

HAQ TEAM MEMBERS WIN PRESTIGIOUS NASA AWARDS

In October 2020, **John Haynes (NASA HQ)** was awarded the [NASA Exceptional Service Medal](#). This award recognized his significant performance and creative ability that demonstrated substantial improvement in space-related endeavors. Since 2004, he has led HAQ Applications as Program Manager, and he also serves as Co-Chair of the [Group on Earth Observations \(GEO\) Health Community of Practice](#) and the [GEO Earth Observations for Health Initiative](#). Notably, in 2020, his team led data collaborations and provided expertise to the NASA/ESA/JAXA [COVID-19 Earth Observing Dashboard](#), as well as supported NASA-funded researchers to address multiple facets of the COVID-19 pandemic. **Lawrence Friedl (NASA HQ)** stated, “In a year in which the entire world was undergoing the COVID-19 health crisis, John led his team to go above and beyond their usual standard of excellent to incredible new heights.”



Credits: J. Haynes

Sue Estes (U. of Alabama in Huntsville) was awarded the **NASA Exceptional Public Service Medal**. This award recognized her significant performance that demonstrated significant contributions to NASA projects, programs, and initiatives. Since 2006, she has served as Senior Associate Program Manager of HAQ Applications, managing public health projects, leading workshops and conference sessions, and contributing to the expansion of the program. Sue said, “[NASA’s Exceptional Public Service Medal] is the [greatest honor](#) I have received in my career.” **John Haynes (NASA HQ)** stated, “Sue is renowned for her expertise and logistics acumen. Her management skills have allowed the HAQ Applications Program to achieve the great successes of the past decade.”



Credits: S. Estes

NASA HAQ TEAM SUPPORTS ONE HEALTH DAY 2020

[One Health Day](#) is celebrated every November to promote the development of transdisciplinary projects that address health threats to humans, animals, and the environment. On One Health Day 2020, the NASA HAQ and Communications Teams posted a feature on the NASA Applied Sciences Program [website](#) to share success stories in three HAQ projects of multidisciplinary collaborations between scientists and community stakeholders that are fundamental to advance our understanding of environmental factors related to COVID-19. These projects included [Understanding the Spread of Infectious Diseases When the Seasons Change](#) (Ben Zaitchik, Johns Hopkins U.), [Studying the Inconsistent Effects of COVID-19 Social Distancing on Air Quality in Global Cities](#) (Susan Anenberg, George Washington U.), and [Connecting Air Quality to the Health Effects of COVID-19](#) (Pablo Méndez-Lázaro, U. of Puerto Rico Medical Sciences Campus). This web feature was promoted by the One Health Commission’s [One Health Day global events](#).

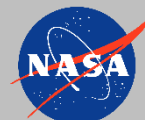
HEALTH AND AIR QUALITY APPLICATIONS APPLIED SCIENCES PROGRAM

JOHN HAYNES
PROGRAM MANAGER
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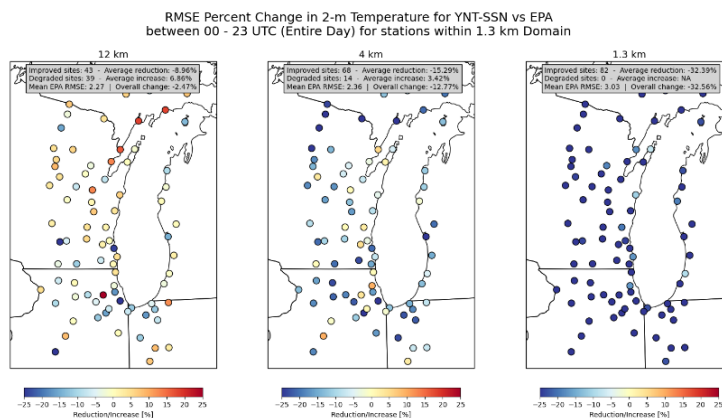
LAURA JUDD
ASSOCIATE
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QUARTERLY HAQ PROJECT HIGHLIGHT:

A SATELLITE CONSTRAINED METEOROLOGICAL MODELING PLATFORM FOR LADCO STATES SIP DEVELOPMENT

Supported through a 2017 HAQ grant, **Jason Otkin (PI)**, **Brad Pierce (U. of Wisconsin-Madison)**, and their team successfully integrated components of their satellite-constrained meteorological modeling platform into the Lake Michigan Air Directors Consortium's (LADCO) process for regional haze and ozone air quality planning. Like many other urban-coastal regions, the impact of lake/land-breeze circulations on near-surface ozone is challenging to simulate in models. Two years into the project, [GLSEA SST observations](#) and NASA SPoRT LIS datasets with incorporated soil moisture retrievals from SMAP are now utilized at LADCO. **Zac Adelman (LADCO, Executive Director)** stated, "Following the [Lake Michigan Ozone Study](#) (LMOS) field campaign in 2017, LADCO and its state partners in the region needed guidance on how to assimilate the information collected during the campaign into air quality management decisions." LMOS observations are key for demonstrating the improved accuracy of this new modeling platform. Future components to the modeling framework that are currently being tested include bias correction of CMAQ clouds using GOES-16 CLAVR-x cloud retrievals, S-NPP VIIRS green vegetation fraction, and downscaling NOx emissions using S-NPP nightlights for CMAQ.



Percentage error change in 2m temperature root mean square error (RMSE) for each station for the new model configuration (YNT-SSN) shared with LADCO relative to the baseline EPA configuration. The EPA configuration employs the Pleim-Xu LSM, Morrison 2-moment cloud microphysics, and ACM2 PBL schemes. This new configuration employs the Noah LSM, YSU PBL, and Thompson microphysics schemes, and is constrained using high-resolution GLSEA SST and NASA SPoRT LIS soil moisture/temperature analyses and analysis nudging of temperature, moisture, and horizontal winds above 2km. Credits: J. Otkin and B. Pierce

INTERAGENCY AIR QUALITY STUDIES

The [Magazine for Environmental Managers](#) (Air & Waste Management Association's monthly magazine) highlighted four interagency studies on air quality that occurred between 2017-2019. In each study, NASA and other state, federal, and private partners aimed to better understand air quality challenges in coastal environments (e.g. Jason Otkin's study, above). The four articles highlight the Long Island Sound Tropospheric Ozone Study ([LISTOS](#)), Ozone Water-Land Environmental Transition Study ([OWLETS](#)), Lake Michigan Ozone Study ([LMOS](#)), and Satellite Coastal and Oceanic Atmospheric Pollution Experiment ([SCOAPE](#)). A copy to the full issue can be accessed by [AWMA members](#) or shared by the HAQ team upon request.

RECENT WEBINARS BY NASA HAQ TEAM

The NASA HAQ Team (**John Haynes, NASA HQ; Helena Chapman, NASA HQ/BAH**) continued to bridge Earth and health science communities through national and international webinar presentations on using Earth observations for public health applications in English and Spanish.

October 2020

- ❑ [4th Space Conference of Paraguay](#) (Paraguay Space Agency): Invited talk on GEO Health CoP and EO4HEALTH in Spanish.
- ❑ [Space Health Symposium \(Australia\)](#): Invited talk on *Satellite Applications for Health Decision-Making* (45 attendees).
- ❑ [World Medical Association/Junior Doctors Network Meeting](#): Invited talk on *Bridging Earth and Health Science Communities during COVID-19 Responses* (65 attendees).
- ❑ [Instituto de Medicina Molecular João Lobo Antunes \(Portugal\)'s Out of the Box seminar series](#): Invited talk on Earth observations for health applications (75 attendees).
- ❑ [Universidad Católica del Cibao \(Dominican Republic\)'s Research seminar series](#): Invited talk on Earth observations for One Health applications in Spanish (25 attendees).



Credits: Paraguay Space Agency

November 2020

- ❑ [Maryland Public Health Association's Annual Conference 2020](#): Invited panelist for the *Planetary Health and One Health Approaches to the COVID-19 Pandemic and Beyond* session.
- ❑ [One Health Young Professional Panel Discussion \(Duke U.; U. of North Carolina; North Carolina State U.\)](#): Invited panelist to share One Health career trajectories (58 attendees).

NASA INVESTIGATOR UPDATES

- ❑ **Susan Anenberg and Dan Goldberg (George Washington U.)**: Their team presented two invited talks at the Mid Atlantic Regional Air Management Association (MARAMA) in November 2020 and the Ozone Transport Commission (OTC) in December 2020.
- ❑ **Assaf Anyamba (USRA/NASA GSFC)**: He was recently appointed to be part of an interdisciplinary Technical Advisory Team (volunteer position) to the Minister for Health (Rwanda) on the [Global Preparedness Monitoring Board](#) in November 2020. Also, his team just released a new version of their Global Chikungunya Risk Mapping and Forecasting Application ([CHIKRisk App](#)).
- ❑ **John Beck (U. of Alabama in Huntsville)**: After his team presented at the BAO Systems' 6th Annual DHIS2 Symposium in Fall 2020, DHIS2 developers (U. of Oslo) contacted his team to discuss how to incorporate this technology into DHIS2's core software. They will continue to discuss potential collaborations in early 2021.
- ❑ **Rita Colwell (U. of Maryland, College Park)**: She was awarded the [William Bowie Medal](#) at the AGU Fall Meeting 2020, in recognition of her outstanding contributions to fundamental Earth and space science research.
- ❑ **Daniel Tong (George Mason U.)**: His project was highlighted in *EOS* article, [Saving Lives by Predicting Dust Storms](#), in December 2020.

NASA HAQ TEAM HOSTS SCIENTIFIC SESSIONS AT AGU 2020

At the American Geophysical Union (AGU) Virtual Fall Meeting 2020, the NASA HAQ team coordinated an oral and poster session, *Using NASA Satellite Data to Advance Environmental Health Applications: Impact of Changing Global Ecosystems on Human Health*, moderated by **Helena Chapman (NASA HQ/BAH)** and **Laura Judd (NASA LaRC)**. With a total of 40 attendees in the live session, eight oral session topics included:



Credits: AGU

- ❑ Innovative Applications of NASA Satellite Data: An Overview of NASA Health and Air Quality Applications (**John Haynes, NASA HQ**)
- ❑ Achieving >90% Sensitivity in Forecasting Malaria Risk 12 Weeks in Advance in the Amazon (**William Pan, Duke U.**)
- ❑ Evaluating West Nile Virus Forecasts in an Endemic Region of North America: A Retrospective Model Comparison and Validation (**Michael Wimberly, U. of Oklahoma**)
- ❑ Satellite Observations of a Rift Valley Fever Interepidemic Period (**Assaf Anyamba, USRA/NASA GSFC**)
- ❑ Predictive Assessment of Transmission of Cholera (**Moiz Usmani, U. of Florida**)
- ❑ Linking Earth Observation Data and Air Quality Ground-based Stations to Analyze African Dust Impacts on Public Health in Puerto Rico (**Pablo Méndez-Lázaro, U. of Puerto Rico Medical Sciences Campus**)
- ❑ Use of Satellite Observations to Assess Multiple Airborne Exposures Experienced by Military Personnel Deployed in Southwest Asia (**Meredith Franklin, U. of Southern California**)
- ❑ Characterizing the Regional, Sectoral and Species-specific Sources of Pollution Exposure and its Associated Health Impacts in Urban Environments: Case Studies in Washington, DC and Santiago, Chile (**Muhammad Omar Nawaz, U. of Colorado-Boulder**)

L. Judd also co-organized 3 oral and 2 poster sessions, highlighting research about *Advances in a Global Observing System for Air Quality*. Highlights included preliminary results from GEMS, as well as TEMPO and MAIA applications (**Aaron Naeger, U. of Alabama in Huntsville; Abigail Nastan, Jet Propulsion Laboratory**). **Rita Colwell (U. of Maryland, College Park)** presented two talks: *Oceans, Climate, and Human Health: Lessons from Cholera for COVID-19* (AGU2020 Featured Plenary) and the *Future of Infectious Diseases: How Earth Observations can Help Predict Next Pandemics* (NASA ESD's Virtual Hyperwall). **H. Chapman** also served as an invited panelist on the GeoHealth Early Career Panel, *Navigating a Career in GeoHealth*, sharing career trajectories and providing advice for interdisciplinary research and practice in Earth and health sciences.

NASA HAQ TEAM PRESENTS AT APHA 2020

In October 2020, at the American Public Health Association (APHA) Virtual Annual Meeting & Expo 2020, **Helena Chapman (NASA HQ/BAH)** represented the HAQ Team and presented an e-poster presentation, *Integrating Satellite Data to Strengthen One Health Surveillance of Emerging Infectious Diseases*, in the APHA Veterinary Public Health Special Primary Interest Group session. This presentation described how NASA Earth-observing satellite data have been integrated into the development of risk maps for malaria and cholera.



Credits: APHA

GEO HEALTH COMMUNITY OF PRACTICE HOLDS BIWEEKLY TELECONS AND IN-PERSON MEETING AT AGU 2020



Credits: AGU

Biweekly Telecons

Since August 2020, the Group on Earth Observations (GEO) [Health Community of Practice](#) (CoP) – led by **John Haynes (NASA HQ)** and **Juli Trtanj (NOAA)** – has coordinated [biweekly community teleconferences](#) to leverage expertise across sectors and geographies and share Earth observation data and tools to support COVID-19 responses. Global experts continue to highlight the value of satellite data in environmental health applications that advance understanding of the direct and indirect impacts of COVID-19 transmission on an array of topics (e.g. air and water quality, disaster preparedness and management, environmental determinants and seasonality, One Health). As each teleconference has engaged 40 to 120 participants, new GEO Health CoP members have joined and presented their research applications to the wider community. Notably, in November 2020, **J. Haynes** and **J. Trtanj** presented the talk, *GEO Health CoP and EO4HEALTH Initiative* at the *New Space Korea 2020: Uplift* conference. In December 2020, the leads of the [Small Work Groups](#) – Heat (**Ben Zaitchik, Johns Hopkins U.**); Infectious Diseases (**Antar Jutla, U. of Florida**); Air Quality, Wildfires, and Respiratory Health (**Tatiana Loboda, U. of Maryland, College Park**); Food Security and Safety (**Dorian Janney, NASA GSFC/GPM**); and Health Care Infrastructure (**John Balbus, NIEHS; Andreas Skouloudis, iSteep.org**) – leveraged expertise with CoP members to provide scientific and technical expertise on selected health-related topics for specific project tasks, projects, and activities. Also, the Co-chairs published the article, [Small Work Groups of the GEO Health CoP](#), on the GEO Community Blog. We welcome new members to join GEO Health CoP teleconferences!

American Geophysical Union Virtual Fall Meeting 2020

In December 2020, the GEO Health CoP and the American Geophysical Union (AGU) partnered to hold the [GEO Health CoP Meeting at AGU Virtual Fall Meeting 2020](#). Presenters included experts from the GEO Secretariat Team (**Steven Ramage**), AmeriGEO (**Angelica Gutierrez**), AGU (**Mark Shimamoto**), WMO (**Joy Shumake-Guillemot**), NASA (**John Haynes**), NOAA (**Juli Trtanj**), and Rensselaer Polytechnic Institute (**Kathy Fontaine, Thilanka Munasinghe**). [Project updates](#) were provided by **Gina Tsarouchi (HR Wallingford)**, **Antarpreet Jutla (U. of Florida)**, **Tatiana Loboda (U. of Maryland, College Park)**, **John Malone and Moara Rodgers (Louisiana State U./A&M College)**, and **Ben Zaitchik (John Hopkins U.)**. [Small Work Group](#) leads offered updates on leveraging expertise with CoP members. With over 75 attendees, this meeting provided an opportunity for Earth and health scientists to describe key international projects and updates, enhance professional networks, and discuss priority focus areas that advance GEO/AGU efforts. It also allowed active engagement for the review of the GEO Health CoP Goals and Work Group activities, which support GEO efforts and further development of the GEO Earth Observations for Health initiative. To review the agenda and slide presentations, please visit the [event webpage](#).

NASA HEALTH AND AIR QUALITY APPLIED SCIENCES TEAM (HAQAST) VERSION 2.0

In December 2020, the [NASA Health and Air Quality Applied Sciences Team](#) (HAQAST) Version 2.0 was selected and includes support for 14 projects led by principal investigators. **Tracey Holloway (U. of Wisconsin, Madison)**, who led HAQAST Version 1.0 from 2016 to 2020, has been selected to lead HAQAST Version 2.0. Below is a complete list of the selected HAQAST principal investigators:

- Susan Anenberg (George Washington U.)
- Bryan Duncan (NASA Goddard Space Flight Center)
- Arlene Fiore (Columbia U.)
- Pawan Gupta (Universities Space Research Association)
- Tracey Holloway (U. of Wisconsin, Madison)
- Yang Liu (Emory U.)
- Jingqiu Mao (U. of Alaska, Fairbanks)
- Randall Martin (Washington U. in St. Louis)
- Jeffrey Pierce (Colorado State U.)
- Armistead Russell (Georgia Institute of Technology)
- Amber Soja (National Institute of Aerospace Associates)
- Daniel Tong (George Mason U.)
- Christopher Uejio (Florida State U.)
- Qian Xiao (U. of Texas Health Science Center at Houston)

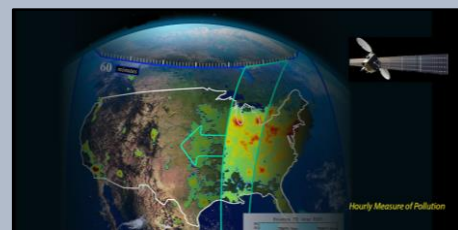


Credit: HAQAST

These project leads – along with their applied research partners, end users, and stakeholders – will work to connect NASA Earth Science data and tools to the environmental health and air quality communities. Welcome to the principal investigators for HAQAST Version 2.0!

2020 NASA TEMPO EARLY ADOPTERS VIRTUAL WORKSHOP

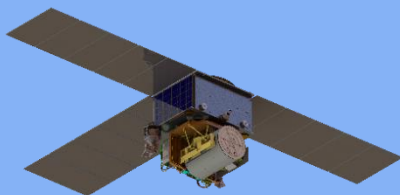
In November, NASA Applied Sciences hosted the [2020 NASA TEMPO Early Adopters Virtual Workshop](#), organized by **Aaron Naeger (U. of Alabama in Huntsville)**. Over 150 participants attended to hear updates on the TEMPO mission and Early Adopters Program, synthetic data demonstrations and product developments, and an implementation plan for experiment requests using the standard and non-standard observing time of the mission. During discussion sessions, early adopters discussed advancement in HAQ applications with TEMPO, such as emission and air pollution exposure assessments, along with critical needs from future operational products and tools to improve decision-making activities. Based on participants' input, the TEMPO Early Adopters team will develop additional synthetic products and tools, including pre-launch training material, to facilitate use of operational TEMPO data and coordinate application groups in order to strategize for the observing time of TEMPO and plan future workshops.



TEMPO. Source: [TEMPO website](#)

MAIA EARLY ADOPTERS WORKSHOP AT ISEE 2020

In November 2020, the International Society for Environmental Epidemiology (ISEE) Annual Conference 2020 supported the **Multi-Angle Imager for Aerosols (MAIA) Early Adopters Pre-conference Workshop** through a virtual webinar. This workshop, moderated by **Abigail Nastan (Jet Propulsion Laboratory)**, included presentations from **John Haynes (NASA HQ)**, **Dave Diner (Jet Propulsion Laboratory)**, **Jeff Walter (NASA Atmospheric Science Data Center)**, **Sagnik Dey (Indian Institute of Technology Delhi)**, and **Meredith Franklin (U. of Southern California)**. Please visit the ISEE's Global Education Channel to view the [webinar recording](#).



MAIA. Credits: General Atomics
Electromagnetic Systems

LOOKING AHEAD

**ROSES2021 to be released on
February 14, 2021**

Virtual Meetings:

[American Meteorological Society
Annual Meeting](#)

January 10-15, 2021

[American Mosquito Control
Association Annual Meeting](#)

March 2-5, 2021

[Association of Schools and Programs
of Public Health Annual Meeting](#)

March 23-25, 2021

[American Thoracic Society
International Conference](#)

May 14-19, 2021

[Air & Waste Management
Association's Annual Conference &
Exposition 2021](#)

June 14-17 2021

NASA

RECENT COMMUNICATIONS

- [Getting to the Heart of the \(Particulate\) Matter: NASA's MAIA to Study How Particulate Matter Air Pollution Affects Our Health](#) (Alan Buis, Jet Propulsion Laboratory)
- [20 Years of Observing Earth from the International Space Station](#) (Lara Streiff, NASA)

NASA Applied Sciences Program

- [PACE Applications Workshop Brings Together Scientists and Decision Makers](#) (Lia Poteet, U.Group)
- [Braving the Storms for Puerto Ricans' Health](#) (Pablo Méndez-Lázaro, U. of Puerto Rico Medical Sciences Campus)
- [SERVIR-Mekong Introduces New Air Quality Explorer Pollution Mapping Tool](#) (Aries Keck, U.Group)
- [2020 NASA Agency Honor Awards](#) (Aries Keck, U.Group)

NASA Earth Observatory

- [Using Space to Monitor Air Quality at the Surface](#) (Andrea Nicolau, SERVIR-Mekong Regional Science Associate)

GLOBAL HEALTH SECURITY AGENDA ANNUAL MINISTERIAL MEETING

In October 2020, the [Global Health Security Agenda Annual Ministerial Meeting](#) included the side event, [Incorporating One Health into Global Security: Educating the Public and Governments](#), moderated by Jennifer Rowland (USDA APHIS), to highlight the role of One Health in global security initiatives. In the first panel, Laura Kahn (Princeton U.), Deborah Thomson (One Health Lessons), and Olga Pena (Canadian Food Inspection Agency) discussed the importance of teaching One Health to students from K-12 and universities. In the second panel, Casey Barton Behravesh (CDC), Jane Rooney (USDA), and John Haynes (NASA HQ) described how One Health can be integrated into federal government activities and shared potential challenges. Over 75 participants attended this side event.

PAST

Webinar:

[MODIS to VIIRS Transition for Air Quality Applications](#)

October 22, 2020

Virtual Meetings:

[American Public Health Association Annual Meeting & Expo](#)

October 24-28, 2020

[NASA GPM-ACCP Transport Logistics Workshop](#)

November 2, 4, and 5, 2020

[2020 NASA TEMPO Early Adopters Workshop](#)

November 18, 2020

[11th International GEMS Workshop](#)

November 24-25, 2020

[American Geophysical Union Fall Meeting](#)

December 1-17, 2020

PUBLICATIONS

[Malaria Transmission and Spillover across the Peru–Ecuador Border: A Spatiotemporal Analysis.](#)

International Journal of Environmental Research and Public Health. (A.K. Gunderson, R.E. Kumar, C. Recalde-Coronel, L.E. Vasco, A. Valle-Campos, C.F. Mena, B.F. Zaitchik, A.G. Lescano, W.K. Pan, M.M. Janko)

[Impact of COVID-19 Containment Measures on Air Pollution in California.](#) *Aerosol and Air Quality Research.* (A.R. Naeger, K. Murphy)

[SCOAPE: Satellite and Shipboard Views of Air Quality along the Louisiana Coast.](#) *The Magazine for Environmental Managers.* (A.M. Thompson, D.E. Kollonige, R.M. Stauffer, N. Abuhassan, A.E. Kotsakis, R.J. Swap, H.E. Wecht)

[COVID-19 Lockdowns Reveal Pronounced Disparities in Nitrogen Dioxide Pollution Levels.](#) *Proceedings of the National Academy of Sciences of the United States of America.* (G.H. Kerr, D.L. Goldberg, S. Anenberg)

[Development of the Low Emissions Analysis Platform – Integrated Benefits Calculator \(LEAP-IBC\) Tool to Assess Air Quality and Climate Co-benefits: Application for Bangladesh.](#) *Environment International.* (J.C.I. Kuylenstierna, C.G. Heaps, T. Ahmed, H.W. Vallack, W.K. Hicks, M.R. Ashmore, C.S. Malley, G. Wang, E.N. Lefèvre, S.C. Anenberg, F. Lacey, D.T. Shindell, U. Bhattacharjee, D.K. Henze)

[Evaluating Sentinel-5P TROPOMI Tropospheric NO₂ Column Densities with Airborne and Pandora Spectrometers near New York City and Long Island Sound.](#) *Atmospheric Measurement Techniques.* (L.M. Judd, J.A. Al-Saadi, J.J. Szykman, L.C. Valin, S.J. Janz, M.G. Kowalewski, H.J. Eskes, J.P. Veefkind, A. Cede, M. Mueller, M. Gebetsberger, R. Swap, R.B. Pierce, C.R. Nowlan, G. González Abad, A. Nehrir, D. Williams)

[Sensitivity of Estimated NO₂-attributable Pediatric Asthma Incidence to Grid Resolution and Urbanicity.](#) *Environmental Research Letters.* (A. Mohegh, D. Goldberg, P. Achkulwisut, S.C. Anenberg)