

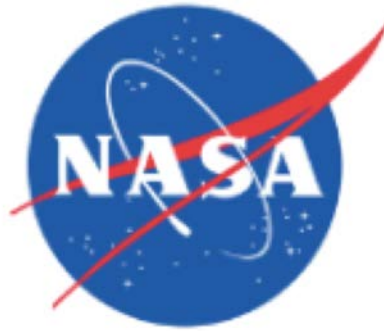


Update on the NASA Health and Air Quality Applied Sciences Team

Dr. Tracey Holloway
NASA HAQAST Team Lead

Center for Sustainability and the Global Env. (SAGE)





WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON



RAMBOLL

What is “hay-kast”?

- Health and Air Quality Applied Sciences Team
- NASA-funded Applied Sciences Team
- ~~3~~ 4-year funded project (thru summer ~~'19~~ '20)
- 13 Members and 70+ co-investigators
- Mission: Connect NASA science with air quality and health applications
- ~ \$15 Million Total Cost
- Three types of work:
 - Member projects
 - Tiger team projects (collaborative)
 - Outreach, engagement, rapid response



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



- Tracey Holloway (Team Lead, UW-Madison)
- Bryan Duncan (NASA GSFC)
- Arlene Fiore (Columbia University)
- Minghui Diao (San Jose State University)
- Daven Henze (University of Colorado, Boulder)
- Jeremy Hess (University of Washington, Seattle)
- Yang Liu (Emory University)
- Jessica Neu (NASA Jet Propulsion Laboratory)
- Susan O'Neill (USDA Forest Service)
- Ted Russell (Georgia Tech)
- Daniel Tong (George Mason University)
- Jason West (UNC-Chapel Hill)
- Mark Zondlo (Princeton University)

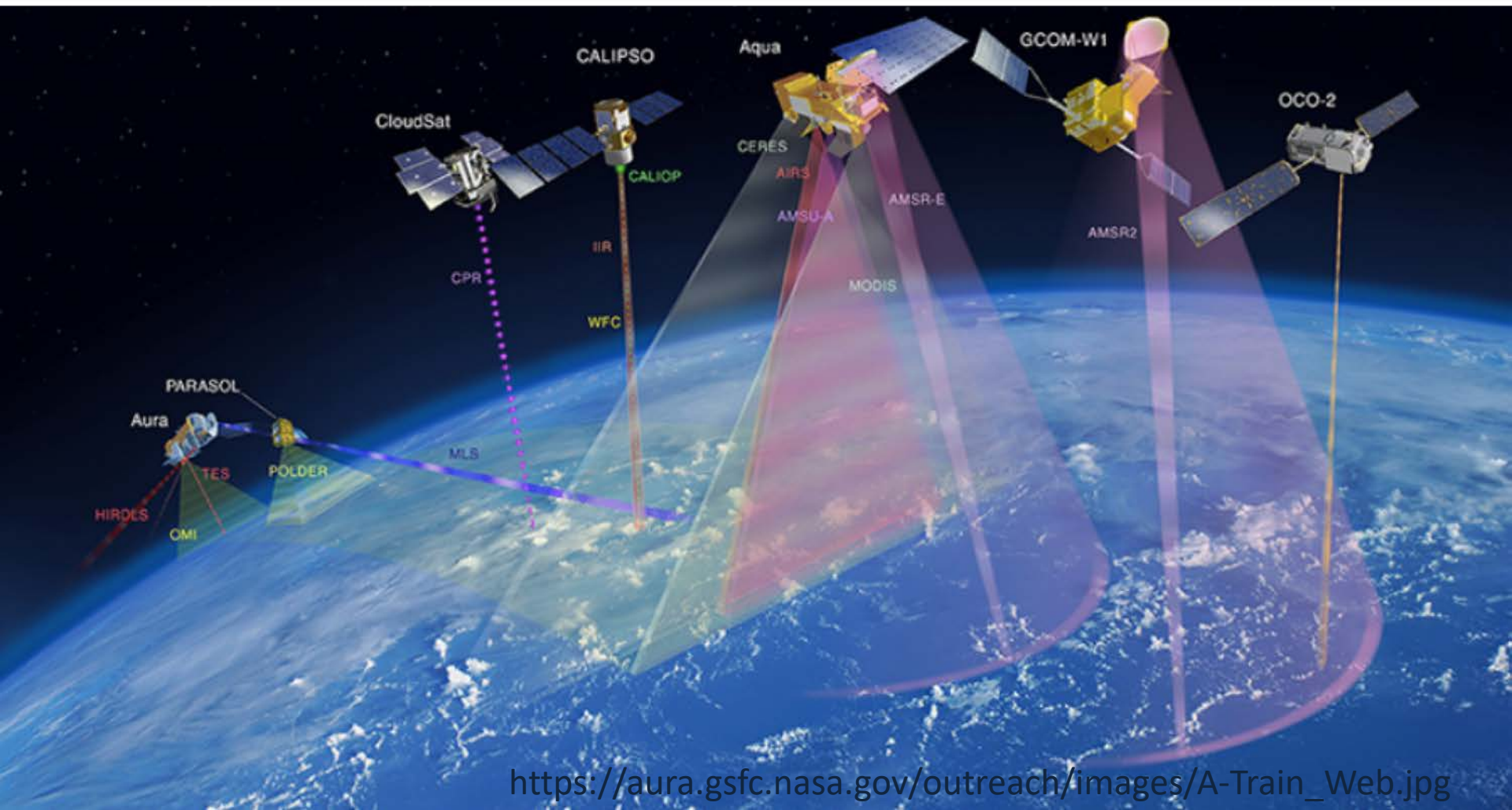
haqast.org



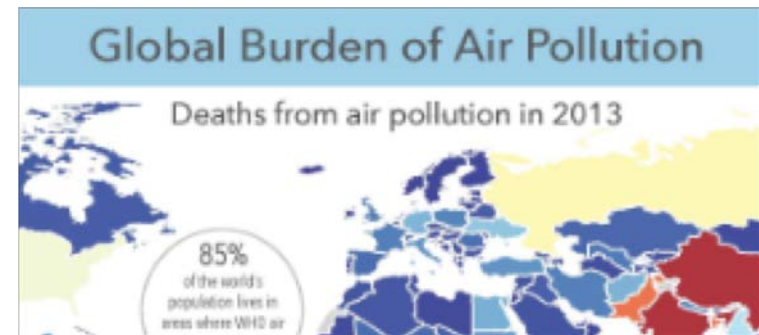


NASA HEALTH AND AIR QUALITY APPLIED SCIENCES TEAM

Connecting NASA Data and Tools with Health and Air Quality Stakeholders



https://aura.gsfc.nasa.gov/outreach/images/A-Train_Web.jpg



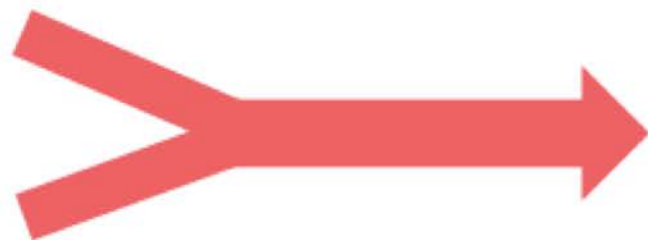
(U.S.) Air Quality Management

- Clean Air Act
- Compare w/ Monitoring
- Litigious
- Federal (especially EPA)
- States, sometimes counties
- Regulated pollutants
- Exceptional Events
- Key opportunities:
 - Model validation
 - emissions inventories
 - Trends

Public Health

- No legal framework
- Open to new data
- Research-oriented
- Global (WHO, other countries)
- Federal (CDC, NIH, EPA)
- Cities & Communities
- All pollutants of interest
- Key opportunities:
 - Population health risk
 - Connect with low cost sensors
 - Public outreach

*Research idea
(from scientist)*



*Research plan
Two-way dialog*

*Problem statement
(from stakeholder)*

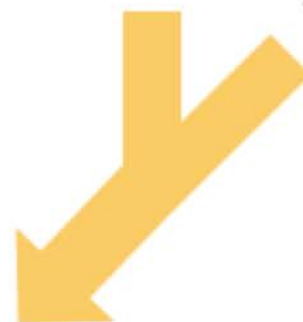


*Build Awareness,
Engagement*



*Stakeholder
Outcomes*

*Research
Publications*



*Document &
Share Success*





HAQAST Supports 2 Types of Projects: Individual & Tiger Team

Sept. 2016

Sept. 2017

Sept. 2018

Sept. 2019

Sept. 2020

13 HAQAST Members' Proposed Initiatives
with stakeholders & Co-I collaborators

Year 1 "Tiger Teams"
4 larger collaborations
Focused, stakeholder-
based, short-term

Year 2 "Tiger Teams"



HAQAST5 Progress Update, PI Holloway

Integrating Satellites into Health and Air Quality Management

- Connect OMI HCHO with EPA National Air Toxics Assessment
 - 2 papers in prep with EPA co-authors
- Supporting model evaluation with satellite data
 - Ongoing development of WHIPS & guidance docs (inc. TROPOMI)
 - 2 papers assessing CMAQ over India published
- Novel applications of satellite data
 - 1 paper published on birds + air quality
 - 3 JARS papers published: 2 on NO₂ (global cities + Kazakhstan) + 1 on HAQAST
 - 1 paper in review (diurnal NO₂)
- Leveraging HAQAST investments
 - 3 papers published on air quality & energy
 - 1 paper in review on air quality & energy
- 13+ academic talks; 7+ stakeholder or public talks; Guidance documentation on haqast.org; videos; Twitter @NASA_HAQAST; D. Miller *Physics Today* blog

Tiger Team Participation

- Co-I Brad Pierce Leading Tiger Team on Improved NO_x emissions using OMI -- Completed demonstration within the NWS air quality forecast system; presented to NOAA/NWS). Results led to an improvement in ozone prediction.
- TT Fiore: Satellite Data in SIPS. Our group extended TT mission to public health.
 - Co-I Jonathan Patz + Holloway + Student Grace Choi have conducted a series of meetings with health stakeholders
 - 1 paper in review Diao et al. review paper
- TT Fiore: Regional Haze.
 - Developing software for AOD vs. CMAQ
 - 1 paper in prep on AOD

9 papers published

3 papers in review

3 in prep



NASA HEALTH AND AIR QUALITY APPLIED SCIENCES TEAM

Connecting NASA Data and Tools with Health and Air Quality Stakeholders

Q Search

ABOUT PEOPLE ▾ PROJECTS ▾ NEWS ▾ **TOOLS AND RESOURCES ^** MEETINGS ▾ CONTACT ▾

Getting Started

Download Data

Tools

NASA ARSET
Training

AQAST 2011-2016

Links to Health and
Air Quality
Community

Glossary

Tutorials and webinars can be found here.

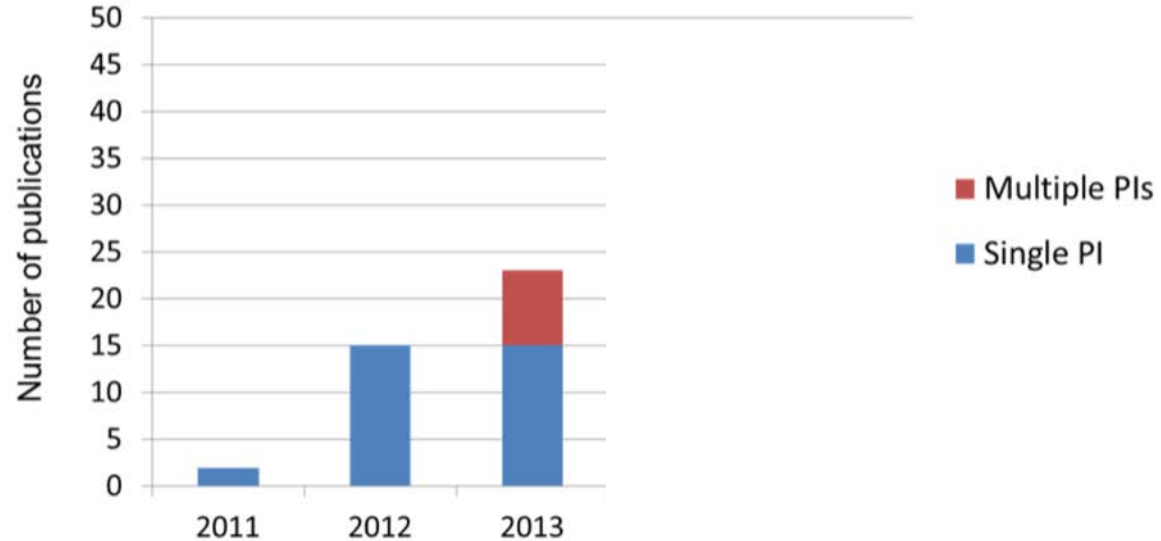
haqast.org

2018 Accomplishments & News

- Team duration → 4 years
- ~30 research publications in 2018
- 20% of papers collaborative across members
- Largest meeting yet in Madison (140 in person + 222 remote attendance)
- \$100K for stakeholder travel
- 2nd round Tiger Team process → 4 selected
- OMI SO₂ featured in EPA Air Trends Report

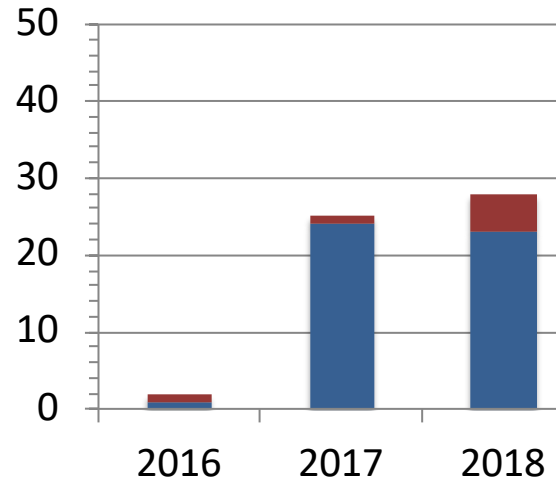
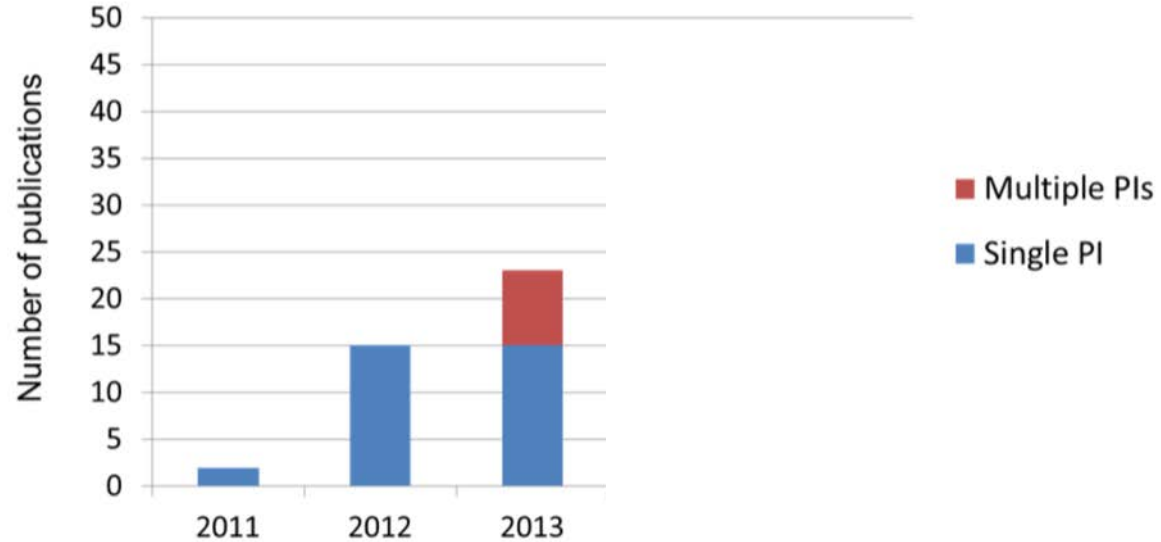


HAQAST builds on the success of AQAST (2011-2016)



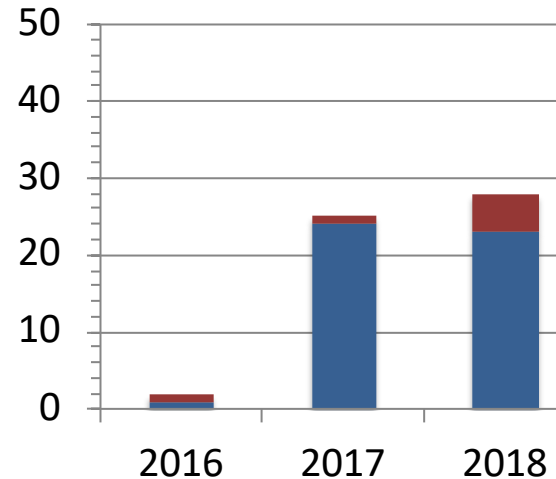
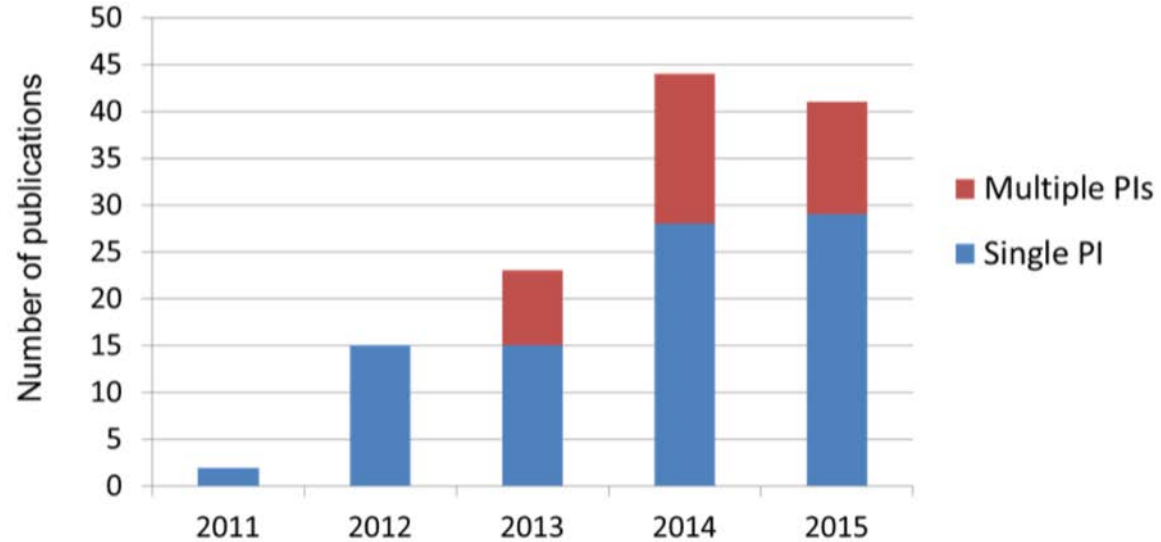
Top figure: Jacob et al., AQAST final report

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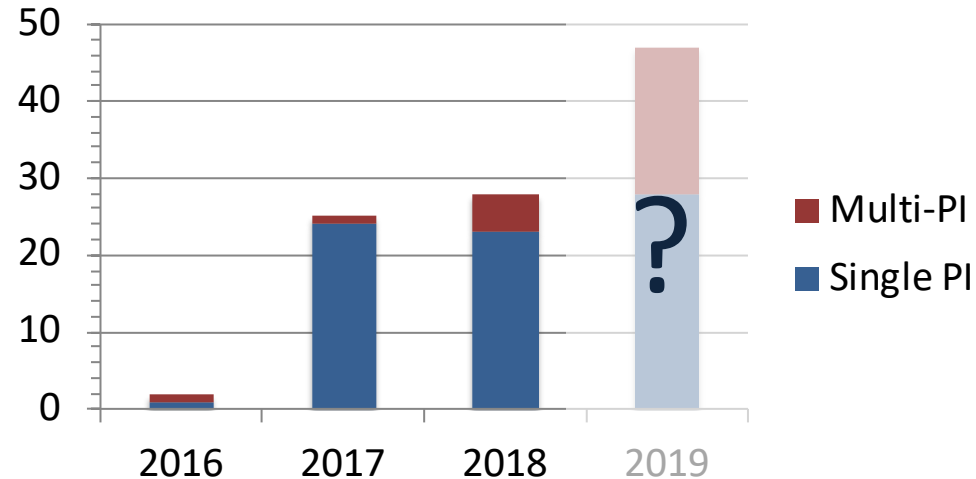
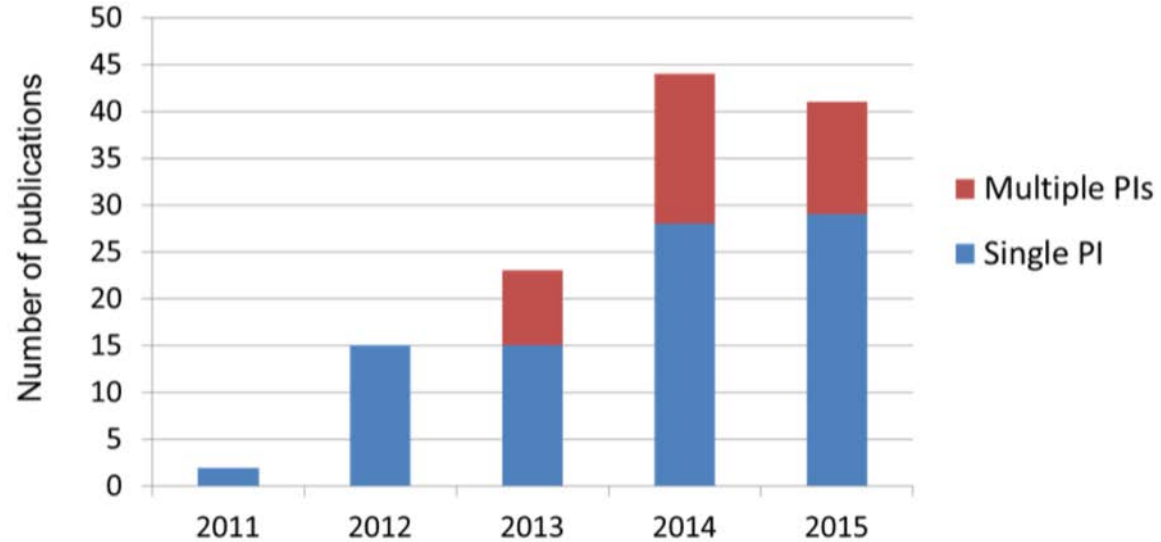
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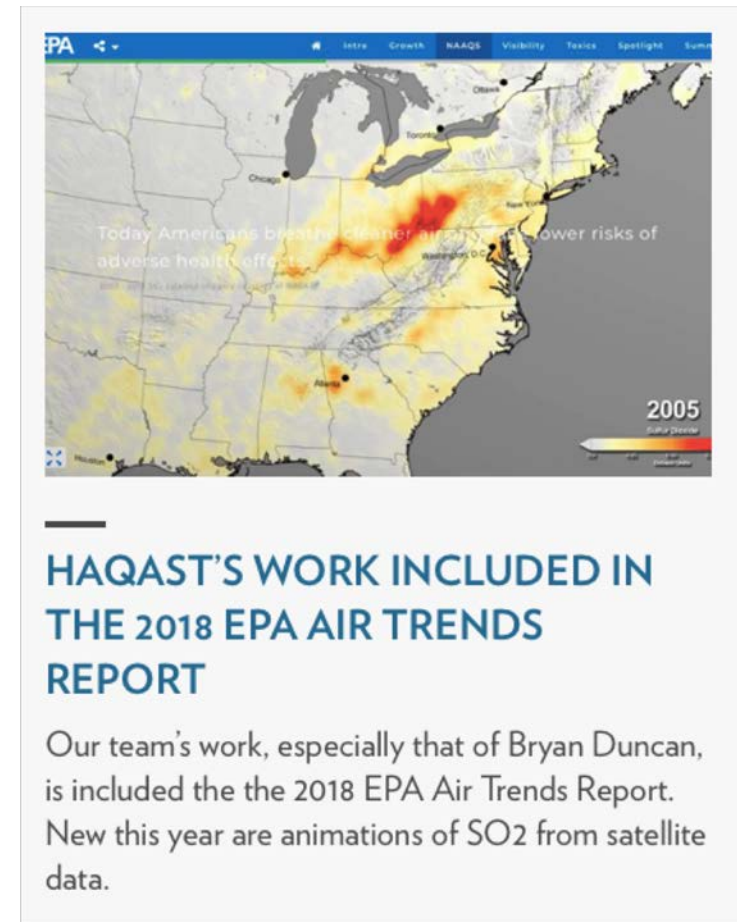
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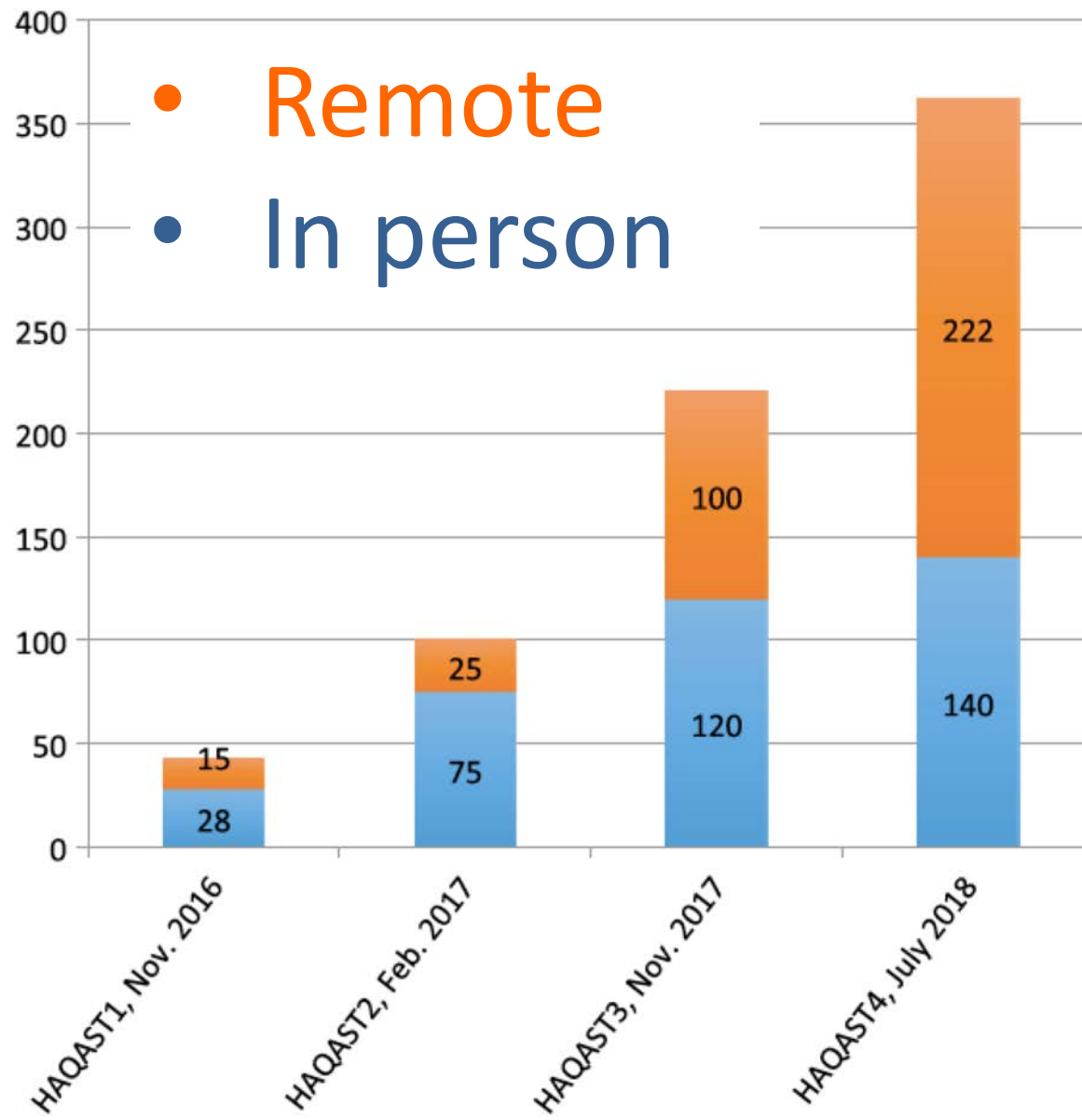


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Join in for
HAQAST5 in
Phoenix, AZ

Jan 3-4 @
ASU
Downdown

HAQAST.org
for info

Novel Meeting Format

- **Focus on two-way dialogue**; surveys after every meeting
- 1/3 of meeting time in open discussion and panel Q&A; 75% of talks 5-minute format
- **Positive response to 5-minute talk** HAQAST3: 96% = right amount of time (86%) or too little time (10%) was spent on 5-min talks. HAQAST4 meeting: 100% = right amount of time (74%) or too little time (26%) was spent on 5-min talks.
- **Networking time increased 50%**: HAQAST3 networking 36% = not enough (0% said was too much). HAQAST4 11% = “not enough” (5% = “too much”)
- **Stakeholder talks increased**: At HAQAST3, 13 stakeholder talks vs. 32 scientist; HAQAST4, vs. 29; HAQAST5, 18 vs. 29



“ I liked the format of the talks– alternating between longer 15-min talks and 5-min talks. This kept my attention throughout the event;”

“ I really like that presenters give us just enough information to get a flavor of their research and then we can follow up with them electronically (via email and links they provide) or in-person to discuss more.”

“ Most of the presentations were concise and informative. Networking, however, was the most important thing for me;”

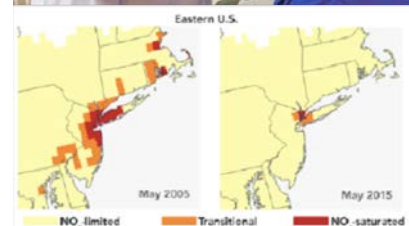
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Y1 Tiger Teams \$1.5 M

- **Led by Brad Pierce & Daniel Tong:** Improved NEI NO_x emissions using OMI Tropospheric NO₂ retrievals
- **Led by Pat Kinney:** High Resolution Particulate Matter Data for Improved Satellite-Based Assessments of Community Health
- **Led by Arlene Fiore:** Supporting the use of satellite data in State Implementation Plans (SIPs)
- **Led by Bryan Duncan & Jason West:** Demonstration of the Efficacy of Environmental Regulations in the Eastern U.S. for Health and Air Quality



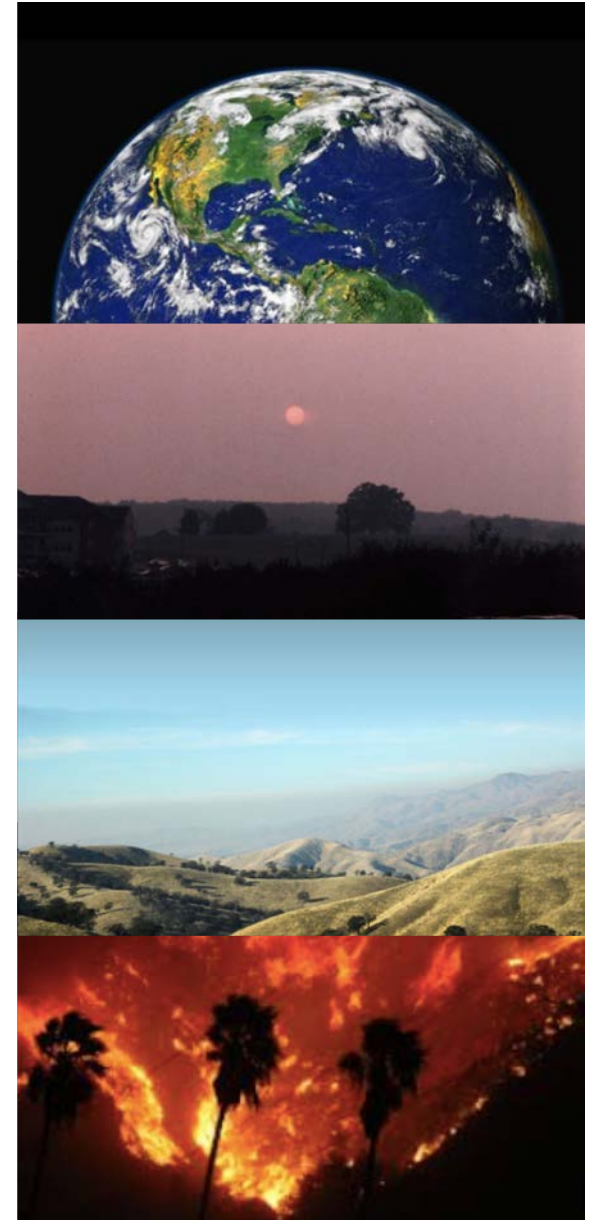
Images from
inhabit.com; rochdaleonline.co.uk; NASA;
Shutterstock

Y2 Tiger Teams

\$1.6M

- **Susan Anenberg**: Using satellite remote sensing to derive global climate and air pollution indicators
- **Arlene Fiore**: Supporting the use of satellite data in regional haze planning
- **Jessica Neu**: Satellite-evaluated and satellite-informed O_3 distributions for estimating U.S. background O_3
- **Susan O'Neill**: Air quality and health burden of 2017 California Wildfires

Images from NASA; NOAA; NASA; SCPR



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ZONDLO SHOWS HOW AGRICULTURE BREATHES

Mark Zondlo's work on the seasonal rhythm of NH₃ profiled by NASA's Image of the Day.



TONG COMMENTS ON MASSIVE DUST STORMS

Daniel Tong's commentary on the health impacts of massive dust storms in Arizona featured in Sierra magazine.



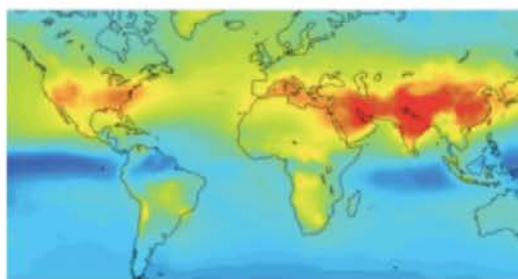
HESS'S WORK HELPS SCIENTISTS TRACK ALLERGY SEASON

Jeremy Hess's work on pollen and allergies profiled by EOS.



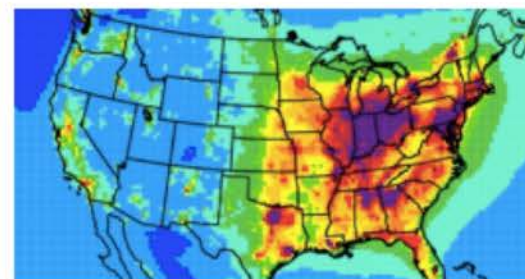
ZONDLO AND THE HAWAIIAN VOLCANOES

Mark Zondlo's work documenting the impacts of the Kilauea eruptions on air quality



ASTHMA'S GLOBAL HEALTH BURDEN

Susan Anenberg's work was recently profiled by NASA for its cutting-edge application of satellite data to asthma and global health.



HUMAN IMPACT OF CLEAN AIR POLICIES

Jason West and Susan Anenberg's work was recently profiled by NASA for their efforts to help air quality managers and policymakers solve clean air problems using NASA data and products.



NASA HAQAST

@NASA_HAQAST Follows you

NASA Health Air Quality Applied Sciences Team (HAQAST), connecting NASA science with health and air quality (2016-2019). Tweets not official NASA communication

haqast.org

Joined December 2012

Tweet to

Message

Tweets
1,991

Following
830

Followers
3,961

Likes
30

Following

Tweets

Tweets & replies

Media



NASA HAQAST @NASA_HAQAST · 18 Dec 2018

Ever wonder if you could get a better handle on your [#allergies](#)? Work from [@NASAEarth](#) HAQAST can help!

Research by Fiona Lo (working with PI Jeremy Hess) on [#socialmedia](#) for [#airquality](#) & [#publichealth](#) profiled by [@AGU_Eos](#)

bit.ly/2rJWJD6 [@UWDEOHS](#) [@theAGU](#) [@GoogleTrends](#)

Google Trends Could Help Scientists Track Allergy Season

Making the Most of HAQAST5

- Think about the big questions
 - How can NASA data be better utilized?
 - Where are the opportunities?
 - What are the barriers?
 - Priorities for the “extra” HAQAST year?
- Make a HAQAST resolution – 1 thing!
- Talk to new people
- Meet Daegan – help us tell your story!

haqast.org