

Engaging stakeholders to advance earth science

By Olivia Sanderfoot
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The National Aeronautics and Space Administration (NASA) does more than build telescopes and launch rockets. Earth observation is a major thrust of NASA activities, and the NASA Applied Sciences Program is dedicated to employing earth science tools to support decision-making relevant to public health and society. The Air Quality Applied Sciences Team (AQAST), launched in 2011, is a perfect example of science serving the public interest, supporting better decision-making in the air quality management community. Dr. Tracey Holloway, a professor at the University of Wisconsin–Madison, serves as the deputy leader of AQAST. One of her goals is to engage stakeholders across the United States in using satellite data to address important research questions in air quality. “I’ve always wanted to do work that directly affects the air quality community,” Holloway says, “but it’s never been hardwired into a research project until the formation of AQAST.”

From day one, Holloway has partnered with state agencies, including the Wisconsin Department of Natural Resources (DNR), to tackle tough air quality questions. Bart Sponseller, deputy administrator of the DNR’s Environmental Management Division, is a co-investigator on Holloway’s AQAST grant, along with Dr. Steve Ackerman, director of the Cooperative Institute for Meteorological Satellite Studies. With Sponseller’s support, Wisconsin has been an active partner in AQAST

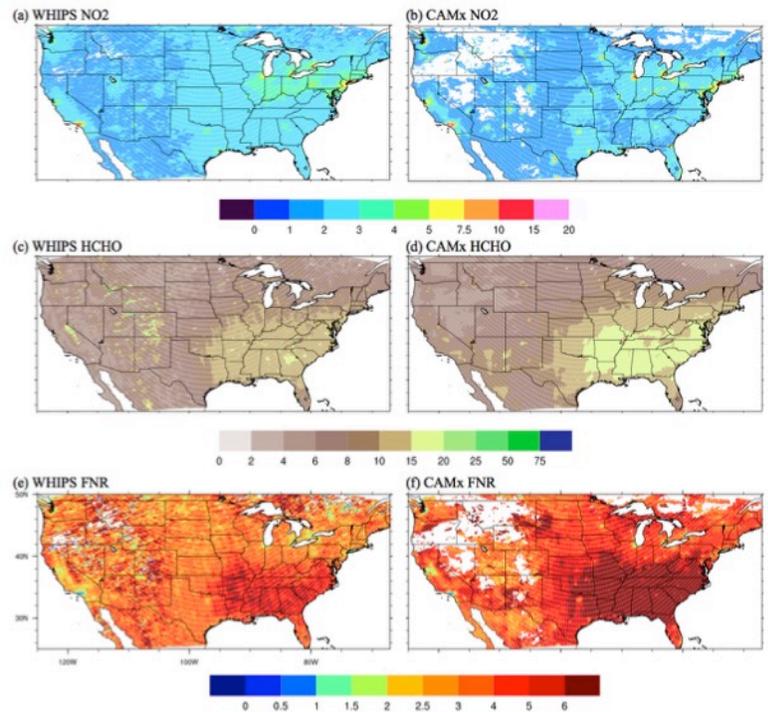


Image shows satellite data (left column) and model data (right column) over the United States during the summer of 2011. Satellite data are from the Ozone Monitoring Instrument and model data are from LADCO simulations evaluated by Holloway’s team (plots courtesy of Dr. Monica Harkey). The top row shows nitrogen dioxide (NO₂) concentrations across the U.S. While both datasets exhibit peak NO₂ values over Chicago, model data shows higher NO₂ levels than satellite data. The center row shows formaldehyde (HCHO) concentrations, which are similar in both plots. The bottom row shows the ratio of HCHO to NO₂, a powerful metric to predict ozone production sensitivity. Both data sets show that ozone is VOC-limited over Chicago.

activities, linking space-based data with issues of importance to the state.

Holloway is also working with Rob Kaleel, executive director of the Lake Michigan Air Directors Consortium (LADCO), to improve modeling of air pollution in the Midwest. LADCO is interested in modeling how changing

sector emissions, such as those from transportation or industry, impacts regional air quality. Improving understanding of the complex relationships among meteorological variables and atmospheric chemistry is an essential first step in refining these models.

Holloway's collaboration with the Wisconsin DNR and LADCO, as well as other state and federal agencies across the U.S., has driven her research activities. In fact, she believes that the working relationships she's built with these agencies are far more important than the outcomes of any specific project. "The biggest benefit has been thinking about research in a user-oriented process," she says, adding that the connections she's made with air quality managers represent a "lasting legacy of the AQAST investment."

In addition to collaborative research, Holloway has also demonstrated her commitment to community engagement through outreach. Holloway is involved in a number of external outreach projects showcasing NASA data products. In July 2014 and 2015, Holloway participated in the annual Career X-Ploration Day at the Adler Planetarium in Chicago where she hosted a booth open to museum visitors to answer questions about how NASA satellite data can be used to study air pollution. In September 2015, Holloway wrote a short article on the future of air quality in the U.S. for the Urbanization and Global Environmental Change (UGEC) Project. Her article, posted to the UGEC Viewpoints blog, examined the use of satellite data in air pollution modeling. Holloway also brought the themes of AQAST work to a broad audience of private and public

stakeholders as chair of the Wisconsin Energy Institute's annual Energy Summit in October 2015. Holloway says her primary goal for the summit was to host a national conversation on the issues that her air quality management partners have flagged as emerging priorities.



Holloway at the 2015 Career X-Ploration Day at the Adler Planetarium.
(Photo courtesy of Tracey Holloway.)



Holloway welcomes private and public stakeholders at the 2015 Energy Summit.
(Photo courtesy of the Wisconsin Energy Institute.)

Holloway's enthusiasm for engaging society in environmental science was recognized this fall by the American Association for the Advancement of Science (AAAS), which named her an

inaugural fellow of the Alan I. Leshner Leadership Institute for Public Engagement with Science for 2016-17. "I was so honored to be invited to participate in this new program," says Holloway. "To me, science and public engagement go hand-in-hand."

Dr. Tracey Holloway's work is a testament to what can be accomplished through investment in applied science. Not only does Holloway develop research projects in response to the needs of Wisconsin air quality managers, she is also passionate about engaging communities of scholars, students, and industry leaders in discussing her findings. This commitment to community engagement ensures that more people understand the ins and outs of air quality and consider the role satellite data may play in answering some of today's most pressing questions in atmospheric science.

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