Overview of NASA HAQAST

The NASA Health and Air Quality Applied Sciences Team (HAQAST)

3rd Generation; 2021-2025

Jenny Bratburd, University of Wisconsin—Madison

What is “hay-kast”?

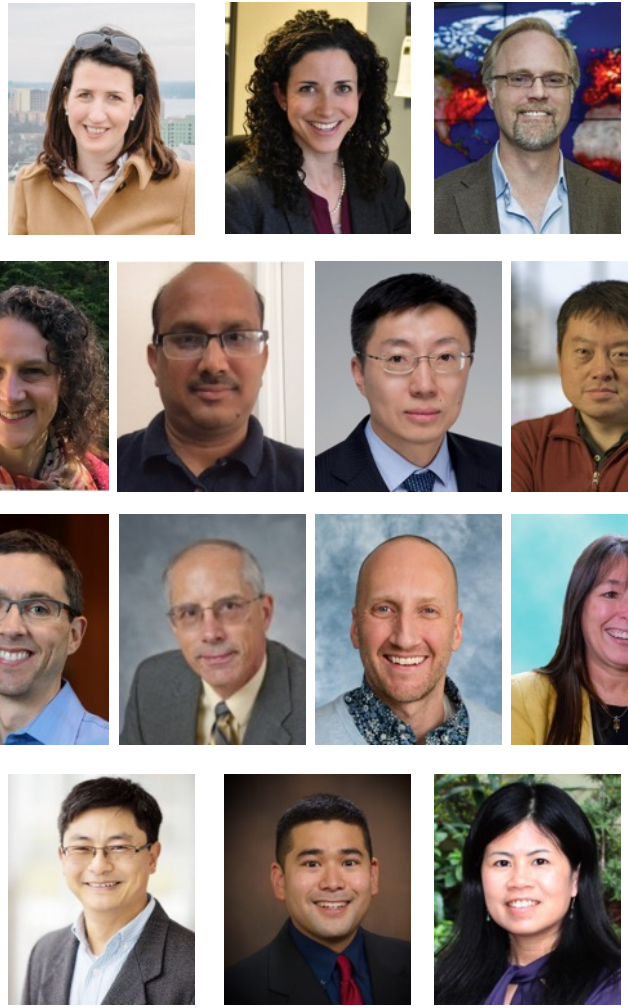
- Health and Air Quality Applied Sciences Team
- 4 year initiative through 2025
- 14 Members and 70+ co-investigators
- Mission: Connect NASA science with air quality and health applications
- ~ $12+ Million Total Cost
- Three types of work:
  - Member projects
  - Tiger team projects (collaborative)
  - Outreach, engagement, rapid response

HAQAST1:
2011-2016

HAQAST2: *2016-2020*
HAQAST3: *2021-2025*

The team structure fundamentally changes outcomes.

- Increased visibility of work and resources to end-users
- Culture to support and promote collaborations and synergies
- Growth of two-way dialogue
- Increased collaborations to meet stakeholder needs
- Rapid spin-up of high-value activities



14 NASA Health and Air Quality Applied Sciences Team Members (HAQAST)

Tracey Holloway (Team Lead, UW-Madison)
Susan Anenberg (George Washington University)
Bryan Duncan (NASA GSFC)
Arlene Fiore (Columbia University)
Pawan Gupta (Universities Space Research Association)
Yang Liu (Emory University)
Jingqiu Mao (University of Alaska, Fairbanks)
Randall Martin (Washington University)
Ted Russell (Georgia Tech)
Jeffrey Pierce (Colorado State University)
Amber Soja (National Institute of Aerospace)
Daniel Tong (George Mason University)
Christopher Uejio (Florida State University)
Qian Xiao (University of Texas Health Science Center at Houston)

haqast.org

HAQAST

HAQAST Ambassadors

NASA HAQAST continues to advance applied research and partnerships, with over 70 investigators, 100s of meeting attendees, and over 1000 email subscribers.

New “Ambassadors” program engages a high-level partners committed to advancing NASA data for societal benefit, and willing to serve as liaisons to their communities.

“NASA satellite data and training has allowed for collaboration and partnerships that … build a community of practice using satellite data for EJ applications

We are currently part of a HAQAST project that will … look at health effects of … air quality and extreme heat in the context of climate policy initiatives in the state.”

The Greening Diplomacy Initiative (GDI) … aims to leverage and integrate satellite data in Department products to provide accurate forecasting capabilities for our personnel overseas.”

“NASA’s MODIS imagery is fundamental in both the analysis and forecasts processes [for wildfires across Alaska].”

13 HAQAST Ambassadors so far represent 4 states/regions (CT, GA, NY, Western states), 3 federal agencies (EPA, Dept. of State, National Park Service); 4 non-profits (American Cancer Society, Health Effects Institute, Earth Stewards); 2 private companies (Breezometer & IQAir)

Smoke replaces ice at Lake Winnipeg.

True color image Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite, from the NASA Earth Observatory, May 2021 over Winnipeg, Canada.
Source: https://Earthobservatory.nasa.gov/images/148340/smoke-replaces-ice-at-lake-winnipeg.

The Four Things to Know about Satellite Data for Air Quality Management

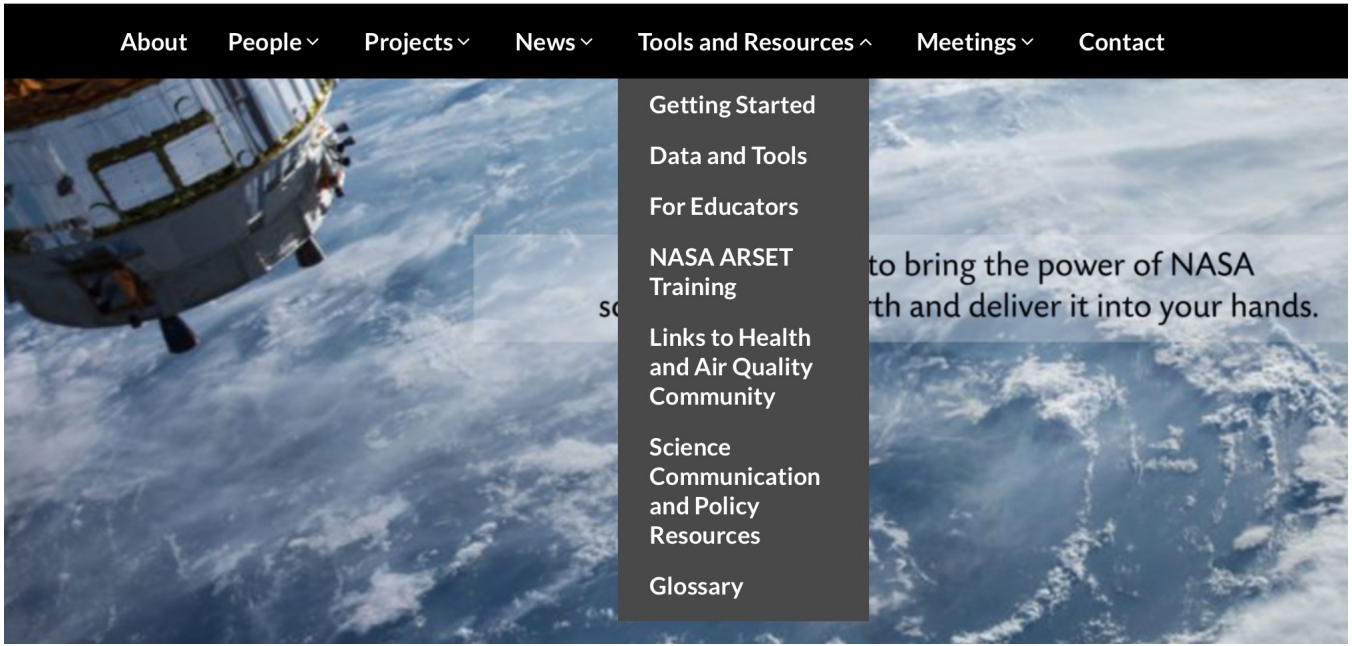
by Tracey Holloway and Jennifer Bratburd

Getting Started Is Easy

HAQAST

NASA HEALTH AND AIR QUALITY APPLIED SCIENCES TEAM

Connecting NASA Data and Tools with Health and Air Quality Stakeholders



ehp Environmental Health Perspectives

Vol. 127, No. 7 | Commentary

Making Open Science Work for Science and Society

Kevin C. Elliott and David B. Resnik

Published: 29 July 2019 | CID: 075002

The open science movement encompasses a number of initiatives [including to] **promote successful communication between experts and decision makers** so they can make effective use of scientific information (Holloway et al. 2018; Royal Society 2012).

Government agencies have also been involved in innovative efforts to help decision makers make more effective use of data and influence research projects to make them as socially relevant as possible…. **NASA has supported a Health and Air Quality Applied Sciences Team (HAQAST), which helps stakeholders make use of NASA data** to answer stakeholders' environmental health questions (Holloway et al. 2018).

HAQAST Supports Two Types of Projects: Individual & Tiger Team

NASA HEALTH AND AIR QUALITY APPLIED SCIENCES TEAM

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2021 Tiger Teams

Satellite data for environmental justice (SD4EJ)

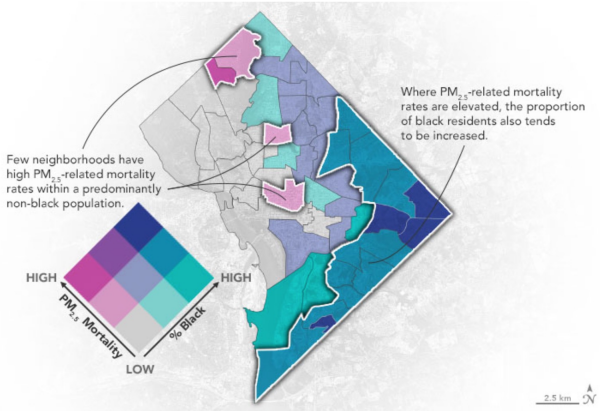
Enabling Stakeholder Access and Utilization of Data Products for Health and AQ Applications (First Steps)

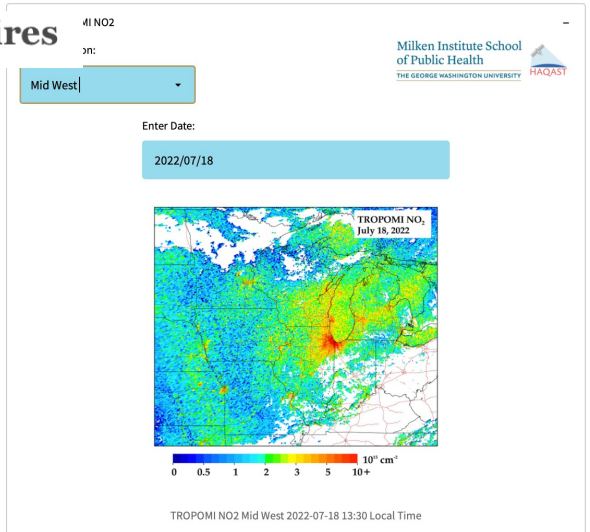
Communicating the uncertainties of satellite-based NOx emissions for urban planning

Enabling USEPA to ingest high-frequency satellite air quality data into the AirNow system

Fused earth observations to quantify health impacts from agricultural fires

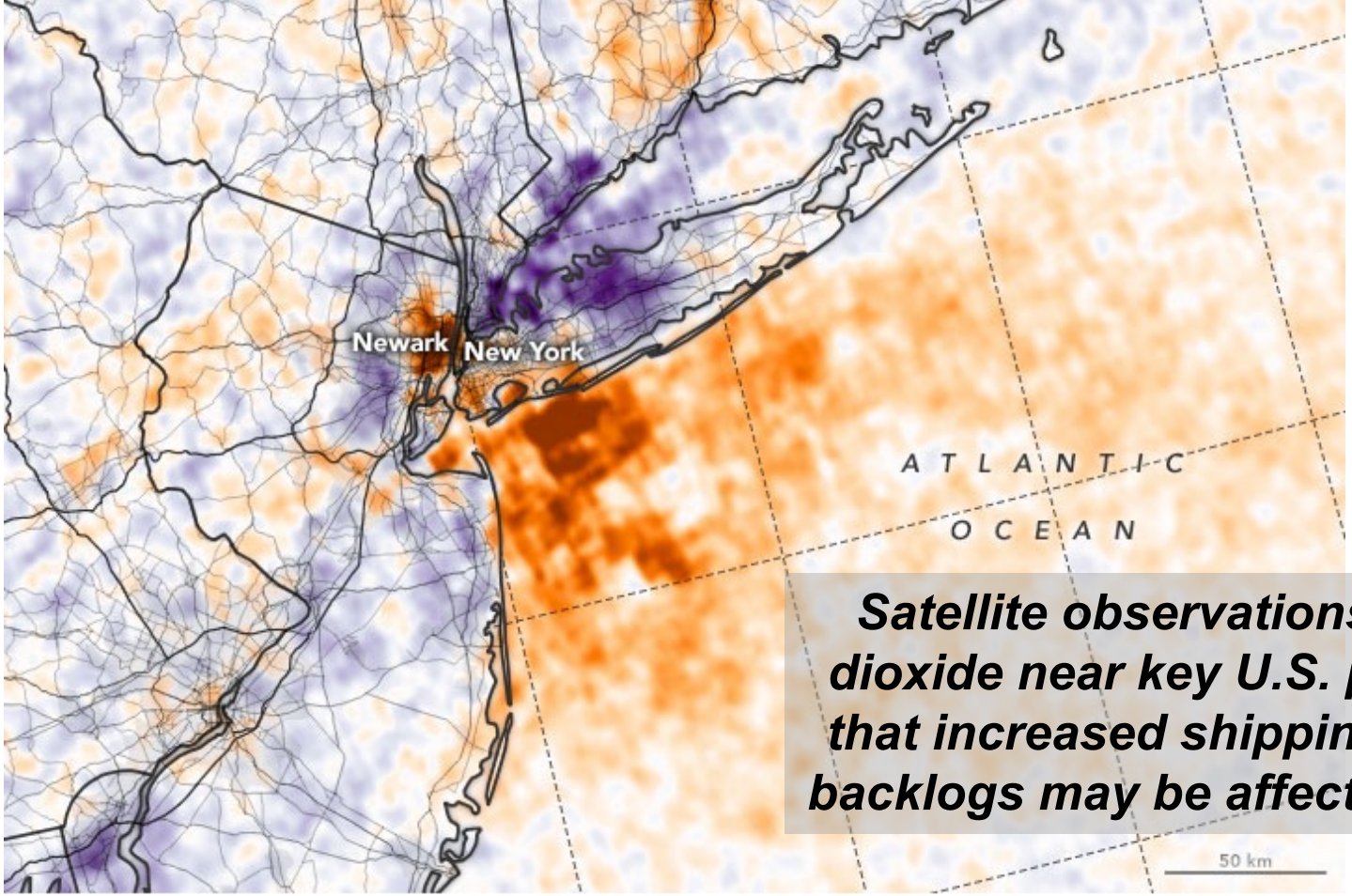
Example outputs: (left) high-resolution analysis of pollution for EJ applications; (right) new website for easy analysis of TROPOMI over the U.S.





Rapid Response Projects

- Responding to the need of smoke forecasts in Alaska: A data fusion approach with advanced deep learning algorithms
- Collaborating with the New Mexico Department of Health to Respond to Wildfires and Extreme Heat
- Distribution and pollution: Investigating the influence of warehouse-related transportation activities on NO2 and PM2.5 using satellites, models, and monitors
- And more!



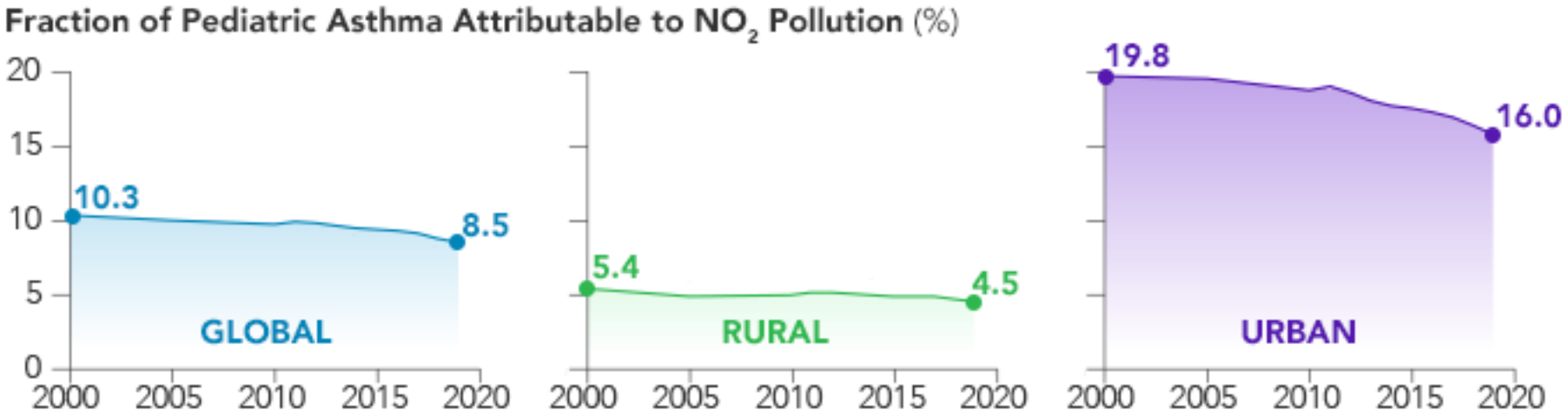
Satellite observations of nitrogen dioxide near key U.S. ports suggest that increased shipping activity and backlogs may be affecting air quality.

Change in Mean Tropospheric NO_2 Column Density, 2018-19 vs 2021 ($\mu mol/m^2$)

≤-40 0 ≥40

https://earthobservatory.nasa.gov/images/149004/scientific-questions-arrive-in-ports

A new satellite-derived global dataset links concentrations of nitrogen dioxide with cases of pediatric asthma in urban areas around the world.



Anenberg, S.C., *et al.* (2022)

Air quality experts incorporate more satellite data and customized models from NASA to better track ozone pollution around the Great Lakes.

https://earthobservatory.nasa.gov/images/150135/clearer-view-of-great-lakes-air-quality

HAQAST Wisconsin

- October 20th & 21st, 2022
- Public, hybrid meeting
- Dialogue with stakeholders & scientists

HAQAST

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