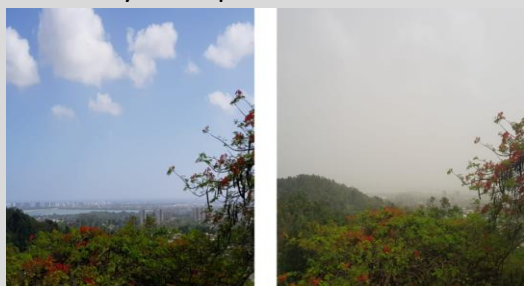
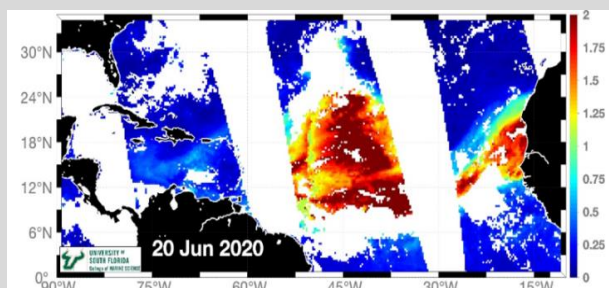


FORECASTING POOR AIR QUALITY EVENTS IN THE CARIBBEAN

Saharan dust storms crossing the Atlantic can serve as a natural fertilizer for plants, but these large dust plumes can adversely impact air quality and human health. **Pablo Méndez-Lázaro (U. of Puerto Rico Medical Sciences Campus)** and his team incorporated MODIS, VIIRS, and GOES-16 aerosol optical depth measurements into a developing air quality forecasting tool in partnership with 19 public, private, and academic institutions in the Caribbean basin. In June 2020, the team used this [prototype tool](#) to issue three days of advance public notice of one of the most [extreme Saharan dust events](#) on record. This work was highlighted in more than 70 news reports and articles in English and Spanish ([CBS News](#), [National Geographic](#), [New York Times](#), [Univision New York](#)). In July 2020, his team coordinated a *Saharan Dust and Public Health* seminar series, sponsored by EcoExploratorio of the Museum of Science of Puerto Rico.



Views of San Juan, Puerto Rico, prior to the Saharan dust plume on June 20 (left) and during the event on June 23, 2020 (right). Credits: NASA/Pablo Méndez-Lázaro



Suomi NPP VIIRS data (AOD/dust concentration).
Credits: NASA/Pablo Méndez-Lázaro

APPLIED SCIENCES WEEK 2020

In August 2020, the NASA Applied Sciences Program hosted the [Applied Sciences Week 2020](#), a four-day virtual event to learn the practical applications of NASA Earth science data by sharing global highlights from researchers and partners and interacting with early-career professionals. Daily plenary sessions highlighted NASA Applied Sciences projects and partners centered around regional themes. This event attracted more than 500 individuals from around the globe. Breakout sessions were coordinated with the DEVELOP Program's summer participants. For the HAQ breakout sessions, **Sue Estes (U. of Alabama in Huntsville)** and **Laura Judd (NASA LaRC)** nominated presentations from three HAQ researchers – **Daniel Tong (George Mason U.)** for the *Western US and Americas*; **Michael Wimberly (U. of Oklahoma)** for the *Central US and Africa*; and **Tabassum Insaf (New York DOH)** for the *Eastern US and Asia*.



Credits: NASA/U.Group

HEALTH AND AIR QUALITY APPLICATIONS APPLIED SCIENCES PROGRAM

haQ

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HAQAST FINAL SHOWCASE 2020

In July 2020, the Health and Air Quality Applied Science Team ([HAQAST](#)) held the [Final Showcase](#) highlighting successes from the four-years of work of the 13 principal investigators, more than 70 total contributors, and scores of user organizations. More than 400 individuals tuned in for the two-day event with eight topical panels involving videos, presentations, and live discussions. HAQAST Lead **Tracey Holloway (U. of Wisconsin, Madison)** showed that the agile, collaborative nature of the team contributed to over 215 total publications. This Final Showcase allowed the team to articulate major achievements, including developing resources for fire management, improving estimates of uncertain emission sources, and growing the user community. One significant highlight presented was by **Jason Vargo (California Department of Public Health)**, who underscored the importance of the HAQAST-enabled daily PM2.5 products (using MODIS aerosol optical depth and other data) at a resolution that State and local managers can use for community health studies. We invite everyone to view the recorded panel sessions, investigator videos, and posters on the [HAQAST Final Showcase](#) website.



Credits: NASA

NASA INVESTIGATORS IN THE NEWS

Susan Anenberg (George Washington U.): She presented the talk, *Inconsistent Effects of COVID-19 Lockdowns on NO₂ Pollution in Cities Globally*, for the [NASEM's Tracking Environmental Changes due to COVID-19 through Remote Sensing](#), in July 2020.

Assaf Anyamba (NASA GSFC/USRA): His project was highlighted in September 2020 in **Episode 5 (Clouds)** of the Netflix Connected series, [The Hidden Science of Everything](#), showcasing how data sources (NASA climate, disease, in-situ mosquito vector) are used to forecast high-risk geographic areas for disease outbreaks. He also presented the talk, *Global Disease Outbreaks: The View from 36,000km*, for the European Society of Clinical Microbiology and Infectious Diseases Conference on COVID-19 in September 2020.

Rita Colwell (U. of Maryland, College Park): She published her book, [A Lab of One's Own: One Woman's Personal Journey Through Sexism in Science](#), in August 2020.

Helena Chapman (NASA HQ/BAH): She received the American Veterinary Epidemiology Society (AVES) Honorary Diplomate at the [AVES Awards Ceremony](#) in August 2020.

Bryan Duncan (NASA GSFC): He provided an overview on NASA Aura OMI data and the new global air quality forecast system by the NASA Goddard Global Monitoring and Assimilation Office, at the UN's Environmental Programme's International Day of Clean Air for Blue Skies event in September 2020. The NASA web feature was [Talking Blue Skies with the U.N. Environment Programme](#).

Julia Gohlke (Virginia Tech): She participated on the panel, *Increasing Heat on Land and Sea: How to Protect Public Health*, for the [NIEHS Global Environmental Day](#) in July 2020.

Michael Wimberly (U. of Oklahoma): The ArboMAP project team (U. of Oklahoma) expanded West Nile virus (WNV) weekly seasonal forecasting from South Dakota to Louisiana, Michigan, and Oklahoma. The forecasts predicted low rates of WNV risk across these states and initial reports of human cases from 2020 indicated that these predictions were generally accurate. Preliminary findings demonstrate a delayed increase WNV cases following severe storms in Louisiana.

Ben Zaitchik (Johns Hopkins U.): His team generated a COVID-19 case record [database](#) that assigns data to a consistent geographical hierarchy for the future alignment with Earth observation data.

UNOOSA AND INTERNATIONAL SPACE UNIVERSITY WEBINARS

In July 2020, the NASA HAQ Team was invited to present at the UN Office for Outer Space Affairs (UNOOSA) Group of Friends Webinar, *Space for Building Forward Better*. **Helena Chapman (NASA HQ/BAH)** presented the talk, *Using Earth Observations in One Health Applications for Societal Benefit*, highlighting the use of Earth observation data to enhance health decision-making. This event aimed to unite experts from the UN and other space-based agencies to discuss the role of space in disaster management and promote synergies and exchanges.

The NASA HAQ Team also presented at the [International Space University](#) Summer (ISU) Program 2020. Using the theme, *Innovative Approaches of Utilizing Space for the Monitoring and Mitigation of the COVID-19 Crisis and for the Preparedness and Prevention of Future Pandemics*, there were more than 90 participants from 25 countries. **John Haynes (NASA HQ)** presented on the panel, *Utilizing Big Data and Space for the Monitoring, Mitigation of COVID-19 and Prevention of Future Pandemics*, to over 83 participants. He stressed that NASA Earth-observing satellite data allow scientists to study environmental changes, such as fluctuations in air quality due to COVID-19 mitigation efforts and risk characterization of vector-borne diseases. He highlighted the tri-lateral NASA/ESA/JAXA Earth Observing Dashboard as an example of international cooperation to inform the global community of COVID-19 effects across environmental and economic indicators. **Helena Chapman** presented the talk, *How Space can Help Monitor COVID-19 and other Pandemics*, to 30 course participants. She highlighted the use of Earth observation data in global efforts to curb infectious disease transmission and enhance health decision-making.

NASA ESD SUMMER INTERNSHIPS

In July 2020, the NASA HAQ Team presented two webinars to support the Seminar Series of the 22 NASA Earth Science Division summer interns, hosted by **Keith Gaddis (NASA HQ/ASTS)**. In one session, **Helena Chapman (NASA HQ/BAH)** presented the talk, *Publishing in the Sciences*, where she shared an overview of the writing process, described key steps to prepare an article, and reviewed examples of a letter to the editor and newsletter submissions. In another session, **John Haynes (NASA HQ)** and **Helena Chapman** presented the talk, *Utilizing Earth Observations for Improved Air Quality and Health Decisions and Strengthened One Health Collaborations*. They highlighted selected HAQ projects that integrate the use of Earth observations to public health (One Health) applications.

HAQ TEAM CONDUCTS 12TH ANNIVERSARY PROGRAM REVIEW

In September 2020, the NASA HAQ Team, led by **Sue Estes (U. of Alabama, Huntsville)**, coordinated the 12th annual HAQ Applications Program Review 2020 with approximately 40 attendees. In this two-day virtual format, presentations were shared by NASA-funded researchers (ROSES, GEO EO4HEALTH, Rapid Response), Communications (**Aries Keck, Lia Poteet**), and CDC partners (**Heather Strosnider, Nicholas Skaff, Emily Prezato**). **Sue Estes, Laura Judd (NASA LaRC)**, and **Helena Chapman (NASA HQ/BAH)** moderated each of the sessions. **John Haynes (NASA HQ)** used a series of poll questions to facilitate his virtual Town Hall discussion on future goals, partnerships, and opportunities. This open platform offered an opportunity for researchers to describe priorities, concerns, and specific challenges faced during the COVID-19 pandemic.

GEO HEALTH COMMUNITY OF PRACTICE HOLDS WEEKLY TELECONS TO SHARE GLOBAL EXPERTISE DURING COVID-19 PANDEMIC



Since April 2020, the Group on Earth Observations (GEO) [Health Community of Practice](#) (CoP) – led by **John Haynes (NASA HQ)** and **Juli Trtanj (NOAA)** – has coordinated [weekly community teleconferences](#) to leverage expertise across sectors and geographies and share Earth observation data and tools to support COVID-19 responses. Global experts continue to highlight the value of satellite data in environmental health applications that advance understanding of the direct and indirect impacts of COVID-19 transmission on human, animal, and environmental health. Topics have included air and water quality, disaster preparedness and management, environmental determinants and seasonality, and One Health and zoonotic disease transmission. As each teleconference has engaged 40 to 120 participants, new GEO Health CoP members have joined and presented their research applications to the wider community. In July 2020, **Juli Trtanj** and **Helena Chapman (NASA HQ/BAH)** facilitated the US GEO Booth for Earth Observations for Health (EO4HEALTH) at the [Esri User Conference 2020](#). In August 2020, supported by the World Meteorological Organization, some CoP members joined the Symposium’s Scientific Committee of the three-day [Climatological, Meteorological, and Environmental Factors in the COVID-19 Pandemic](#) virtual symposium ([outcome statement](#)). We welcome new CoP members to join any of the upcoming GEO Health CoP teleconferences!

AMERIGE OSS SYMPOSIUM 2020

In August 2020, more than 800 participants attended virtual sessions of the [AmeriGEOSS Symposium 2020](#). Using the theme, *Bridging the Divide: Better Together: Geospatial Information for Decision Making in the Americas*, the symposium aimed to identify synergies and priorities using Earth observation data that can strengthen regional collaborations. Sessions provided an opportunity to identify challenges and share approaches to enhance communication, strengthen capacity building, and identify knowledge gaps for end-user communities. Notably, **health** was adopted as a fifth focus area, following biodiversity and ecosystem sustainability, disaster resilience, food security, and sustainable agriculture, and water resources management. At the Americas Caucus meeting, **Helena Chapman (NASA HQ/BAH)** provided an overview on the EO4HEALTH Initiative and the GEO Health CoP, describing updates on the small work groups, research projects, and COVID-19 teleconferences.

50 YEARS OF THE CLEAN AIR ACT VIRTUAL SYMPOSIUM

In September 2020, the [Clean Air For All: 50 Years of the Clean Air Act virtual symposium](#), hosted by the American University’s Center for Environmental Policy, Center for Environmental Filmmaking, and the American Lung Association, was held to commemorate achievements since its enactment. **John Haynes (NASA HQ)** and **Susan Anenberg (George Washington U.)** participated on the *Clean Air and Climate Change in the 21st Century* panel.

TEMPO SCIENCE TEAM MEETING 2020

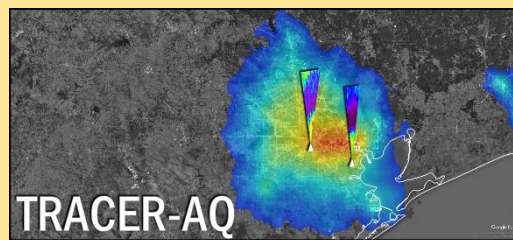
In August 2020, NASA TEMPO Principal Investigator **Kelly Chance (U. of Alabama in Huntsville)** hosted the two-day [TEMPO Science Team Meeting](#). On Day 1, the team coordinated 45-minute sessions that focused on scientific algorithm development of trace gas products, validation plans, and modeling efforts. On Day 2, they organized sessions that discussed the data distribution plans by ASDC and anticipated use of TEMPO data for fire, agricultural, and aerosol research and applications. The fire session highlighted the importance of GOES-R/TEMPO synergy for advancing TEMPO algorithms and products. **Aaron Naeger (U. of Alabama in Huntsville)** led a session on the [TEMPO Early Adopters Program](#) and applications of TEMPO data using synthetic products. During poster sessions, attendees shared their unique research and application studies pertinent to TEMPO and engaged in focused interactive discussions. Presentation slides can be found on the [TEMPO Science Meetings](#) webpage.



TEMPO. Credits: NASA

2021 AIR QUALITY FIELD STUDY IN HOUSTON

To compliment [Tracking Aerosol Convection interactions ExpeRiment](#) (TRACER), a DOE-led study, NASA is coordinating a parallel air quality (AQ) component ([TRACER-AQ](#)) to observe the current state of air quality in the Houston region in partnership with local air quality management, public health, and other researchers. In July 2020, NASA co-PIs **Laura Judd (NASA LaRC)** and **John Sullivan (NASA GSFC)** kicked off the TRACER-AQ science team, currently comprised of collaborators from federal (DOE, NOAA), state (TCEQ), City of Houston (Dept. of Health), and academic (e.g., U. of Houston, Baylor U.) institutions. For this study, NASA will deploy airborne and ground-based air quality observations in the Houston area, including over the marine environments of Galveston Bay and the Gulf of Mexico. These measurements, linked with the dense AQ network operated by TCEQ as well as specialized observations through TCEQ supported research projects and TRACER partners, will provide a uniquely-integrated perspective to examine local AQ challenges. More details about this growing study will be available later this fall on the [TRACER-AQ](#) website.



TRACER-AQ. Credits: NASA

HAQ TEAM PRESENTS AT ONE HEALTH FEDERAL INTERAGENCY GROUP

Since July 2020, the HAQ Team has regularly attended the CDC's One Health Federal Interagency COVID-19 Coordination Group and more targeted discussion in the Environmental Subgroup. In September 2020, **John Haynes (NASA HQ)** and **Juli Trtanj (NOAA)** provided an overview of their agency missions using Earth observations for public health applications to other representatives of federal agencies. They also described the GEO Health Community of Practice as a global network to share expertise and leverage resources to mitigate risk of the emerging One Health challenges.

INTERNATIONAL SOCIETY FOR ENVIRONMENTAL EPIDEMIOLOGY

In August 2020, the HAQ team participated in the [32nd Annual Conference of the International Society for Environmental Epidemiology](#). **John Haynes (NASA HQ)** presented, *Using NASA Earth Observations to Strengthen Air Quality Applied Research and Management*, as a panelist on the CDC's *Increasing Knowledge about Health Effects of Wildfire Smoke: A Summary of Multiagency Research Efforts to Inform Public Health Surveillance and Practice* session to an estimated 80 participants. **Helena Chapman (NASA HQ/BAH)** presented the e-poster, *Applying NASA Satellite Data to Examine Emerging One Health Threats: Going Beyond Traditional Epidemiologic Methods*.

UPCOMING

Webinar:

[Advanced Webinar: MODIS to VIIRS Transition for Air Quality Applications](#)

October 22, 2020

Virtual Meetings:

[American Public Health Association Annual Meeting & Expo](#)

October 24-28, 2020

[American Geophysical Union Fall Meeting](#)

December 7-11, 2020

NASA COMMUNICATIONS

NASA's Space for U.S. site

- ❑ [NASA Helps New Yorkers Cope with Summer Swelter](#) (Tabassum Insaf, New York DOH)
- ❑ [Staying Cool When the Heat is On](#) (Dan Johnson, Indiana U.-Purdue U. at Indianapolis)
- ❑ [Fighting Mosquito-borne Disease with Help from Satellites](#) (Michael Wimberly, U. of Oklahoma)

NASA Earth Observatory

- ❑ [A Dust Plume to Remember](#) (Pablo Méndez-Lázaro, U. of Puerto Rico Medical Sciences Campus)
- ❑ [Of Mosquitoes and Models: Tracking Disease by Satellite](#) (Assaf Anyamba, NASA Goddard; Antar Jutla, U. of Florida)

NASA Applied Sciences Program

- ❑ [A New Era of Combating Disease Made Possible with Earth Observations](#) (Assaf Anyamba, NASA Goddard; Antar Jutla, U. of Florida)
- ❑ [Puerto Rican Health and Weather Experts Now Have an Early Warning System for When Saharan Dust Affects Air Quality](#) (Pablo Méndez-Lázaro, U. of Puerto Rico Medical Sciences Campus)

NASA

- ❑ [NASA Helps Puerto Rico Prepare for Saharan Dust Impacts](#) (Pablo Méndez-Lázaro, U. of Puerto Rico Medical Sciences Campus)
- ❑ [NASA Ayudó a Puerto Rico a Prepararse para los Impactos del Polvo Sahariano](#) (Pablo Méndez-Lázaro, U. of Puerto Rico Medical Sciences Campus)

WOMEN AT NASA PANEL

In September 2020, [RMIT University](#) based in Melbourne, Australia, hosted a moderated virtual panel highlighting three successful women from NASA Langley Research Center: **Laura Judd (HAQ Associate Program Manager)**, **Marilee Roell (SAGE III Science Manager)**, and **Jamie Nehrir (SAGE III/ISS Mission Operations Manager)**. Each woman briefly described their respective career paths and shared challenges, perspectives, and successes as a women in STEMM. This event attracted more than 300 participants, including high school students from 34 Australian schools and students of RMIT's Vocational Education and Higher Education STEMM studies program.

APHA WEBINAR FOR HEALTH EDUCATORS

In August 2020, the HAQ Team (**Helena Chapman, NASA HQ/BAH**) was invited to present the topic, *Bridging Earth and Health Science Communities during the COVID-19 Response: Focus on the One Health Approach*, at the American Public Health Association's Public Health Education and Health Promotion's webinar, [Health Educators Leading a Way to a Post COVID-19 World](#). She described the GEO Health Community of Practice as an innovative platform to share resources, communicate findings, and facilitate open discussions on environmental factors related to COVID-19 transmission. This webinar had over 76 attendees.

PAST

Virtual Meetings:

[HAQAST Final Showcase](#)

July 21-22, 2020

[NASA Earth Applied Sciences Week](#)

August 3-6, 2020

[Climatological, Meteorological and Environmental Factors in the COVID-19 Pandemic](#)

August 4-6, 2020

[TEMPO Science Team Meeting](#)

August 13-14, 2020

[International Society for Environmental Epidemiology Annual Conference](#)

August 24-27, 2020

[AmeriGEO Week](#)

September 7-8, 2020

HAQ Annual Program Review

September 15 and 21, 2020

PUBLICATIONS

[Observing Nitrogen Dioxide Air Pollution Inequality Using High-Spatial-Resolution Remote Sensing Measurements in Houston, Texas](#). *Environmental Science & Technology*. (M.A.G. Demetillo, A. Navarro, K.K. Knowles, K.P. Fields, **J.A. Geddes**, C.R. Nowlan, S.J. Janz, **L.M. Judd**, J. Al-Saadi, K. Sun, B.C. McDonald, G.S. Diskin, S.E. Pusede)

[Impact of COVID-19 Containment Measures on Air Pollution in California](#). *Aerosol and Air Quality Research*. (**A.R. Naeger**, K. Murphy)

[Review: Strategies for Using Satellite-based Products in Modeling PM2.5 and Short-term Pollution Episodes](#). *Environmental International*. (M. Sorek-Hamer, R. Chatfield, **Y. Liu**)

[Disentangling the Impact of the COVID-19 Lockdowns on Urban NO2 From Natural Variability](#). *Geophysical Research Letters*. (**D.L. Goldberg**, **S.C. Anenberg**, D. Griffin, C.A. McLinden, Z. Lu, D.G. Streets)

[One Health Research, Education, and Mentorship during the COVID-19 Pandemic](#). *World Medical Association/Junior Doctors Network Newsletter*. (**H.J. Chapman**)

[One Health and Veterans' Post-deployment Health](#). *The Clinical Teacher* (M. Mathewson-Chapman, **H.J. Chapman**)