAURA JUDD
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LANGLEY RESEARCH CENTER



NATIONAL PUBLIC HEALTH WEEK 2023

In April 2023, **National Public Health Week (NPHW)**, which is supported by the American Public Health Association (APHA), highlighted the *Centering and Celebrating Cultures in Health* theme. The NASA HAQ and Communications Teams (**Aries Keck, NASA HQ; Lia Poteet, IntelliBridge**) prepared social media communications (NASA Earth [Facebook](#) and [Twitter](#)) to highlight how NASA Earth observations can help inform local decision-making activities that protect community health. Project highlights included [monitoring wildfire impacts](#) (**Jason Vargo, Federal Reserve Bank of San Francisco**) (see [Facebook](#) and [Twitter](#) posts), assessing Saharan dust events (**Pablo Méndez-Lázaro, Univ. of Puerto Rico Medical Sciences Campus**) (see [Twitter](#) post), and [examining health effects of artificial lights at night](#) (**Qian Xiao, Univ. of Texas Health Science Center at Houston**) (see [Facebook](#) and [Twitter](#) posts).



Social media post on [NASA Earth Twitter](#)

NATIONAL MOSQUITO CONTROL AWARENESS WEEK 2023

In June 2023, the NASA HAQ and Communications (**Aries Keck, NASA HQ; Lia Poteet, IntelliBridge**) Teams prepared social media communications (NASA Earth [Facebook](#) and [Twitter](#)) to support the American Mosquito Control Association's National Mosquito Awareness Week 2023. Project highlights included [monitoring and forecasting mosquito-transmitted diseases](#) – developing malaria early warning systems in the Amazonia (**William Pan, Duke Univ.**), tracking invasive mosquito species with VectorSurv in several US states (**Chris Barker, Univ. of California, Davis**), and improving malaria decision support with DHIS2 in Africa (**John Beck, Univ. of Alabama in Huntsville**).



Credits: CDC

NASA HAQ INVESTIGATOR AND TEAM UPDATES

- ❑ **Susan Anenberg (George Washington Univ.):** She was interviewed for the *GW Today* ([Why Wildfire Smoke Pollution Is So Intense Right Now—and Likely to Get Worse](#)) and the *USA Today* ([Wildfires in Canada are impacting US air quality. Here's how to protect yourself](#)) in June 2023.
- ❑ **Assaf Anyamba (Oak Ridge National Laboratory):** He was interviewed for *Nature* ([El Niño is here — how bad will it be?](#)) as well as selected to be part of the US State Department's The Dengue Strategy Forum for South Asia in June 2023.
- ❑ **MAIA MAL/Early Adopters: Amber Jenkins (Jet Propulsion Laboratory)** joined the [Jet Propulsion Laboratory Project Leadership Team](#) as the MAIA Mission Applications Lead in August 2023. [Abigail Nastan](#), who has held this leadership position since 2018, has transitioned into a new position at the Alaska Volcano Observatory, where she will serve as geologist and apply her Earth science expertise in volcano research and scientific communication.

SUCCESSFUL TEMPO LAUNCH ON APRIL 7

On April 7, at 12:30AM ET, the host Intelsat 40e satellite carrying the [TEMPO instrument was launched](#) on a SpaceX Falcon 9 rocket from Cape Canaveral Space Force Station in FL. Over 400 people experienced [launch](#), including many from the TEMPO mission, science, and early adopter teams. TEMPO successfully powered up on June 7, and first images are expected in August 2023. The mission also received funding to produce near real-time NO₂ (nitrogen dioxide), HCHO (formaldehyde), and aerosol products with an expected latency of 2-3 hours.



TEMPO. Source: [TEMPO website](#)

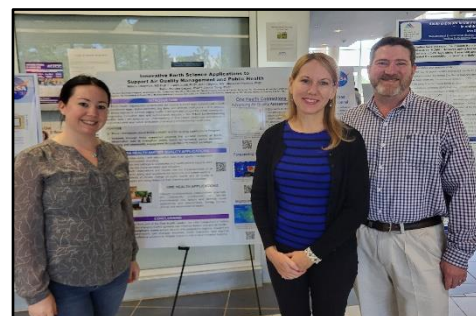


HAQ team (Left) and TEMPO launch (Middle/Right) from Cape Canaveral Space Force Station. Credits: NASA/SpaceX

In May 2023, a [joint meeting](#) for TEMPO, [GeoXO ACX](#) (Atmospheric Composition Instrument), and [TOLNet](#) (Tropospheric Ozone Lidar Network) was held at the University of Alabama in Huntsville, with a total of 408 attendees (128 in-person, 280 virtual). Using the theme, *Building the Pathway from TEMPO to GeoXO*, the meeting featured discussion sessions with topics on [TEMPO Green Paper](#) experiments, application developing such as air quality modeling, emissions, and extreme events, and cross-mission synergy for enhanced applications. The final day of the meeting included a hands-on training session provided information on tools to download, process, and analyze TEMPO proxy data. This first-ever joint meeting between the TEMPO and GeoXO programs provided a setting for the long-term planning of air quality observations over greater North America, with special attention on coordinating a suite of data products for enabling enhanced health and air quality studies in the future.



Meeting attendees. Credits: UAH



HAQ team at the poster session. Credits: NASA

NASA HAQAST MISSOURI MEETING

In April 2023, the [NASA Health and Air Quality Applied Sciences Team](#) (HAQAST), led by **Tracey Holloway (Univ. of Wisconsin, Madison)**, held the HAQAST Missouri Meeting with the 14 HAQAST Principal Investigators, researchers, and stakeholders. The meeting engaged stakeholders on uses of Earth science information for environmental health and air quality. This event addressed multiple topics, including applications of new satellite missions (e.g. TEMPO, MAIA); improved wildfire forecasts; health impacts of prescribed fires; climate change and extreme events; oil and gas applications; emission control strategies; and environmental justice. Also, the new [Health and Air Quality Community Forum](#) was launched, as an applications-oriented portal to support users in determining the ideal NASA data products for their needs. Overall, this HAQAST meeting engaged 225 people – with 105 in-person. For more information, please view the [recordings](#).



Attendees at HAQAST Missouri Meeting (Top/Bottom Left), and S. Anenberg moderates a session (Top Right). Credits: NASA HAQAST

SELECTION OF 2023 HAQAST TIGER TEAMS

The NASA HAQAST announced the selection of the [2023 Tiger Teams](#). Tiger Teams are short-term, high-impact, collaborative efforts between HAQAST members and stakeholders to identify and solve a critical problem using NASA data and products. The five teams are:

- ❑ *Analysis to Support Air Quality and Health TEMPO Applications for Surface Ozone* (Led by Arlene Fiore, Massachusetts Institute of Technology)
- ❑ *Mitigating Uncertainties in Lateral Boundary Conditions used for Regional Air Quality Assessment Modeling* (Led by Bradley Pierce, Univ. of Wisconsin-Madison)
- ❑ *Applications of GOES-R Aerosol Data in Operational Air Quality Management and Public Health Decision Support Systems Team* (Led by Yang Liu, Emory Univ.)
- ❑ *Satellite Data for Environmental Justice* (Led by Qian Xiao, Univ. of Texas Health Science Center at Houston)
- ❑ *Satellite Observations Supporting Assessment of Unconventional Oil and Gas Emissions and Exposures Team* (Led by Ted Russell, Georgia Institute of Technology)

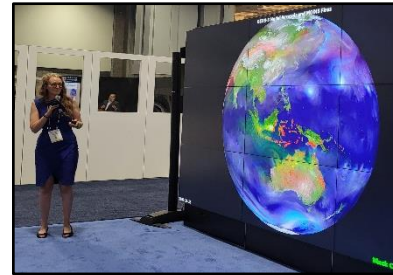


Credits: NASA HAQAST

NASA HAQ TEAM SHARES EARTH SCIENCE APPLICATIONS AT ATS 2023

At the American Thoracic Society (ATS) International Conference 2023, the NASA HAQ team coordinated a scientific session, *Advantages of NASA Satellite Data in Air Quality and Respiratory Health Applications*, in Washington, DC. This session, moderated by **Helena Chapman (NASA HQ/BAH)** and **Laura Judd (NASA LaRC)**, highlighted the NASA HAQ program, Pan American Health Organization (PAHO) priorities, one NASA project, and NASA ARSET, to over 70 attendees.

- ❑ *NASA Health and Air Quality Applications: Applying Satellite Data to Respiratory Health* (John Haynes, NASA HQ)
- ❑ *Advancing Air Quality Monitoring and Health Surveillance in the Americas* (Juan Castillo, PAHO)
- ❑ *The Impacts of Drought on Respiratory Health: Using NASA Data Products to Understand these Connections* (Jesse Bell, Univ. of Nebraska Medical Center)
- ❑ *NASA Applied Remote Sensing Training (ARSET) for Health and Air Quality Applications* (Melanie Follette Cook, NASA GSFC)



At ATS 2023, NASA and One Health sessions (Top Left/Right), and NASA Hyperwall talks by L. Friedl and K.E. Knowland (Bottom Left/Right). Credits: NASA

Also, **Muge Akpınar-Elci (Univ. of Nevada, Reno)** and **H. Chapman** led the [*Why is the One Health Approach Needed for Emerging Health Issues?* session](#), and **H. Chapman** gave the talk entitled, *Overview of One Health, Using Innovative Data*. Notably, the NASA Applied Sciences Program (NASA GSFC/SSO) supported the first-ever [*NASA Science exhibit at ATS2023*](#) with 9 Hyperwall presentations exploring the use of Earth observations in health and air quality applications.

PROMOTING AIR QUALITY DECISION SUPPORT AT AWMA 2023

In June 2023, at the **Air & Waste Management Association (AWMA) Annual Conference & Exhibition 2023**, the NASA HAQ Team coordinated the scientific session, *Integrating Satellite Observations into Air Quality Decision Making*, in Orlando, FL. Moderated by **Laura Judd (NASA LaRC)** and **Helena Chapman (NASA HQ/BAH)**, **John Haynes (NASA HQ)**, **Sheryl Magzamen (Colorado State Univ.)**, and **Aaron Naeger (Univ. of Alabama in Huntsville)** described research conducted in partnership with air quality managing agencies with topics covering improved model accuracy used within SIPs, high-resolution air quality satellite data, and on-the-ground sampling to better understand exposures to harmful emissions. A total of 70 people attended this session. In complementary sessions, **A. Naeger** shared TEMPO updates, and **H. Chapman** described using NASA data to enhance environmental health communication and collaboration strategies, to over 30 attendees.



A. Naeger provides TEMPO updates at AWMA 2023. Credits: H. Chapman

GEO HEALTH COMMUNITY OF PRACTICE HOLDS MONTHLY TELECONS



The Group on Earth Observations (GEO) [Health Community of Practice](#) (CoP) – led by **John Haynes (NASA HQ)** and **Juli Trtanj (NOAA)** – continues to coordinate community teleconferences to leverage expertise across sectors and geographies and share Earth observation data and tools to support health decision-making. On average, 40 attendees participated in each telecon. Below is a synopsis of each meeting.

□ **April-May 2023:** The EO4Health team offered an overview of the GEO Heat Incubator, GEO Symposium 2023, and GEO Week & Ministerial Summit 2023. They also moderated an open discussion about preparation for the One Health session and side events planned for AmeriGEO Week 2023.

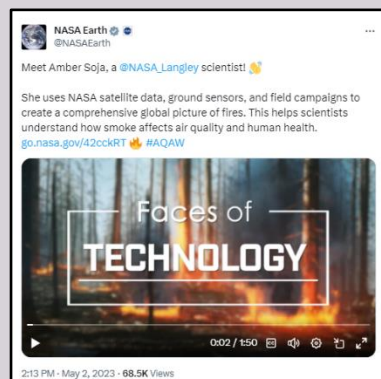
□ **June 2023:** In the Deep Dive on Health Activities in Europe, **Paschalis Tziastias, Franz Immler, and Jean Dusart (European Commission)** shared current activities and priorities of the European region. Invited speakers included: **Cristina Ananasso** and **Julie Letertre (European Centre for Medium-range Weather Forecasts)**, **Aleksandra Kazmierczak (European Environment Agency)**, **Haris Kontoes (National Observatory of Athens)**, **Nicola Pirrone (National Research Council of Italy)**, **Maria Feio (Univ. de Coimbra, Portugal)**, and **Frederic Bartumeus (Centre for Advanced Studies of Blanes)**. Also, **Orhun Aydin (St. Louis Univ.)** and **Mahesh Jampani (International Water Management Institute, Sri Lanka)** presented updates on the Food Security & Safety Work Group.

The CoP Work Group leads – Heat, Infectious Diseases, Air Quality, Food Security and Safety, Health Care Infrastructure – have continued to coordinate regular telecons with CoP members, which have offered valuable opportunities for scientific exchange and networking opportunities.

In June 2023, **Andreas Skouloudis (iSteep.org)** served as an invited panelist on the Youth Engagement session, as part of the [GEO Symposium 2023](#). He highlighted the three-year [NASA-ORNL-RPI Student Engagement](#) activity, which has allowed students to acquire practical skills in using NASA data products and applications, which are needed to address emerging health threats.

AIR QUALITY AWARENESS WEEK 2023

In May 2023, the NASA HAQ and Communications (**Marissa Kunerth, IntelliBridge**) Teams prepared social media communications (NASA Earth [Facebook](#) and [Twitter](#)), to support Air Quality Awareness Week 2023. The focus was on wildfires (see [Facebook](#) and [Twitter](#) post) (**Amber Soja, NASA LaRC**), highlighting the ongoing research efforts of the [2021 NASA HAQAST Tiger Team](#) entitled, *Fused Earth Observations to Quantify Health Impacts from Agricultural Fires*.



Social media post on [NASA Earth Twitter](#).

HAQ COMMUNITY ENGAGEMENT

The NASA HAQ team (**Laura Judd, NASA LaRC; Helena Chapman, NASA HQ/BAH**) gave in-person and virtual talks that introduced the HAQ program and key examples of using Earth observations for public health applications.

- ❑ **Univ. of Denver’s Josef Korbel School of International Studies (Virtual):** Shanna McClain (NASA HQ) and H. Chapman presented talks on Earth science applications for Disasters and Health for 18 graduate students and faculty.
- ❑ **NASA Earth Science Division (Virtual):** H. Chapman presented an overview of the HAQ program and selected projects as part of the webinar series for interns of the High School Senior Experience.
- ❑ **[Water for Food Global Conference \(Lincoln, NE\)](#):** L. Judd contributed her scientific talk, as part of the Drought and Health session.
- ❑ **[AGU Chapman Conference on Climate and Health for Africa \(Washington, DC\)](#):** H. Chapman presented a poster highlighting HAQ projects on cholera and malaria forecasting in Africa.

LOOKING AHEAD

ARSET Training:

[Assessing the Impacts of Fires on Watershed Health](#)

July 6-13, 2023

[Monitoring Water Quality of Inland Lakes using Remote Sensing](#)

July 18-24, 2023

[Satellite Data for Air Quality Environmental Justice and Equity Applications](#)

August 23-September 6, 2023

Meetings:

[AmeriGEO Week](#)

August 7-12, 2023

San José, Costa Rica

[DEVELOP Day](#)

August 9, 2023

Washington, DC

MAIA EARLY ADOPTERS UPDATE

The **Multi-Angle Imager for Aerosols (MAIA)** synthetic data are now available to MAIA early adopters. The creation of this dataset was a joint effort between NASA Applied Sciences’ grantees (from Emory Univ. and Univ. of Iowa) as well as the NASA Atmospheric Sciences Data Center. This test dataset spans the year of 2018 in the Boston/NYC Primary Target Area and uses a combination of GOES and modeling data. Next steps include integrating these datasets into the NYC Department of Health and Mental Hygiene Community Air Survey and the Syndromic Surveillance system.

RECENT COMMUNICATIONS

NASA

- ❑ **[On a Changing Planet, NASA Goes Green](#)** (Jamie Adkins, NASA)
- ❑ **[Satellite Data, Applications Flowing Through SERVIR to Southeast Asia](#)** (Beth Ridgeway, NASA)

NASA Applied Sciences Program

- ❑ **[NASA Data Tracks Veterans’ Exposure to Smoke and Air Pollution](#)** (Lia Poteet, IntelliBridge)
- ❑ **[Brighter Neighborhoods Harm Human Health](#)** (Aries Keck, NASA)

NASA Earth Observatory

- ❑ **[2023 Fire Season in the Northern Hemisphere](#)** and **[2023 North Atlantic Hurricane Season](#)**

NASA Global Climate Change

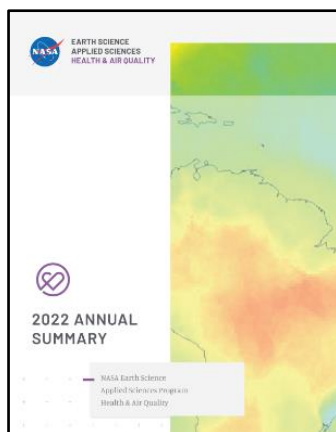
- ❑ **[When Climate Gets Under Your Skin](#)** (Alan Buis, NASA Jet Propulsion Laboratory)

NASA EarthData

- ❑ **[The POWER of Earth Science Data](#)**

HAQ ANNUAL SUMMARY 2022

The NASA Applied Sciences Program disseminated the [NASA Health and Air Quality Applications Annual Summary 2022](#), which highlighted major accomplishments, project portfolio milestones, community leadership, and international activities in 2022. It summarized the achievements of the Health and Air Quality Applied Sciences Team (HAQAST) and Earth Observations for Health (EO4HEALTH) activities of the GEO Work Programme 2020–2022.



Credit: NASA

PAST

ARSET Training:

Fundamentals of Machine Learning for Earth Science

April 20-May 4, 2023

Meetings:

NASA HAQAST Missouri

April 18-19, 2023

St. Louis, MO

Joint Science Meeting for TEMPO, GeoXO

ACX, & TOLNet

May 1-5, 2023

Huntsville, AL

American Thoracic Society International Conference

May 19-24, 2023

Washington, DC

Air & Waste Management Association's Annual Conference & Exposition

June 5-8, 2023

Orlando, FL

PUBLICATIONS

[Adverse Health Outcomes Following Hurricane Harvey: A Comparison of Remotely-Sensed and Self-Reported Flood Exposure Estimates.](#) *Geohealth*. (B. Ramesh, R. Callender, **B.F. Zaitchik**, M. Jagger, S. Swarup, **J.M. Gohlke**)

[Unified Real-time Environmental-epidemiological Data for Multiscale Modeling of the COVID-19 Pandemic.](#) *Scientific Data*. (H.S. Badr, **B.F. Zaitchik**, G.H. Kerr... **D.L. Goldberg**, **S.C. Anenberg**, L.M. Gardner)

[Earth Observation Training Opportunities for Medical Students.](#) *Clinical Teacher*. (**H.J. Chapman**, C. Tuholske)

[The Impact of Sustained Malaria Control in the Loreto Region of Peru: A Retrospective, Observational, Spatially-varying Interrupted Time Series Analysis of the PAMAFRO Program.](#) *Lancet Regional Health – Americas*. (M.M. Janko...A.G. Lescano, **B.F. Zaitchik**, **W.K. Pan**)

[The Association between Drought Exposure and Respiratory-Related Mortality in the United States from 2000 to 2018.](#) *International Journal of Environmental Research and Public Health*. (Y. Gwon, Y. Ji, **J.E. Bell**, A.M. Abadi, J.D. Berman, et al.)