Update on NASA Air Quality Forecasts, Health Air Quality Index, etc.

Bryan Duncan & Lok Lamsal, NASA Goddard Space Flight Center
Kevin Cromar, New York University
NASA GMAO: Christoph Keller, K. Emma Knowland

July 16th, 2018; HAQAST Meeting, University of Wisconsin, Madison
New Stakeholders

Holli Ensz  
*Dept. of Interior Bureau of Ocean Energy Management (BOEM)*

Susan Alexander  
*The University of Alabama in Huntsville*

Rima Habre  
*University of Southern California*
**HAQAST TT: Demonstration of the Efficacy of Environmental Regulations in the Eastern U.S.**

**Determine Air Pollutant Trends**

- $O_3$ & Precursors ($NO_2$, $HCHO$)
- $NO_2$
- PM & Precursors ($NO_2$, $SO_2$, $NH_3$)

**Assess Health Benefits**

Morbidity & Mortality

**Stakeholders to Inform AQ Policy**

Inform the next round of policy development for the new $O_3$ standard and regional haze.

**Stakeholder Communication**

Better share AQ progress with Governor’s Offices, state & federal legislators and the general public.

Bryan Duncan & Jason West, Co-Leads
Website draft: https://airquality.gsfc.nasa.gov

- Work in progress, but comments are welcome on content.
  - Need more content on health, PM$_{2.5}$
- Ginger Butcher will address layout once content is settled.

Before and After: World Nitrogen Dioxide Levels, 2005-2016
DoI Bureau of Ocean Energy Management (BOEM) – NASA Agreement

Goal: Scope out the feasibility of using satellite data to monitor offshore/near coastal air quality.

- **Deliverable #1:** Report on the current state of satellite air quality data products over the GOM. We will work with retrieval experts to see if the retrievals over open water can be improved.
- **Deliverable #2:** A mini-campaign in the GOM in 2019 when onshore flow predominates. BOEM wants a demonstration of how satellite data correspond to surface data.

SCOAPE-related Presentations

- Don’t miss presentation by Holli Ensz (BOEM; POC)
- Posters by Debra Kollonige (NASA; Project Manager) & Anne Thompson (NASA; Co-PI)
Global Health Air Quality Index (HAQI) Forecasts

• NASA GMAO AQ forecasts are not ready for the public, but check out [https://airquality.gsfc.nasa.gov/forecast](https://airquality.gsfc.nasa.gov/forecast)

• Don’t miss Kevin Cromar’s presentation on HAQI formulation.

• Evaluation & subsequent model debugging ongoing, but lack AQ data in most world cities. Developing relationships with several partner cities:
  ○ Rio de Janeiro (received their AQ data and emissions inventory)
  ○ Jakarta (series of meetings in March; submitted collaboration proposals)

• Numerous stakeholders cannot work with AQ forecast output as is, so we put in proposal (PI Keller) to ROSES A.39: “Development of a centralized, easy-to-use data access and visualization platform for NASA GMAO air quality model output”.

• Writing global AQ forecast system description paper.
Aura Science Team Meeting
(https://aura.gsfc.nasa.gov/)

*When?* January 22-24, 2019

*Where?* Pasadena, CA

*Deadlines?* Abstracts due November 1, 2018

*Registration (free):* https://mls.jpl.nasa.gov/aura2019
A Satellite-Based Global Health Air Quality Index (HAQI): Development and Assessment

- Work with NASA GMAO (Christoph Keller, Emma Knowland) to develop and evaluate global AQ forecast system (not in original proposal; requested by stakeholder - UNICEF)
  - Evaluation & subsequent model debugging ongoing, but lack AQ data in most world cities.
  - Developing relationships with several partner cities: Rio de Janeiro (received their AQ data and emissions inventory), Jakarta (series of meetings in March; submitted collaboration proposals).
  - Numerous stakeholders cannot work with AQ forecast output as is, so we put in proposal (PI Keller) to ROSES A.39: “Development of a centralized, easy-to-use data access and visualization platform for NASA GMAO air quality model output”.
  - Writing global AQ forecast system description paper.
- Development of Health Air Quality Index (HAQI) – Kevin Cromar (Co-I; NYU)
  - Completed.
- Novel applications of satellite data
  - Working with NASA GSFC’s new Food Security Office to develop a theme on the impact of air pollution on crop yields.
- Secured Interagency Agreement with Dept. of Interior Bureau of Ocean Energy Management (BOEM)
  - Developing report on feasibility of using satellite data to monitor offshore air quality in ONG areas.
- 5 stakeholder talks; maintain AQ website (https://airquality.gsfc.nasa.gov); maintain Ozone Garden at GSFC Visitor Center – mentoring two summer interns; 4 AQ publications

Tiger Team Participation

- TT Duncan & West: Efficacy of Environmental Regulations on AQ & Health
  - Expanding & populating AQ website; updated OMI NO$_2$ & SO$_2$ animations.
  - Developing factsheets for various audiences.
  - Overview article completed.
  - Beginning final report to stakeholders.
- TT Fiore: Satellite Data in SIPS.
  - Completed tutorial on using OMI NO$_2$ for SIPS.
  - Placed 3 tutorials on AQ website under “AQ Managers” tab.
NASA Forecasts: PM$_{2.5}$ vs US Embassy Monitor
NASA Forecasts: PM$_{2.5}$ vs US Embassy Monitor
**HAQAST TT: Demonstration of the Efficacy of Environmental Regulations in the Eastern U.S.**

- **Lead HAQAST PIs:** Bryan Duncan (NASA; 80%) & Jason West (UNC; 100%)

- **AQ/Health Management Contacts**
  - Susan Wierman (MARAMA)
  - Tad Aburn (MDE)
  - John Walker (EPA)
  - Fuyuen Yip (CDC/NCEH)
  - Paul Miller (NESCAUM)
  - Anne Gobin (CT DEEP)

- **Other HAQAST Participants**
  - Mark Zondlo (Princeton U.; 60%)
  - Yang Liu (Emory U.; 40%)
  - Ted Russell (Georgia Tech; 34%)
  - Arlene Fiore (Columbia U.; 10%)
  - Daven Henze (U. Colorado; 10%)
  - Daniel Tong (George Mason U.; 5%)
  - Pat Kinney (Boston U.)
  - Susan Anenberg (George Washington U.)
  - Lok Lamsal (NASA)