

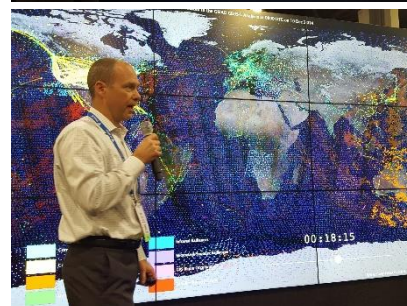
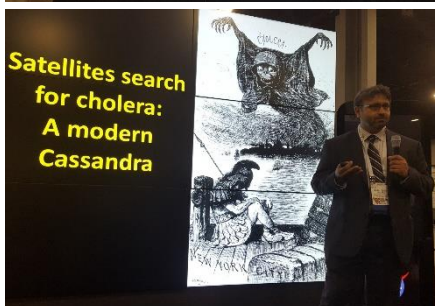
NASA HEALTH AND AIR QUALITY TEAM PRESENTS TALKS AT THE HYPERWALL AND SCIENTIFIC SESSIONS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION (APHA) ANNUAL MEETING

At APHA 2018, held in Atlanta, GA, the NASA HAQ Team sponsored the session, *Observations from Space: A Unique Vantage Point for the Study of Climate Change and its Association with Disease Occurrence*. Presentation titles included *NASA Earth Observation Systems and Applications for Public Health and Air Quality Models and Decisions* (John Haynes, NASA), *Remote Sensing of Zika Virus in the Americas* (Antar Jutla, West Virginia U.), *An Early Warning System for Human West Nile Virus* (Justin Davis, South Dakota State U.), and *Utilizing Satellite Data in Climate Health Surveillance and Mitigation – A Case Study in Translational Epidemiology* (Tabassum Insaf, New York State Department of Health). The NASA Hyperwall talks at the exhibit hall booth, which won the blue ribbon as best conference exhibit for the second consecutive year, include:

1. *NASA Earth Observations for Health and Air Quality Applications*, by John Haynes (NASA)
2. *Predicting Malaria Outbreaks with NASA Satellites and Mosquito Meets MODIS*, by Sue Estes (NASA)
3. *Satellites Search for Cholera: A Modern Cassandra*, by Rita Colwell (U. Maryland) and Antarpreet Jutla (West Virginia U.)
4. *Global Transport of Aerosols and Trace Gases*, by Steve Graham (NASA)



S. Estes, J. Haynes, R. Colwell, A. Jutla (Left to Right).
Photo credit: H. Chapman



Top Row: Left (J. Haynes), Right (S. Estes); Bottom Row: Left (A. Jutla), Right (S. Graham). Photo credit: H. Chapman

HEALTH AND AIR QUALITY APPLICATIONS APPLIED SCIENCES PROGRAM



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HEADQUARTERS

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NASA EARTH SCIENCE DIVISION HOSTS THE HYPERWALL, FEATURING TALKS ON EARTH OBSERVATIONS DATA, PRODUCTS, AND THEIR AIR QUALITY AND PUBLIC HEALTH APPLICATIONS

American Geophysical Union (AGU) Fall Meeting 2017

At AGU 2017, held in New Orleans, LA, the NASA ESD Team sponsored Hyperwall talks at the exhibit hall booth by several principal investigators and program officials. The meeting offered multiple general sessions, each covering a different and exciting topic applicable across all fields of Earth and space science. The NASA HAQ Team convened an oral and poster session, *People and Pixels 20th Anniversary: Advances in the Use of Remote Sensing in Social Science, Public Health, and Air Quality Applications*, moderated by Sue Estes. John Haynes presented the program overview, and Yang Liu (Emory U.) presented on the effects of wildfires on air quality. HAQAST investigators also presented in multiple oral and poster sessions. At this meeting, the formation of a GeoHealth track was announced, which aims to strengthen transdisciplinary research in earth sciences and public health.

American Meteorological Society (AMS) Annual Meeting 2018

At AMS 2018, held in Austin, TX, the NASA ESD Team sponsored Hyperwall Exhibit Hall Booth talks by several principal investigators and program officials.



NASA Exhibit Hall Booth at AGU 2017.
Photo credit: H. Chapman



AGU Hyperwall talk by J. Haynes.
Photo credit: H. Chapman



AGU Hyperwall talk by Lawrence Friedl.
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NASA PRINCIPAL INVESTIGATORS IN THE NEWS

Antarpreet Jutla (West Virginia U.): [Satellites Predict a Cholera Outbreak Weeks in Advance](#)

Using GPM, MERRA-2, NOAA-NCEP, and SEDAC data, investigators validated the prediction model for cholera in Yemen. They successfully predicted the cholera outbreak in summer 2017 at least four weeks in advance. The project's scalability to other areas of the world is likely to be successful.

William Pan (Duke U.): [Using NASA Satellite Data to Predict Malaria Outbreaks](#)

By using NASA data from Earth-observing satellites (LDAS, MODIS, Landsat, GRACE, TRMM, GPM, SMAP, and GOES), investigators can track the types of human and environmental events that typically precede a malaria outbreak. In partnership with the Peruvian government, the team has developed a system that uses satellite and other data to help forecast outbreaks at the household-level months in advance and prevent their occurrence.

HAQAST 3 MEETING FEATURES TALKS ON AIR QUALITY AND PUBLIC HEALTH APPLICATIONS FROM INVESTIGATORS AND STAKEHOLDERS

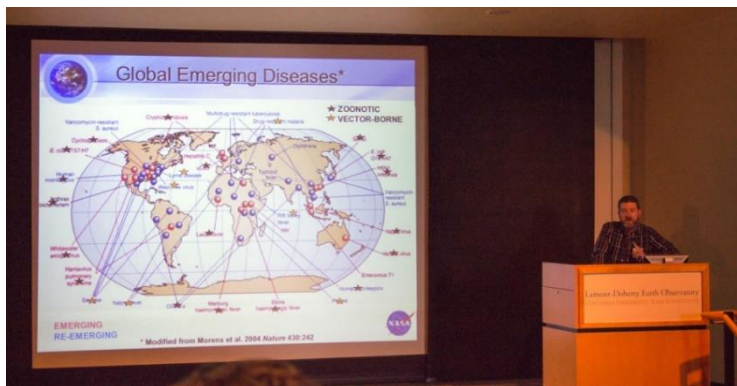
This meeting, co-hosted by the New York State Energy Research and Development Authority (NYSERDA), was held at the Lamont-Doherty Earth Observatory in Palisades, NY. With approximately 125 in-person participants, this was the largest HAQAST meeting ever. The meeting agenda was divided into Day 1 (Energy and Emissions; Satellite Data and Air Quality Trends; Satellite Data and Health; Stakeholder Engagement) and Day 2 (Connecting NASA Data with Policy Applications; HAQAST Successes; Opportunities and Next Steps). Principal investigators presented milestones achieved and future plans for their core, as well as Tiger Team projects. Stakeholders and end users also presented on HAQAST collaborations and current challenges, with ozone transport and particulate matter as noted priorities. Presenting stakeholders included NOAA, EPA, Mid Atlantic Regional Air Management Association, New York State Department of Environmental Conservation, Connecticut Department of Energy and Environmental Protection, Northeast States for Coordinated Air Use Management, CDC, and USDA. A total of 24 posters were also presented at this meeting. After the main agenda, principal investigators met in closed session to formulate ideas for the second round of Tiger Teams.



Lamont-Doherty Earth Observatory.
Photo credit: H. Chapman



HAQAST Poster Session.
Photo credit: H. Chapman



J. Haynes opens the HAQAST 3 Meeting.
Photo credit: HAQAST

HAQAST WORLDVIEW TUTORIAL NOW AVAILABLE AT HAQAST.ORG

As part of the NASA's Earth Observing System Data and Information System (EOSDIS), Worldview is a web-based tool that allows real-time visualization of air quality issues from global satellite imagery. Imagery is currently available from May 2012 to present.

GROUP ON EARTH OBSERVATIONS (GEO) XIV PLENARY

GEO's XIV Plenary, an annual meeting of GEO's 104 Member governments and 109 Participating Organizations, was held in Washington D.C., in October 2017. In a special session, the NASA Applied Sciences Program announced selected projects from *ROSES 2016: Earth Observations for Health (EO4Health)*, which supports the GEO Work Programme. The four awarded projects were: *Earth Observations for Cholera Prediction in Africa* (**Antarpreet Jutla**, West Virginia U.), *Multi-sensor Data for Myanmar Malaria Early Warning System* (**Tatiana Loboda**, U. of Maryland), *Surveillance for Vector-borne Disease in the Americas* (**John Malone**, Louisiana State U.), and *Environmental Determinants of Enteric Infectious Disease* (**Benjamin Zaitchik**, Johns Hopkins U.).

Two GEO side events focused on the GEO Health community and featured global initiatives and activities to improve the use of satellite, atmospheric, and in situ Earth observations for better decision making. First, the [GEO Health and Environment Community of Practice \(CoP\)](#), a global network of governments, organizations, and observers, hosted its first in-person meeting since 2013. The standing-room only crowd heard presentations from a wide array of experts from NASA, NOAA, Bill and Melinda Gates Foundation, World Health Organization, and Sustainable Development Goals (SDGs) Compacts 2020. A draft CoP strategy was composed, to be further refined in 2018. The EO4Health community activity was highlighted by GEO as an emerging success during the Plenary. Second, the CoP supported another side event, [Operationalizing One Health: Observe, Analyze, Communicate](#), coordinated by the US State Department, EPA, and NASA. Key points from this side event included: 1) One Health (approaching human-animal-environmental health as parts of a whole) is a key measure for protecting public health and generating efficiencies, and 2) One Health relies on a cycle of observation, analysis, and communication. Helena Chapman spearheaded the discussion with her presentation, *Introduction to One Health and the Three-Step Cycle*. Examples from the Arctic and from tropical regions dealing with mosquito-borne disease were presented.



J. Haynes presents his *NASA Perspective and New Projects on Earth Observations for Health (EO4HEALTH)* talk.

Photo credit: H. Chapman



Ramesh Krishnamurthy (WHO) presents his *Earth Observation and Remote Sensing Data for Public Health* talk.

Photo credit: H. Chapman

FIRST GEOSTATIONARY VEGETATION, ATMOSPHERIC CARBON MISSION: GEOCARB

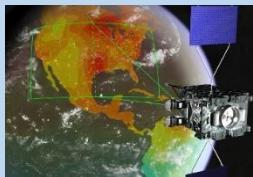


Photo credit: NASA/Lockheed Martin/U. of Oklahoma

The [Geostationary Carbon Observatory](#) (GeoCarb) is an Earth Venture Mission which will take the first GEO measurements of CO₂, CO, CH₄, and Solar Induced Fluorescence (SIF) at 5-10 km resolution. The mission objective is to significantly improve our knowledge of terrestrial fluxes of CO₂ and CH₄ at science and policy-relevant scales. Applications of SIF are proposed to provide direct information on photosynthesis for the agriculture community. Instrument delivery is expected in 2020.

DECADAL STRATEGY FOR ESAS 2017



Photo credit: NASA

In January 2018, the National Academies of Science, Engineering, and Medicine released [Thriving on our Changing Planet: A Decadal Strategy for Earth Observation from Space](#). This consensus study report describes prioritized applications, observations, and science, coupled with strategic guidance, for Earth observation initiatives from 2017-2027.

REPORT ON EXPLORATORY SPACEFLIGHTS

In January 2018, the National Academies of Science, Engineering, and Medicine released the [Review of NASA's Evidence Reports on Human Health Risks: 2017 Letter Report](#). This fifth report describes human health risks related to long-duration spaceflights.

FIRST IMAGES FROM COPERNICUS SENTINEL-5P

The European Space Agency launched the Copernicus Sentinel-5 Precursor satellite (S5p) in October 2017. This air quality satellite includes the advanced TROPospheric Monitoring Instrument ([TROPOMI](#)) to monitor aerosols, CO, CH₄, and NO₂. [First images](#) illustrate levels of air pollutants.



Photo credit: European Space Agency

Upcoming:

Funding Opportunities:

ROSES-2018
Letters of Intent due
March 2018 – January 2019
Full Applications due
May 2018 – April 2019

Meetings:

TEMPO Satellite Data - Early Adopters
Workshop
April 10-11, 2018
Ft. Collins, CO

GLOBE Midwest Student Research
Symposium
May 18, 2018
Detroit, MI

American Thoracic Society International
Conference
May 18-23, 2018
San Diego, CA

Air and Waste Management Association's
Annual Conference & Exhibition
June 25-28, 2018
Hartford, CT

HAQAST 4 Team Meeting
July 17-18, 2018
Madison, WI

Spotlight:

Helena Chapman, MD PhD AAAS S&T Policy Fellow, 2017-2019 Health and Air Quality Applications



Photo credit: National Academies

In September 2017, AAAS S&T Policy Fellow Dr. Helena Chapman joined the NASA HAQ Team. She continues to build on the HAQ portfolio of Dr. Shobhana Gupta, linking Earth observations to public health applications in air quality management and infectious disease control.

Trained in medicine, epidemiology, and environmental health (“One Health”), Helena is passionate about promoting transdisciplinary health collaborations that investigate and mitigate health risks of humans, animals, and ecosystems. Her dissertation research at the University of Florida examined the “knowledge-action” gap among clinicians regarding adherence to tuberculosis infection control measures in health institutions in the Dominican Republic (DR). As a Christine Mirzayan S&T Policy Fellow at the National Academies of Sciences, Engineering, and Medicine, she worked on the *Veterans and Agent Orange: 11th Biennial Update* consensus study. Prior to her doctoral studies, she completed a research fellowship at the Centers for Diagnosis, Advanced Medicine and Telemedicine (CEDIMAT) and served as adjunct professor at the Iberoamerican University School of Medicine in Santo Domingo, DR. Her policy interests include using the One Health approach to address environmental health risks, including infectious disease control, air/water quality, and food safety and security.

Publications:

[Using Satellites to Improve Public Health](#)

Physics Today (D. Miller)

[Co-benefits of Global, Domestic, and Sectoral Greenhouse Gas Mitigation for US Air Quality and Human Health in 2050](#)

Environmental Research Letters (Y. Zhang, S.J. Smith, J.H. Bowden, Z. Adelman, J.J. West)

[Constraining the Uncertainty in Emissions over India with a Regional Air Quality Model Evaluation](#)

Atmospheric Environment (A. Karambelas, T. Holloway, G. Kieseewetter, C. Heyes)

[Potential Air Quality Benefits from Increased Solar Photovoltaic Electricity Generation in the Eastern United States](#)

Atmospheric Environment (D. Abel, T. Holloway, M. Harkey, A. Rushaj, G. Brinkman, P. Duran, M. Janssen, P. Denholm)

Past:

Webinars:

ARSET Advanced Webinar
Data Analysis Tools for High
Resolution Air Quality Satellite
Datasets
January 17-22, 2018

Meetings:

HAQ Annual Team Meeting
September 12-13, 2017
Reno, NV

GEO XIV Plenary
October 25-26, 2017
Washington, DC

American Public Health Association
Annual Meeting & Expo
November 4-8, 2017
Atlanta, GA

HAQAST 3 Team Meeting
November 28-29, 2017
Palisades, NY

American Geophysical Union
Fall Meeting
December 11-15, 2017
New Orleans, LA

American Meteorological Society
Annual Meeting
January 7-11, 2018
Austin, TX