## SPACE VIEWS AID FLORIDA 'RED TIDE' HEALTH ALERTS

Large accumulations of the dinoflagellate *Karenia brevis* in coastal waters cause *red tides* that are toxic to humans and marine life. In Fall 2018, **Richard Stumpf (NOAA)** and his research team used data from NASA's Terra and Aqua satellites, the European Space Agency's Sentinel-3 satellite, and the HABscope smartphone app (for video uploads by trained citizen scientists) to develop a new **24-hour Experimental Red Tide Respiratory Forecast** (updated every three hours) along Florida's Gulf Coast. This information can facilitate risk assessment and decision making to better understand these environmental disturbances and safeguard human and animal health along Florida's Gulf Coast. For more information, please read this **NASA Story**.
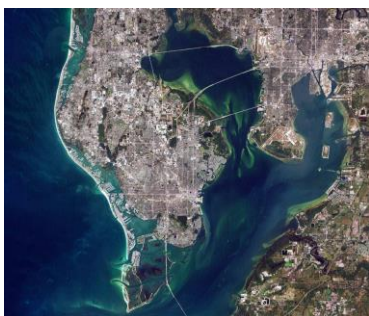
Landsat satellite image illustrates Florida's Gulf Coast. Photo credit: NASA
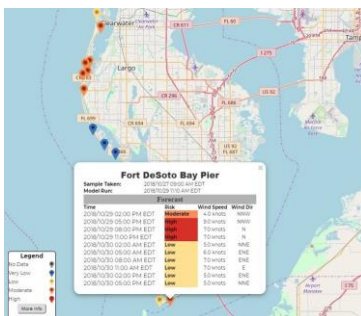
Smartphone-based data provides updates for the red tide health alert system along Florida's Gulf Coast. Photo credit: NASA


R. Stumpf, S. Estes, and research team (left to right) at Florida's Gulf Coast. Photo credit: GCOOS

NASA SATELLITES HELP SCIENTISTS DETERMINE GLOBAL BURDEN OF ASTHMA

Globally, ambient and household air pollution is the leading environmental health risk. In Fall 2018, **Susan Anenberg (George Washington U.)**, **Daven Henze (U. of Colorado, Boulder)**, and the research team used atmospheric models, ground-based monitors, and **Aura's Ozone Monitoring Instrument** satellite data, to estimate global levels of pollution and the burden of asthma. The use of satellite data provided global ambient air quality concentrations, even in geographic areas lacking ground measurements. Researchers highlighted two health findings: 1) Ozone and particulate matter are associated with 8–21% and 3–11% of asthma emergency room visits, respectively, in the United States; and 2) 50% of asthma emergency room visits were projected to occur in South and East Asian countries. This information can enable stakeholders to better understand the sources of air pollution that influence health outcomes. For more information, please read this **NASA Story**.
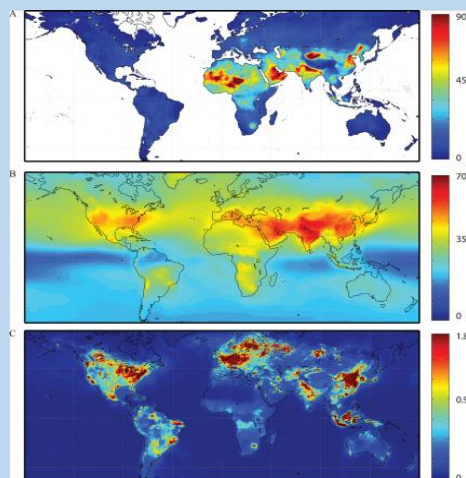
Pollutant concentrations used to estimate asthma impacts in 2015: $PM_{2.5}$ (A), ozone (B), NO_2 (C). Red indicates higher levels, and blue indicates lower levels. Photo credit: S. Anenberg

NASA HEALTH AND AIR QUALITY TEAM PRESENTS TALKS AT AGU 2018 HYPERWALL AND SCIENTIFIC SESSIONS

At the American Geophysical Union (AGU) Fall Meeting 2018, held in Washington, DC, the NASA ESD Team sponsored Hyperwall talks at the exhibit hall booth by principal investigators and program officials. Multiple general sessions covered topics applicable across all fields of Earth and space science. Supporting the new AGU GeoHealth section, the NASA HAQ Team coordinated an oral and poster session, *Using NASA's Satellite and Suborbital Measurements and Modeling for Health and Air Quality Applications,* moderated by **Sue Estes (U. of Alabama, Huntsville)**. Nine oral session topics included: *Using NASA's Satellite for Modeling of HAQ Applications* (**John Haynes, NASA HQ**), *Heat Warning Decision Support System Enhancements in New York State Using Satellite-derived Estimates of Air Temperature* (**Tabassum Insaf, New York State Department of Health**), *Toward Cholera Free Nations: How NASA Satellites Helped in Real-time Disease Forecasting in Yemen* (**Antarpreet Jutla, West Virginia U.**), *Modeling and Predicting Enteric Infectious Disease Burden Using Hydrometeorological Estimates Derived from Earth-observing Satellites and Model-based Reanalysis* (**Josh Colston, Johns Hopkins U.**), *Using Satellite-derived Surface Concentrations to Estimate the Mortality Associated with Ambient Air Pollution in Cities Worldwide* (**Susan Anenberg, George Washington U.**), *Air Quality Forecasts Using the NASA GEOS Composition Model* (**Christoph Keller, NASA Goddard Space Flight Center**), *Reducing Uncertainties in Retrospective Air Quality Simulations through the Use of Satellite Observations* (**Arastoo Biazar, U. of Alabama, Huntsville**), *Quantitative Maps Describing Respirable Particle Episodes in the San Joaquin Valley Using Moderate Resolution Satellite Imagery* (**Robert Chatfield, NASA Ames Research Center**), and *Linking Satellite Data to the One Health Approach* (**Helena Chapman, NASA HQ**).

J. Haynes presents at the NASA Hyperwall exhibit at AGU2018. Photo credit: H. Chapman

HAQ session presenters at AGU2018. Photo credit: J. Witte

NASA INVESTIGATORS IN THE NEWS

Jason West (U. of North Carolina): [US Air Pollution Deaths Nearly Halved between 1990 and 2010](#)
Richard Stumpf (NOAA): [Space Views Aid Florida 'Red Tide' Health Alerts](#) [NASA Satellites Help Scientists](#)
Susan Anenberg (George Washington U.): [NASA Satellites Help Scientists Determine the Global Burden of Asthma](#)
Susan Anenberg (George Washington U.), Jason West (U. of North Carolina): [NASA Science Shows Human Impact of Clean Air Policies](#)
Jason Hess (U. of Washington): [Google Trends Could Help Scientists Track Allergy Season](#)

GEO HEALTH COMMUNITY OF PRACTICE HOLDS QUARTERLY TELECON AND IN-PERSON MEETING AT AGU 2018

Quarterly Telecon

In November 2018, the Group on Earth Observations (GEO) Health Community of Practice (CoP) held the **quarterly telecon** to provide updates on scientific initiatives and elaboration of the Work Plan. The leads of three GEO CoP Small Working Groups – Heat (**Tatiana Loboda, U. of Maryland, College Park**), Infectious Diseases (**Antarpreet Jutla, West Virginia U.**), and Cross-cutting Issues (**Dorian Janney, NASA Goddard Space Flight Center**) – provided brief reports on their Work Plan sections. **Doug Cripe (GEO Secretariat representative)** and **Kym Watson (Fraunhofer IOSB)** offered program and project updates. Invited speaker **Lisa Conti (One Health Initiative/Florida Department of Agriculture and Consumer Services)** noted that the One Health approach can bring Earth observation data and technology to strengthen transdisciplinary research and community collaborations. A total of 24 participants, representing different agencies in public and private sectors, participated on the telecon. The next quarterly telecon is planned for February 2019.

AGU Fall Meeting 2018

In December 2018, the GEO Health CoP and the American Geophysical Union (AGU) partnered to hold the **GEO Health CoP Meeting at AGU 2018** in Washington, D.C. Presenters included experts from the GEO Secretariat (**Doug Cripe**), PAHO (**Marcelo Korc**), AGU (**Mark Shimamoto**), NASA (**John Haynes, Helena Chapman, Argyro Kavvada**), NOAA (**Juli Trtanj**), NIH (**John Balbus**), and AquaWatch/Blue Planet (**Emily Smail**). GEO project updates were provided by **Antarpreet Jutla (West Virginia U.)**, **Ben Zaitchik (John Hopkins U.)**, and **Tatiana Loboda (U. of Maryland, College Park)**. This meeting provided an opportunity for Earth and health scientists and practitioners to describe key international projects and updates, enhance professional networks, and discuss priority focus areas that advance GEO/AGU efforts. It also allowed active engagement for the review of the GEO Health CoP Goals and Work Plan, which supports GEO efforts and furthers development of the GEO Earth Observations for Health activity to a potential initiative.

A. Miller and R. Colwell attend the GEO Health CoP Meeting. Photo credit: H. Chapman

D. Cripe, A. Kavvada, and J. Balbus (first row, left to right) and M. Korc and A. Jutla (second row, left to right) present at the GEO Health CoP Meeting. Photo credit: H. Chapman

NASA HEALTH AND AIR QUALITY TEAM PRESENTS TALKS AT APHA 2018

At the American Public Health Association (APHA) Annual Meeting & Expo 2018, held in San Diego, California, **Helena Chapman (NASA HQ)** represented the HAQ Team and presented two oral presentations to approximately 50 attendees per session: *Operationalizing "One Health": Integrating Remote Sensing and Citizen-Based Observations* (APHA Veterinary Public Health Special Primary Interest Group) and *Integration of Satellite Data into Environmental Health Education, Practice, and Research* (APHA Environment Section). She also assisted with educational outreach activities at the US Global Change Research Program (USGCRP) and American Association for the Advancement of Science (AAAS) exhibit hall booths.

Presenters at APHA Veterinary Public Health Special Primary Interest Group. Photo credit: J. Schwind

H. Chapman presents her *Operationalizing One Health* talk. Photo credit: J. Schwind

UPCOMING

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

Meetings:
HAQAST 5 Team Meeting
January 3-4, 2019
Phoenix, AZ

American Meteorological Society Annual Meeting
January 6-10, 2019
Phoenix, AZ

American Association for the Advancement of Science Annual Meeting
February 14-17, 2018
Washington, DC

Association of Schools and Programs of Public Health Annual Meeting
March 20-22, 2018
Arlington, VA

GEDI LAUNCH: DEC 5, 2018

Photo credit: NASA/Kim Shiflett

On December 5, 2018, the **Global Ecosystem Dynamics Investigation** (GEDI) instrument was transported to the International Space Station on SpaceX Commercial Resupply Mission 16. This instrument's high-resolution laser will collect 3D observations of Earth's forest canopy height, canopy vertical structure, and surface elevation. These data will provide better understanding of carbon and water cycles, water resource management, and weather prediction.

ONE HEALTH IN THE NEWS

Photo credit: CDC

As part of the **CDC Zoonoses & One Health Update (ZOHU)** monthly calls, **Helena Chapman (NASA HQ)** was one of three invited panelists on the **December 2018 ZOHU** call. She presented the topic, *Using Earth Observation Data in One Health Applications for Societal Benefits*, to over 270 attendees. This ZOHU panel presentation can be found on **YouTube**.

Spotlight:
Jacquelyn Witte, M.Sc.
Associate Program Manager
Health and Air Quality Applications

Photo credit: SSAI

In October 2018, Jacquelyn Witte joined the NASA HAQ Team. Trained in meteorology and environmental sciences at McGill University and oceanography at Dalhousie University, Jacquelyn is passionate about understanding air quality issues at local and regional scales. Since 1998, she has served as a Research Scientist (Science Systems and Applications Inc., SSAI) at the Atmospheric Chemistry and Dynamics Lab at NASA Goddard Space Flight Center. She currently works on the **Southern Hemisphere Additional Ozonesondes (SHADOZ)** project: a NASA project that partners with NOAA and international institutions to archive high quality ozonesonde measurements in the tropics and sub-tropics to enhance our understanding of ozone vertical distribution in the tropical regions, and guide algorithm development and validation for satellites and models. She was recently presented the NASA/GSFC Earth Science Division Award 2017 for Outstanding Performance in Science. She has published more than 50 articles in the areas of trace gas composition, variability, and trends. Her research interests include atmospheric trace gas analyses, including use of ground-based instruments and tropospheric field missions.

PAST

Webinars:
High Temporal Resolution Air Quality Observations from Space
September 4-25, 2018

In-Person Trainings:
Satellite Remote Sensing of Air Quality
November 18-19, 2018
IIRS, Dehradun, India

Meetings:
American Public Health Association Annual Meeting & Expo
November 10-14, 2018
San Diego, CA

American Geophysical Union Fall Meeting
December 10-14, 2018
Washington, DC

PUBLICATIONS

Estimates of Present and Future Asthma Emergency Department Visits Associated With Exposure to Oak, Birch, and Grass Pollen in the United States *GeoHealth* (J.E. Neumann et al.)

Potential for City Parks to Reduce Exposure to BTEX in Air *Environmental Science: Processes & Impacts* (M.J. Milazzo et al.)

Long-term Trends in the Ambient $PM_{2.5}$- and O_3-related Mortality Burdens *Atmospheric Chemistry and Physics* (Y. Zhang et al.)

Heat Waves and Fatal Traffic Crashes in the Continental United States *Accident Analysis & Prevention* (C.Y.H. Wu et al.)

Estimates of the Global Burden of Ambient PM2.5, Ozone, and NO2 on Asthma Incidence and Emergency Room Visits *Environmental Health Perspectives* (S.C. Anenberg et al.)

Scientific Assessment of Background Ozone over the U.S.: Implications for Air Quality Management *Elementa (Washington, DC)* (D.A. Jaffe et al.)

All-cause Mortality Risk Associated with Long-term Exposure to Ambient PM2.5 in China: A Cohort Study *Lancet Public Health* (T. Li et al.)