

# Bridging Earth Observations with the “One Health” Community



**Juli Trtanj, MES**

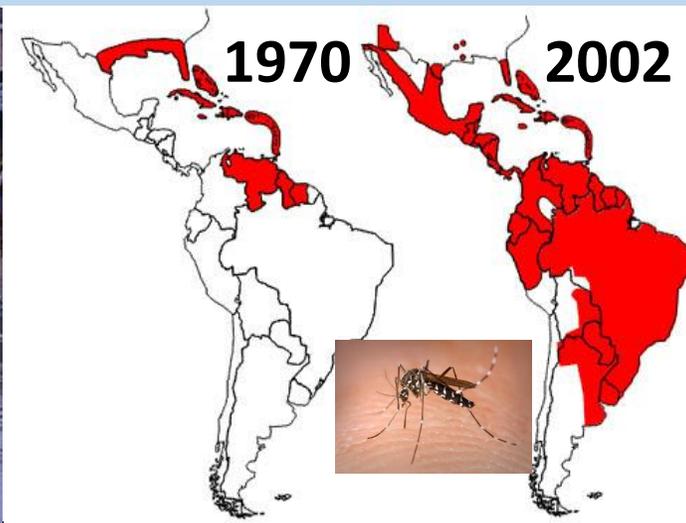
One Health & Integrated Climate & Weather  
Extremes Research Lead

NOAA Climate Program Office

**Helena Chapman, MD PhD**

AAAS S&T Policy Fellow

NASA Applied Sciences Program



**How can globalization affect the health of our ecosystem?**

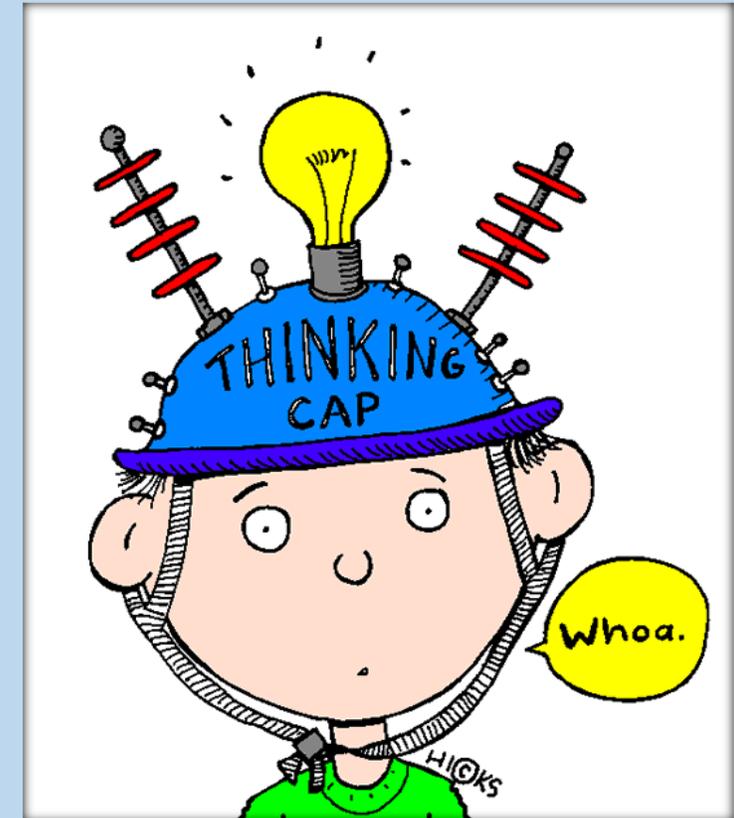
# What are known risks to our global ecosystem?

- ❑ Healthy environments are essential to maintain balance within the ecosystem, collectively shared by humans, animals, and plants
- ❑ WHO global estimates (2012):
  - ❖ 12.6M deaths (1 in 4) associated with residing or working in unhealthy environments
  - ❖ 6.5M deaths (1 in 9) associated with air pollution



“To raise new questions, new possibilities, to regard old problems from a new angle, requires **creative imagination** and marks **real advance in science**”

(Albert Einstein)



# How do we define “health”?



“State of complete physical, mental and social well-being and not merely the absence of disease or infirmity”  
(WHO Preamble to the Constitution, 1948)

# How do we define “One Health”?

## □ Centers for Disease Control and Prevention

❖ **“Collaborative, multisectoral, and trans-disciplinary approach**—working at the local, regional, national, and global levels—with the goal of achieving optimal health outcomes recognizing the **interconnection** between people, animals, plants, and their shared environment”

## □ World Health Organization

❖ “Approach to designing and implementing programmes, policies, legislation and research in which **multiple sectors communicate and work together** to achieve better public health outcomes”



# What are the benefits of “One Health” collaborations?



- Fostering teamwork
- Strengthening communication across sectors
- Coordinating disease surveillance
- Increasing public awareness through dissemination

“When we try to pick out anything by itself, we find it **hitched** to everything else in the Universe” (John Muir)

# What is the value of Earth observations (satellite)?

## Earth Science Missions

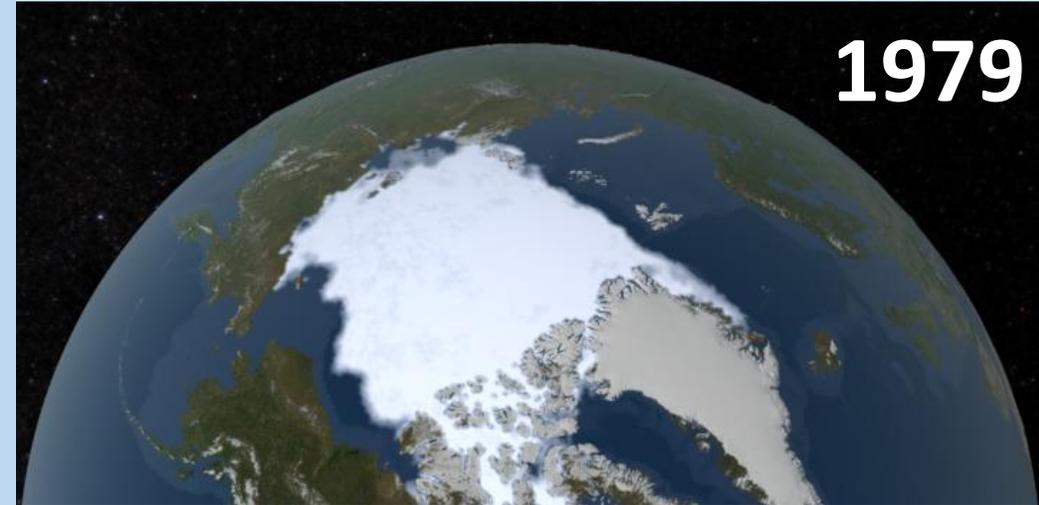
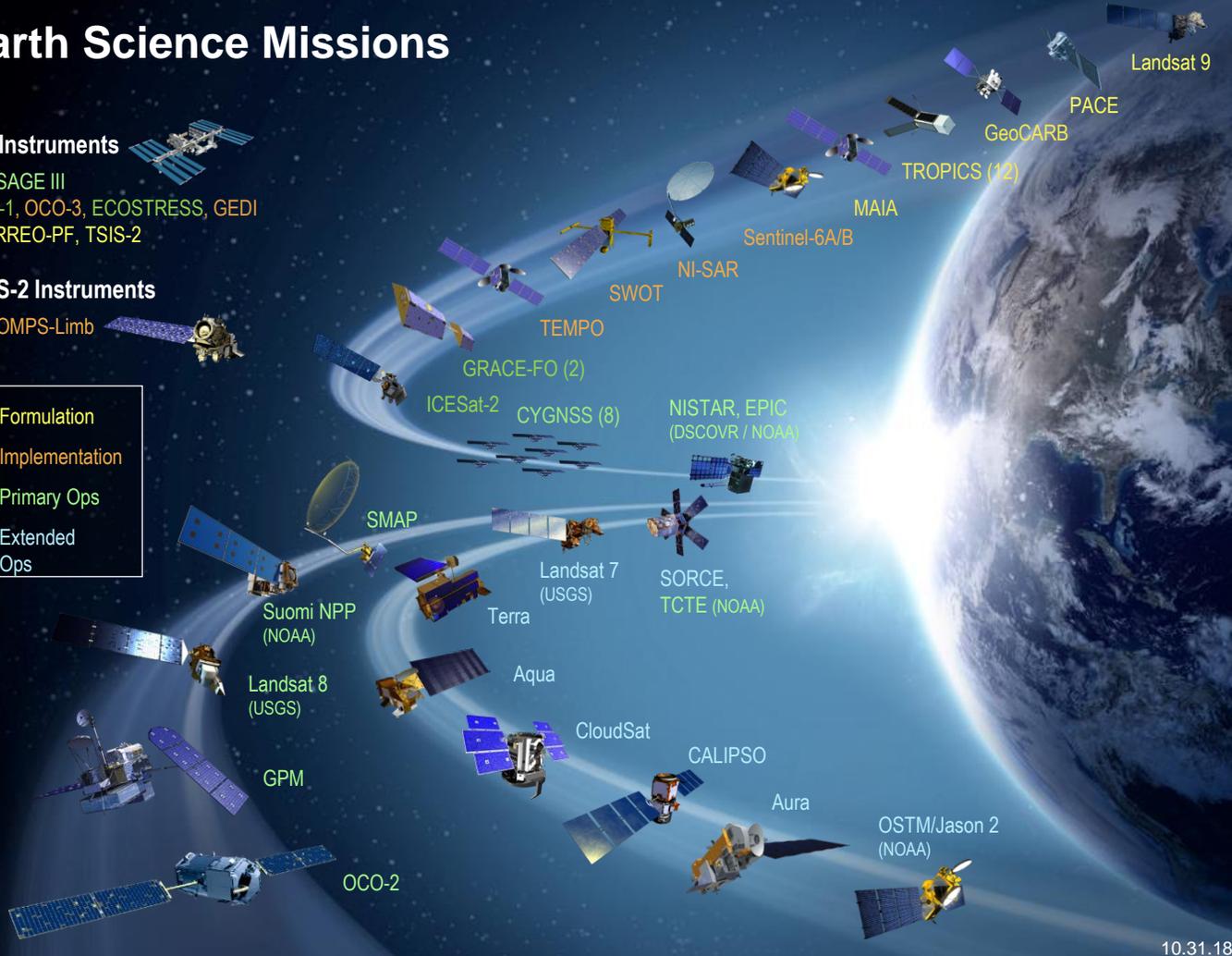
### ISS Instruments

LIS, SAGE III  
TSIS-1, OCO-3, ECOSTRESS, GEDI  
CLARREO-PF, TSIS-2

### JPSS-2 Instruments

RBI, OMPS-Limb

- Formulation
- Implementation
- Primary Ops
- Extended Ops



# What is the value of Earth observations (local)?

AT&T 9:29 AM 100%

← Time and Location

Enter the local date and time of the observation:

Jul 7, 2016

9:28 AM

Enter location coordinates:

Latitude: 34.1244

Longitude: -117.7491

Next

School: Mengo Primary School  
Site: 36NVF498337

Measurements Data Counts School Info Site Info Photos

Select Photos: Mosquito Habitat Mapper Select Date: 2018-08-30 12:53:00.0



11/2/2018 LEO Network

LEO NETWORK (1)

search

Observations  News Articles

Utqiagvik

Chukchi Sea

Beaufort Sea

Alaska

Yukon

Whitehorse

Juneau

Prince Rupert

Wasatch Mountain (post-conviction) 08AA-4089-A 15 Jun 2018 Payson, Utah, United States LEO Network

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM (<http://www.anthc.org>)

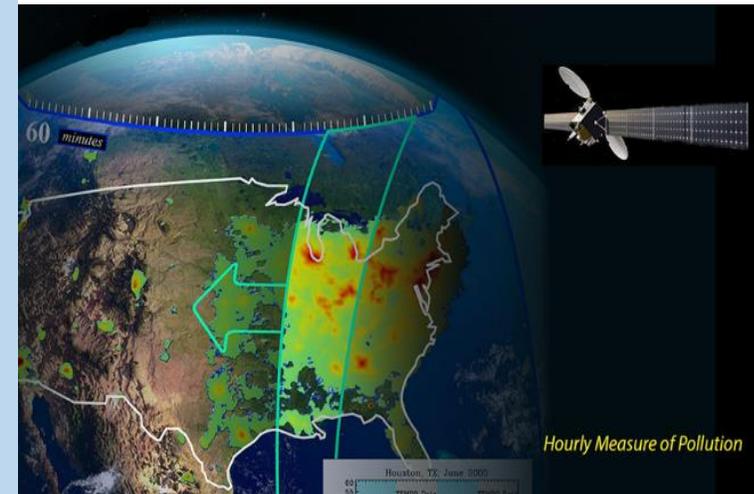
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<https://www.leonetwork.org/en/#lat=64.11060221954631&lng=-99.31640625&zoom=4&showing=6498FFD2-08AA-4089-A705-709152FB0FBE>

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# Why are connections between Earth and health scientists beneficial?

- ❑ Provide information to achieve program objectives (e.g., HP2020, SDGs)
- ❑ Enhance communication between stakeholders and other decision-makers
- ❑ **Support training of the global health workforce for their preparedness and response measures**





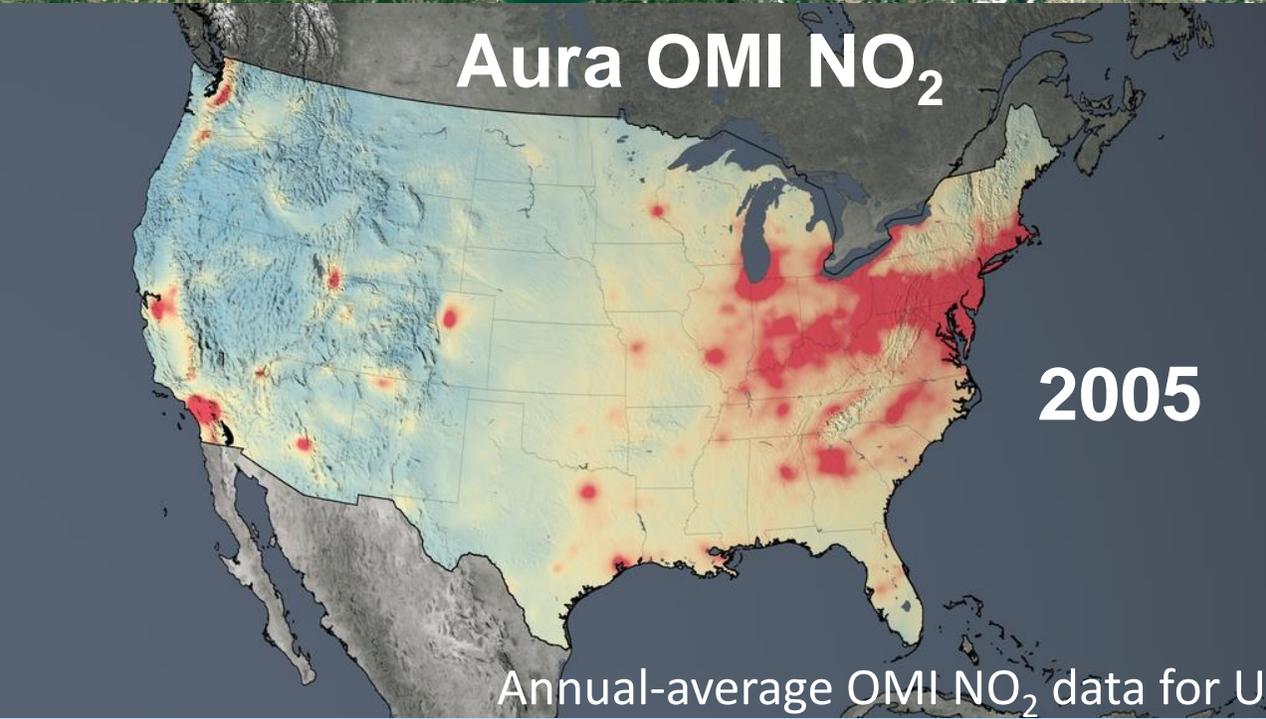
## SATELLITES HELP DETECT HARMFUL ALGAL BLOOMS

Large accumulations of algae can harm people and animals. NASA satellite data help detect, forecast and target responses to such harmful algal blooms.

Photo credit: U.S. Peace Corps

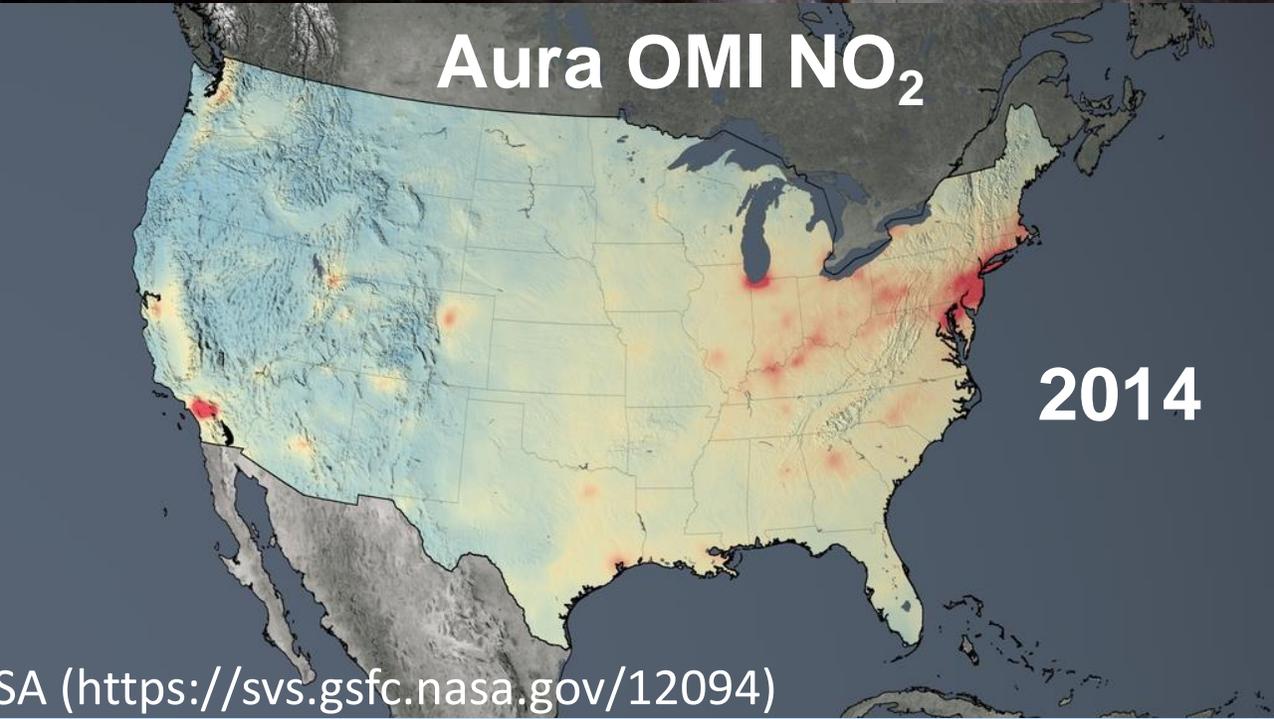
## USING NASA SATELLITE DATA TO PREVENT MALARIA OUTBREAKS

Researchers use satellite data to reveal and track the types of human and environmental events that typically precede an outbreak.



Aura OMI NO<sub>2</sub>

2005



Aura OMI NO<sub>2</sub>

2014

Annual-average OMI NO<sub>2</sub> data for USA (<https://svs.gsfc.nasa.gov/12094>)

**One Health appeals to all at a personal level!**



NASA, 2018: <https://visibleearth.nasa.gov/view.php?id=57723>

# Together, we can strengthen “One Health” connections!

❖ Transdisciplinary collaborations can lead scientists and community practitioners to identify risk factors and develop **innovative approaches** and **interventions** for societal benefits



❖ Earth observation data can form part of the “**One Health**” **toolkit** for public health practitioners, scientists, educators, and decision-makers



Thank you for your attention!

