Connecting NASA Data with Public Health and Air Quality

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ATMOSPHERIC AND OCEANIC SCIENCES

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

Journal of Applied Remote Sensing

HAQAST

Short history of NASA applied science teams for air quality and health

Tracey Holloway,[a,*] Daniel J. Jacob,[b] and Daegan Miller[a]

AQAST

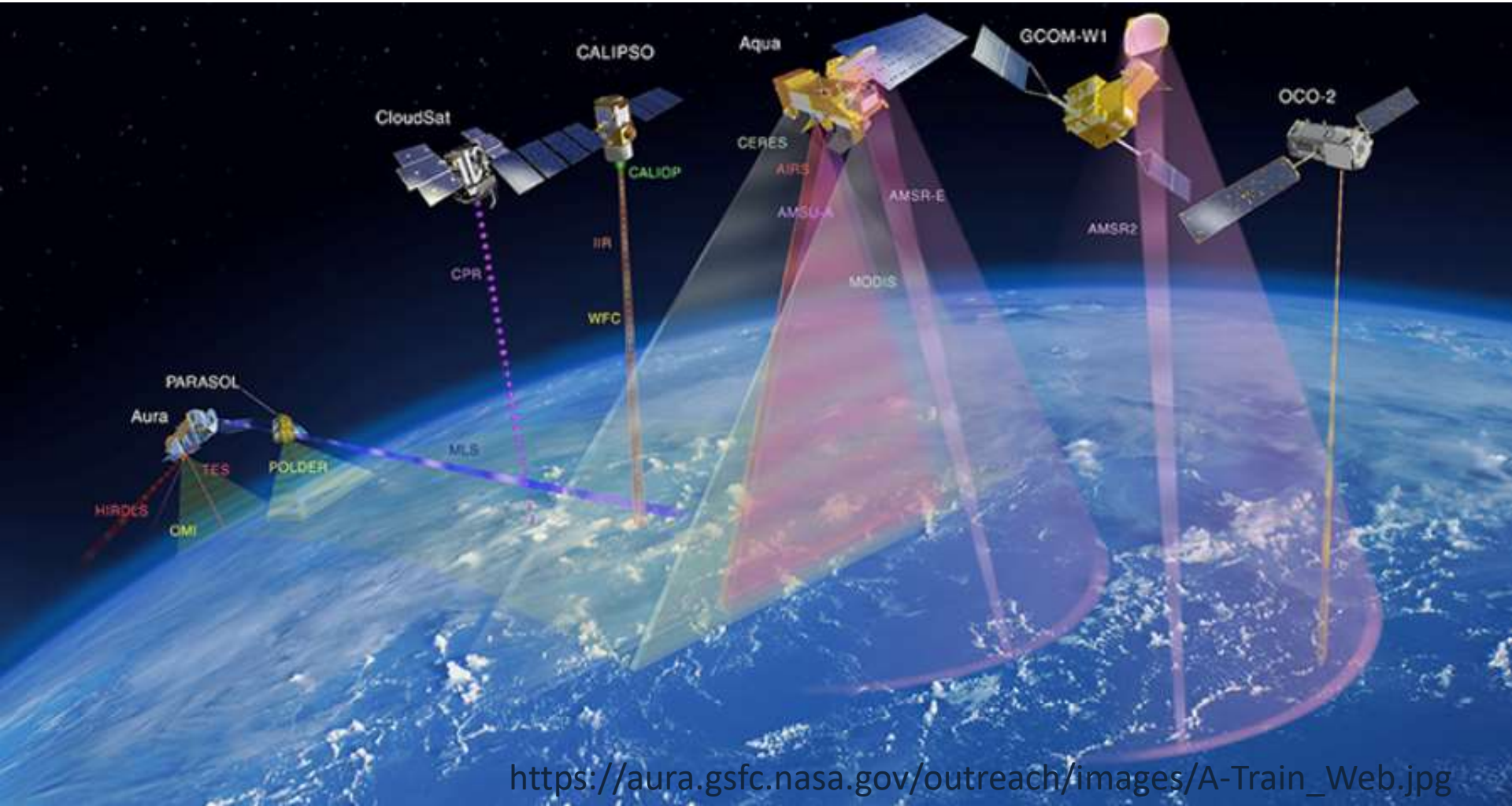
The team structure fundamentally changes outcomes.

- 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

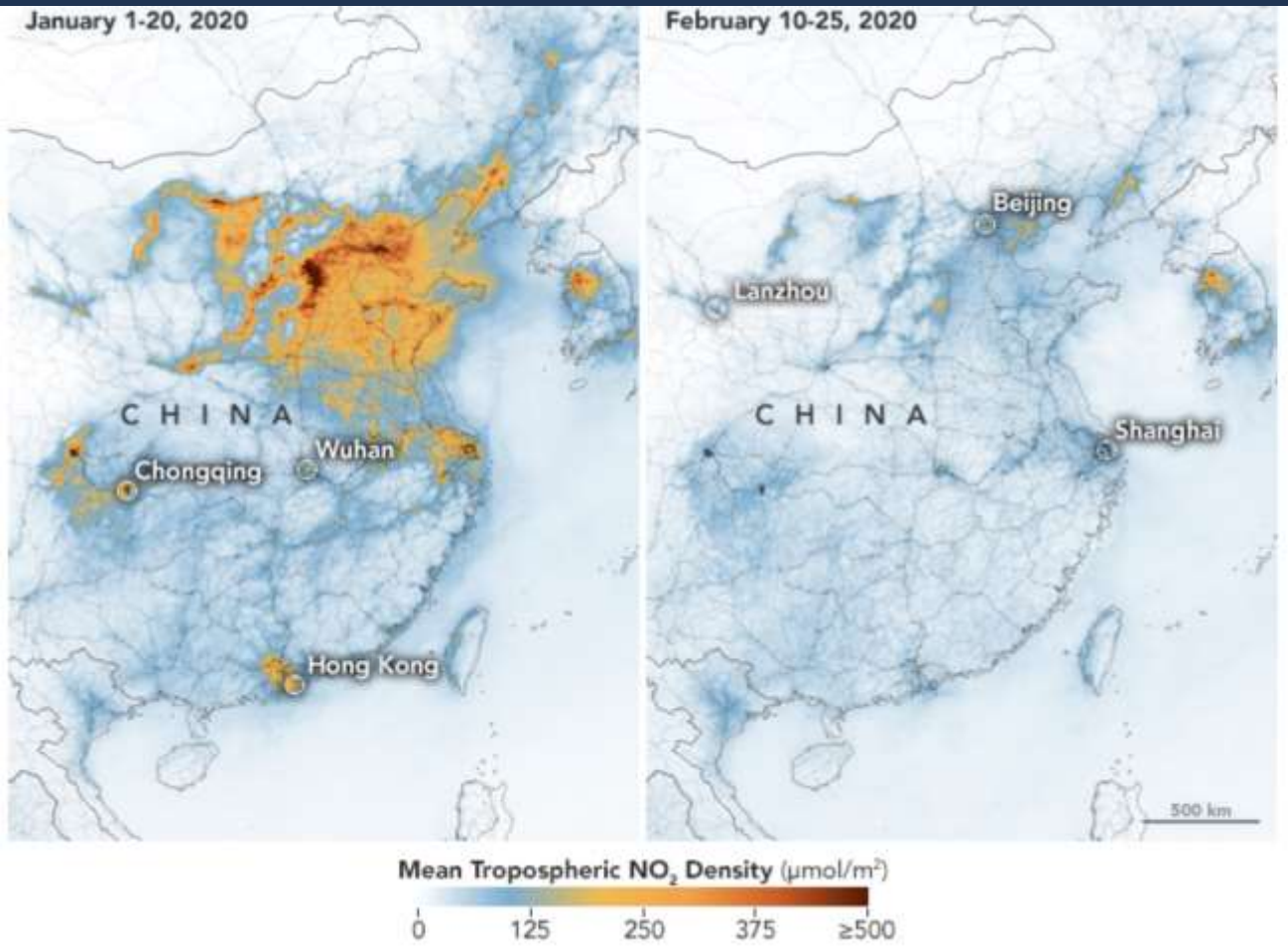
HAQAST

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



NO_2 amounts have dropped with the coronavirus quarantine, Chinese New Year, and a related economic slowdown.

Image of the Day for March 2, 2020

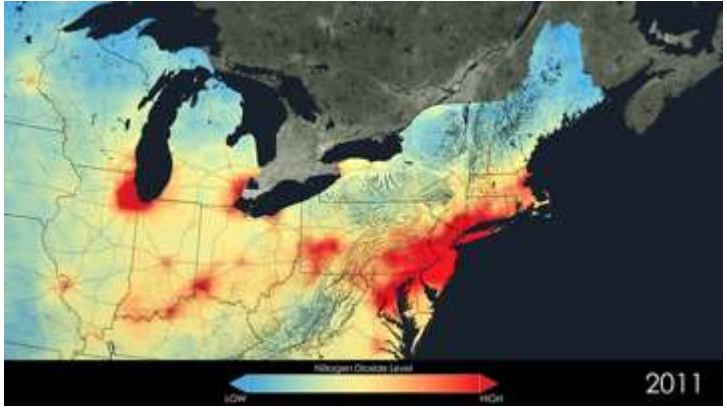
Instrument:
Sentinel-5P

NASA Earth Observatory

Potential Monitoring Site Purposes

1. To Determine Compliance with National Ambient Air Quality Standards (NAAQS)
2. To Develop Regional Pollution Trends in Urban and Rural Areas
3. To Evaluate the Effects of Population, Land Use and Transportation on Air Quality
4. To Evaluate Air Dispersion Models
5. To Provide Air Quality Information to the Public

Text from a slide of Bart Sponseller, WI DNR



Potential Monitoring Site Purposes

A Role for Remote Sensing?

1. To Determine Compliance with National Ambient Air Quality Standards (NAAQS) — **Not Now**
2. To Develop Regional Pollution Trends in Urban and Rural Areas — **Yes**
3. To Evaluate the Effects of Population, Land Use and Transportation on Air Quality — **Yes**
4. To Evaluate Air Dispersion Models — **Yes**
5. To Provide Air Quality Information to the Public — **Yes**

Adapted from a slide of Bart Sponseller, WI DNR (remote sensing added)

(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

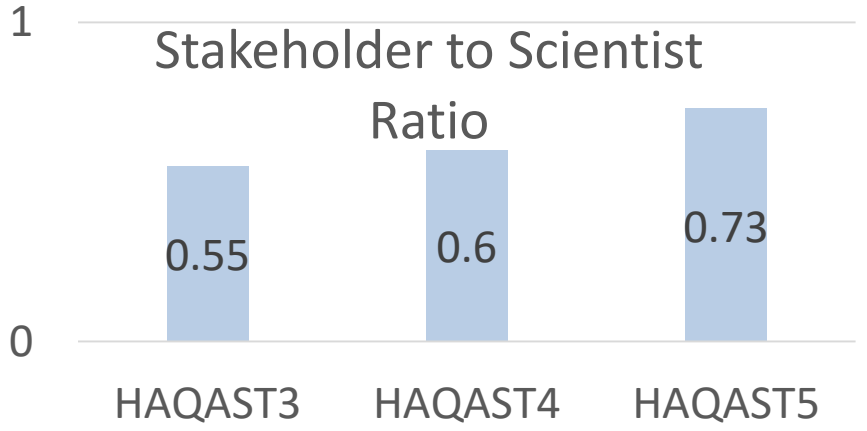
- No legal framework
- Open to new data
- Research-oriented
- Global (WHO, other countries)
- Federal (CDC, NIH, EPA)
- Cities & Communities
- All pollutants of interest
- Key opportunities:
  - Population health risk
  - Connect with low cost sensors
  - Public outreach

Designing Meetings to Engage Stakeholders

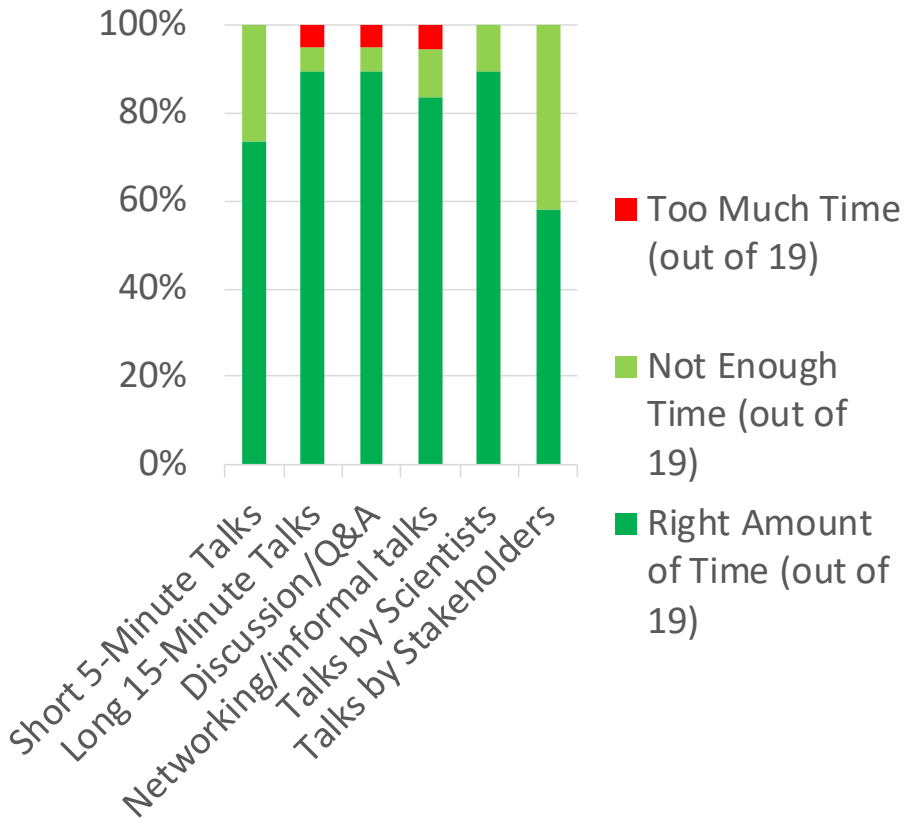
Novel format of topical panels, with 75% of all talks limited to 5-minutes, 1/3 time for Q&A

Based on past survey results, we have:

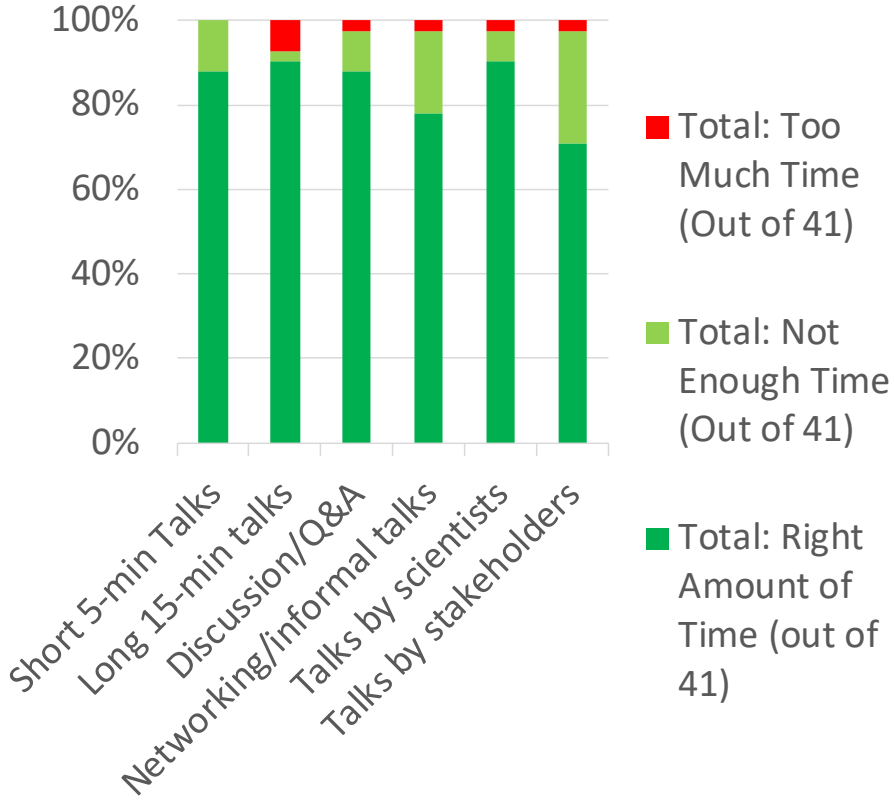
- Increased the proportion of stakeholder/scientist talks.
- Funded stakeholders to attend the meeting.
- Prioritized talks by stakeholders (every stakeholder who requests a talk is given a talk; we also solicit stakeholder talks).



High Levels of Audience Satisfaction



HAQAST4, July 2018, Madison, WI



HAQAST5, January 2019, Phoenix, AZ

“Do satellites provide ground-level PM for health exposure?”

- common question from health organizations

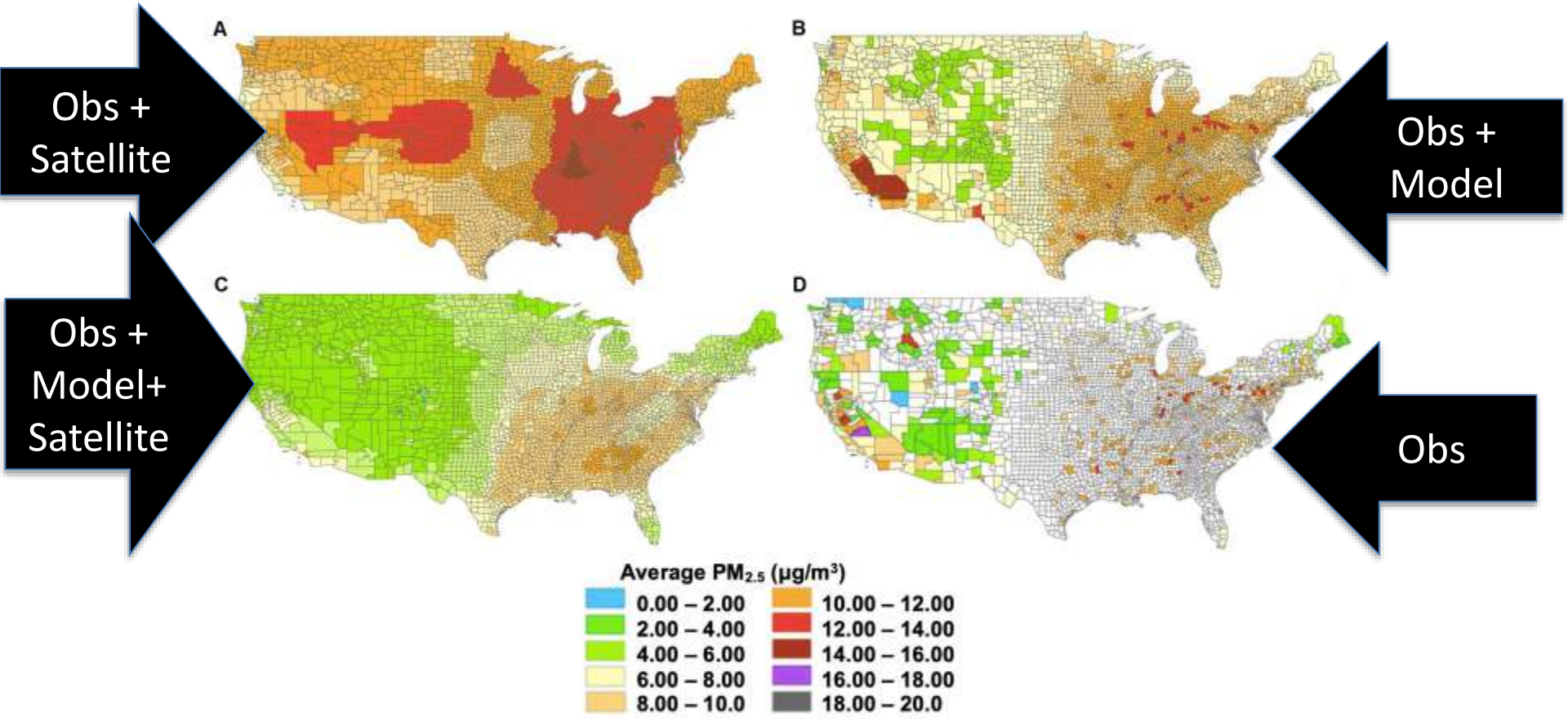
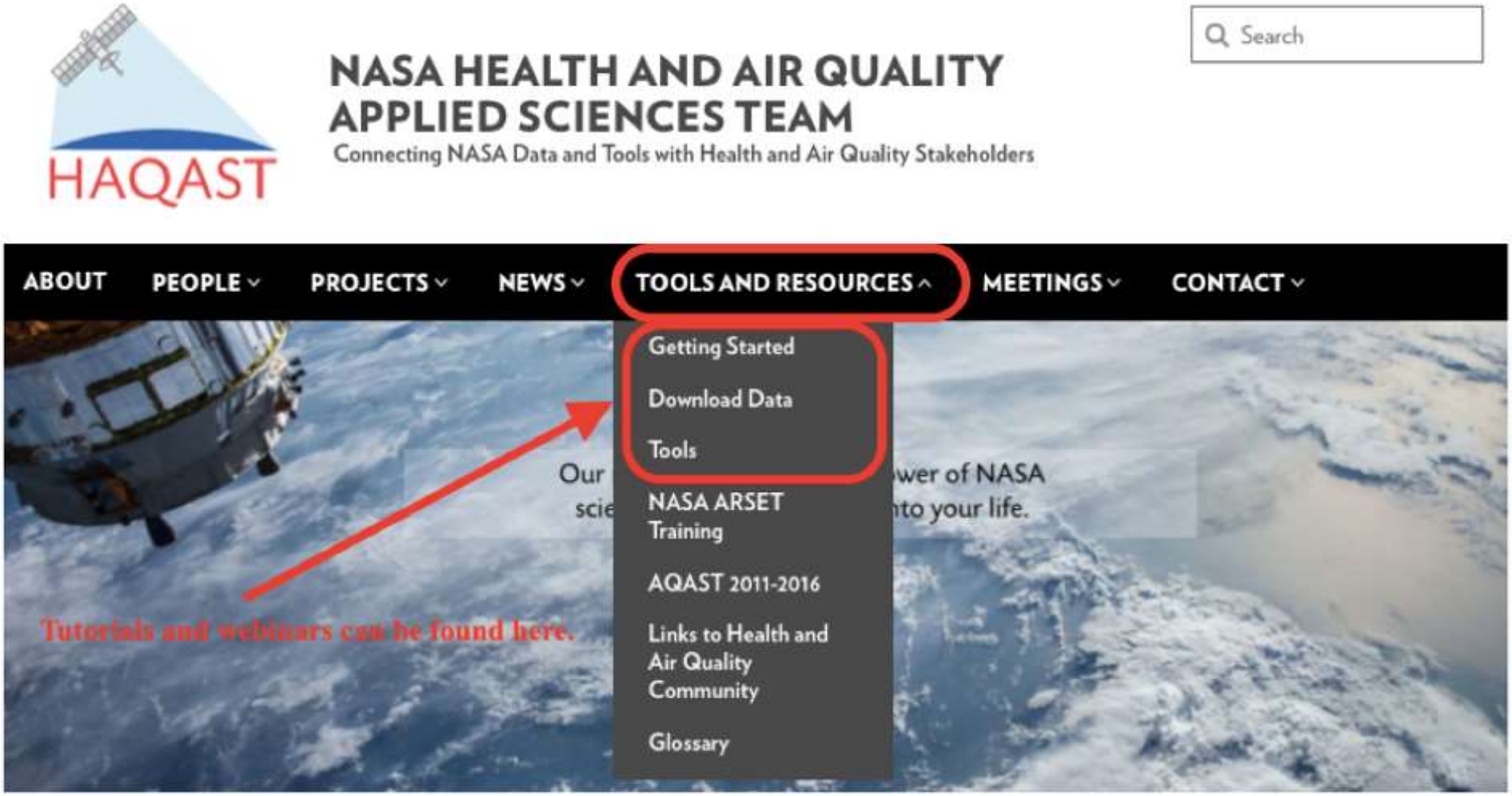


Figure 1. ArcGIS-generated county-level maps of annual mean $PM_{2.5}$ in 2011 using: (A) CDC WONDER, (B) EPHTN, (C) Dalhousie data (V4.NA.01), and (D) EPA AQS and IMPROVE fused data. White spots on the map represent "no data available".

From Grad Student Seohyun ("Grace") Choi in Diao, Holloway, et al., in review, JAWMA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