

NASA Health and Air Quality

remote sensing for public health

the cherry blossom mega issue!

volumes 9,10 & 11

february, march, and april 2017

Citizen Science Takes Center Stage



Artwork from citizenscience.org, Photos by Shobhana Gupta

NASA projects were represented at Citizen Science Association's second biannual CSA conference in Minneapolis/St. Paul, MN. NASA HAQ related presentations included the Keynote talk on Flint's water crisis by Dr. Marc Edwards, Virginia Tech, and Citizen LeeAnne Walters. A Closing Reception featured former NASA Chief Scientist, Waleed Abdalati, and showcased projects including tracking air and water pollution at fracking sites, and using sensors on asthma inhalers. These were featured in "The Crowd and The Cloud" series, which debuted on PBS in April, 2017. NASA Solve and NASA's International Space Apps Challenge participated in the Public Citizen Science Festival at the Science Museum of Minnesota.

upcoming:

Webinars:

**ARSET Advanced Webinar
Methods in Using NASA Remote
Sensing for Health Applications**
June 1, 8, and 15th, 2017

**Archived ARSET Webinar
Satellite Derived Annual PM2.5
Data Sets in Support of United
Nations Sustainable Development
Goals**

Funding Opportunities:

**Federal Funding Opportunity for
FY18 from NOAA Climate
Program Office
Letters of Intent (LOIs) due
June 14, 2017
(June 28, 2017 for MAPP)
Full Applications due
August 14, 2017
(September 11, 2017 for MAPP)
Competitions with links to health
include: AC4, MAPP, OOM, SARP**

Meetings:

**American Thoracic Society
International Conference
May 19-24, 2017
Washington, DC**

**Air and Waste Management
Association's Annual Conference
and Exhibition
June 5-8, 2017
Pittsburgh, PA**

**CEOS's One Earth-One Health
Workshop
June 21, 2017
Montreal, CA**

**2017 NCAR/CDC Workshop on
Weather, Climate and Health
July 17-20, 2017
Boulder, CO**

HEALTH AND AIR QUALITY APPLICATIONS

APPLIED SCIENCES PROGRAM

JOHN HAYNES

PROGRAM MANAGER
HEADQUARTERS

SUE ESTES

ASSOCIATE
MARSHALL SPACE
FLIGHT CENTER

ALI OMAR

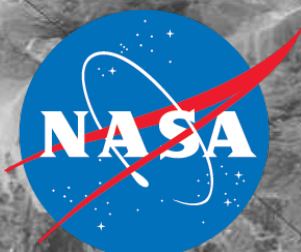
ASSOCIATE
NASA-LANGLEY
RESEARCH CENTER

SHOBHANA GUPTA

AAAS S&T POLICY FELLOW
HEADQUARTERS

Created by Shobhana Gupta, MD, PhD; please direct correspondence to shobhana.gupta@nasa.gov

haQ



SPOTLIGHT

GLOBAL MOSQUITO ALERT - UN BACKED CITIZEN SCIENCE PLATFORM TO FIGHT MOSQUITO-BORNE DISEASES



Photo courtesy of Wilson Center

The Global Mosquito Alert was launched from an alliance between citizen-science organizations in Europe, Australia, the United States and Southeast Asia, and the United Nations Environment to aid the global fight against mosquito-borne diseases, responsible for killing close to 2.7 million people annually.

Scientists and volunteers from around the world can use this global platform and citizen science techniques to track and control mosquito borne viruses, including Zika, yellow fever, chikungunya, dengue, malaria, and the West Nile virus.

The Global Mosquito Alert will be supported by data coordinated through UN Environment's knowledge platform, Environment Live. This platform provides real-time, open access data to researchers, policy-makers, and the public. The list of information providers for this initiative includes Spain's Mosquito Alert, Spain, Portugal's MosquitoWEB, Italy's Zanzamapp, Netherlands' Muggenradar, USA's Invasive Mosquito Project, and the USA/ International program, Globe Observer Mosquito Habitat Mapper.

END OF MISSION: EARTH OBSERVING-1 (EO-1)

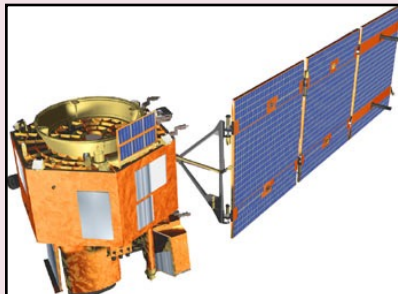


Photo courtesy of NASA Earth Observatory

After 16+ years of experiments and data collection, NASA retired the Earth Observing – 1 (EO-1) spacecraft earlier this year. EO-1 was launched on November 21, 2000, and completed its designed baseline mission in 2001. The data collected from the mission is archived at the USGS Earth Resources Observation and Science (EROS) Data Center (EDC).

READ ABOUT NASA ARSET PROGRAM'S ACCOMPLISHMENTS IN THE 2016 ANNUAL REPORT!



Since 2009, NASA ARSET has trained more than 8,000 people through online and in-person trainings, representing over 2,600 organizations and 160 countries worldwide!

NOAA'S SUMMER HEAT OUTLOOK IS RELEASED

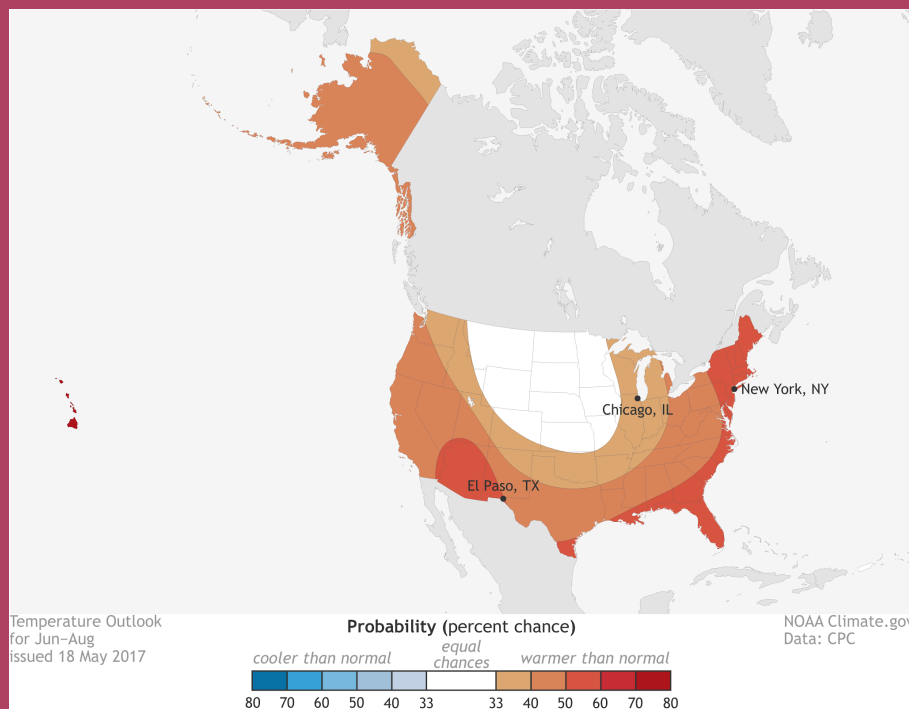


Photo courtesy of NOAA Climate.gov

From Alaska to southern California, and from Maine to Texas—odds are tilted toward well above average warmth this summer!

save the date!

NASA Health and Air Quality Applications Annual Meeting

September 12-13, 2017
Reno, NV

See you all in
The Biggest Little City in the World!

Our Research in the News

- NASA's Earth Observing-1 Satellite's extraordinary life, lasting 16 years beyond the planned 1 year mission timeline, was highlighted. EO-1 is retired as it runs out of fuel. **WIRED**

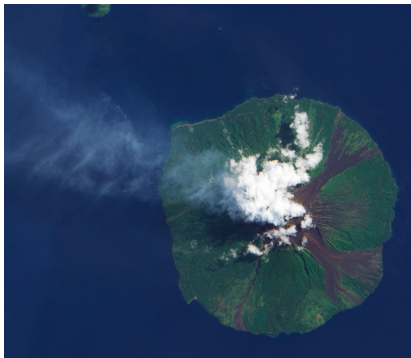


Photo courtesy of
NASA Earth Observatory

- NASA's Van Allen Probes detect a human made protective bubble around the Earth. This artificial bubble is formed from interactions between very low frequency waves, transmitted from stations on the ground, and particles in space. The bubble's outer edge aligns with the inner edge of Van Allen belts, and it can shield Earth against natural high energy particle radiation in space. **The Atlantic**

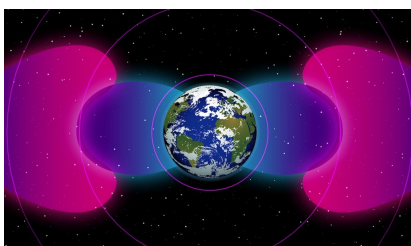


Photo courtesy of
Goddard Visualization Studio

WHAT'S NEW IN THE FIELD?

HUMAN HEALTH AND ADAPTATION: UNDERSTANDING CLIMATE IMPACTS ON HEALTH AND OPPORTUNITIES FOR ACTION

**United Nations Synthesis Paper
March 3, 2017**

This document, compiled by the Subsidiary Body for Scientific and Technological Advice, provides information on the impacts of climate change on human health, on emerging activities, and on challenges and opportunities for collaborative climate action. The report highlights inputs from parties, partner organizations, experts, and other participants at the 10th Focal Point Forum of the Nairobi work programme on impacts, vulnerability and adaptation to climate change.

RECURRENT POTENT HUMAN NEUTRALIZING ANTIBODIES TO ZIKA VIRUS IN BRAZIL AND MEXICO

**Cell
May 4, 2017**

Protective antibodies to Zika virus (ZIKV) were tested by Davide F. Robbiani et. al. by screening cohorts in Brazil and Mexico. Serologic reactivity to a dengue 1 virus antigen is associated with increased ZIKV neutralizing antibody titers after exposure. Thus, previous exposure to dengue 1 virus could alter human susceptibility to ZIKV and confer protection against infection. Interestingly, the high ZIKV-neutralizing antibodies that protect mice against ZIKV challenge, cross-react with the dengue 1 virus, but not other flaviviruses.

ZIKA VIRUS PERSISTENCE IN THE CENTRAL NERVOUS SYSTEM AND LYMPH NODES OF RHESUS MONKEYS

**Cell
May 4, 2017**

Maliki Aid et. al. detect persistence of Zika virus in cerebrospinal fluid (CSF) and lymph nodes of infected rhesus monkeys weeks after the virus has been cleared from peripheral blood, urine and mucosal secretions. Their correlation with upregulated pro inflammatory factors could be indicative of persistent or occult neurologic or lymphoid disease in infected individuals, even after the virus has been cleared peripherally.

LEVELS OF AMBIENT AIR POLLUTION ACCORDING TO MODE OF TRANSPORT: A SYSTEMATIC REVIEW

**The Lancet
November 25, 2016**

Magda Cepeda et. al. report their findings from a systematic study of online databases to compare air pollution exposure to mode of transport for those using motorized transport (car, bus, motorcycle, or massive motorized transport eg. train, subway or metro) and active commuters (pedestrians and cyclists). Overall, car commuters had higher pollutants exposure than active commuters, due to proximity to traffic and high air exchange. However, active commuters had higher inhalation doses than commuters using motorized transport, due to larger inhalation rates and increased commuting times. Yet, benefits of active commuting from physical activity outweigh the risks from inhaled particles.

resources

for our community

BIOMEDICAL CITIZEN SCIENCE HUB

Sponsored by the Division of Cancer Biology and the Division of Cancer Control and Population Sciences at the National Cancer Institute, one of the 27 Institutes and Centers at the National Institutes of Health, the Biomedical Citizen Science Hub is an online collaboration space for the growing and virtually dispersed biomedical citizen science resources, projects, references, methods, and communities to be discovered and engaged by interested stakeholders.

VECTOR CONTROL FOR ENVIRONMENTAL HEALTH PROFESSIONALS

New Vector Control Online Training Curriculum from CDC and partners for environmental health professionals working in government agencies, tribal organizations, schools, and businesses. The curriculum emphasizes the use of integrated pest management to address public health pests and vectors that spread pathogens, including Zika virus.

GLOBAL BIODIVERSITY INFORMATION FACILITY

An international open data infrastructure funded by governments, this resource provides data related to more than 1.6 million species, collected over three centuries of natural history exploration, including current observations from citizen scientists. GBIF has been cited as a source for more than 1,400 peer-reviewed research publications covering topics including range shifts in mosquito-borne arboviruses, malaria treatment and prevention, and mapping of risks of chugs parasites.

UNEP RONA

The UN Environment Programme's North America Office assists in carrying out UN Environment's global program by promoting collaboration between UNEP and all sectors of North American society, including the U.S. and Canadian governments, the private sector and civil society groups and stakeholders.

TECHNICAL DOCUMENTATION ON EXPOSURE-RESPONSE FUNCTIONS FOR CLIMATE-SENSITIVE HEALTH OUTCOMES

Part of the CDC's Climate and Health Technical Report Series, this document provides resources to public health practitioners and agencies interested in applying CDC's five-step Building Resilience Against Climate Effects (BRACE) Framework. This document shares examples of health, weather, and climate data that can be used in health-effects studies; study designs commonly used to assess relationships between climate hazards and health effects; and case studies for quantifying future disease burden due to climate change.

CLIMATE AND HEALTH INTERVENTION ASSESSMENT: EVIDENCE ON PUBLIC HEALTH INTERVENTIONS TO PREVENT NEGATIVE HEALTH EFFECTS OF CLIMATE CHANGE

Part of the CDC's Climate and Health Technical Report Series, this document outlines the findings of the BRACE Midwest/Southeast Collaborative on the evidence of effectiveness of various interventions for reducing the negative health impacts of climate change. This report provides an initial assessment of Type Two evidence, or evidence on effectiveness of interventions, for several specific climate change impacts and health outcomes (in contrast to Type One evidence, evidence linking climate-sensitive exposures to health outcomes of interest, and Type Three evidence, evidence on evaluation and implementation within a community.)

THE EFFECTIVENESS AND IMPLEMENTATION OF 4-POSTER DEER SELF-TREATMENT DEVICES FOR TICK-BORNE DISEASE PREVENTION: A POTENTIAL COMPONENT OF AN INTEGRATED TICK MANAGEMENT PROGRAM

Part of the CDC's Climate and Health Technical Report Series, this document provides guidance on one potential intervention activity to combat the spread of tick-borne illness, the 4-Poster self-treatment bait station device for controlling tick populations among white-tailed deer hosts.

MENTAL HEALTH AND OUR CHANGING CLIMATE: IMPACTS, IMPLICATIONS, AND GUIDANCE

Sponsored by the American Psychological Association and ecoAmerica, this report expands information and recommended actions on climate and health. The report highlights the impacts of climate change on mental health, including inducing stress, depression, and anxiety; straining social and community relationships; leading to potential increases in aggression, violence, and crime. The report aims to help increase the awareness of these issues and to address them. It identifies populations particularly vulnerable to these impacts, such as children, and communities with few resources to deal with the impacts of climate change.

PICTURE POST

Developed from NASA funding and housed at the University of New Hampshire, this platform is a part of the Digital Earth Watch (DEW) environmental monitoring program. Picture Post enables citizen scientists to measure environmental change with cameras and smartphones to help understand and document the local effects of global climate change.

CITSCI.ORG

Developed from initial NSF funding and through the Natural Resources Ecology Lab at Colorado State University, CitSci.org provides tools and resources to develop and implement projects using the scientific method. The range of supported projects include monitoring air and water quality and tracking energy use.

OPERATION HEALTHY AIR

Funded by grants from NASA and NSF, this program from the Earthwatch Institute will engage partners and participants to map and measure how differences in environment - such as the amount of trees or pavement - affect local air quality and temperature. Pilot campaigns developing local citizen networks of air sensors are starting in Long Beach, Chino and the Inland Empire in summer of 2017, and will look to expand to Los Angeles and other cities in 2018.

NASA EARTH SCIENCE DIVISION HOSTS THE HYPERWALL, FEATURING TALKS BY EARTH OBSERVATIONS DATA, PRODUCTS, AND THEIR AIR QUALITY AND PUBLIC HEALTH APPLICATIONS AT THE AMERICAN METEOROLOGICAL SOCIETY MEETING IN



Photos by Heather Hanson and Shobhana Gupta

NASA's Health and Air Quality Applied Sciences Program hosted a panel titled "NASA Earth Observations and Climate Change" as a part of the Eighth Conference on Environment and Health. Presentations included:

1. "Exploring Environmental Health Concepts and Applications that Utilize NASA Satellites and Instruments to Improve Human Health", by John Haynes, Program Manager of NASA's Health and Air Quality Applied Sciences Program;
2. "Quantifying the Risk for Outbreaks of Zika Virus in the Continental United States", by Christopher Barker at University of California, Davis;
3. "Design and Implementation of Integrated Surveillance and Modeling Systems for Climate-Sensitive Diseases", by Michael Wimberly, at South Dakota State University;
4. "A Multiscale Satellite Based Prediction of Diarrheal Disease: Case Study from Cholera", by Antar Jutla, at West Virginia University; and
5. "Methods and Challenges for Forecasting Mosquito-borne Disease Incidence Using a Meteorologically Driven, Coupled Entomological-epidemiological Model", by Cory Morin at University of Washington, Seattle.

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NASA EARTH SCIENCE DIVISION SHARES EARTH OBSERVATIONS DATA, PRODUCTS, AND THEIR AIR QUALITY AND PUBLIC HEALTH APPLICATIONS AT THE AMERICAN METEOROLOGICAL SOCIETY MEETING IN SEATTLE, WASHINGTON, IN JANUARY, 2017.



Photos by Jason Hong

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