

## DOE Scientists Sample the Skies

Scientists from DOE's Argonne National Laboratory (ANL), BNL, and Pacific Northwest National Laboratory (PNNL) are taking to the skies above Western Pennsylvania for one month to sample the air for aerosol pollutants and evaluate their effects on Earth's climate.

The research is part of the International Consortium for Atmospheric Research on Transport and Transformation (ICARTT) experiment, an effort by many separate institutions and government agencies to conduct a joint regional air quality and climate study of unprecedented scope. The Atmospheric Sciences Program within the Office of Biological & Environmental Research (OBER) within DOE's Office of Science is contributing about \$300,000 in funding for the study. All measurement data from DOE will be made fully and freely available to both the scientific community and the public.

"One main goal is to understand how pollutants from the Northeastern U.S. affect climate and air quality as they spread over the North Atlantic Ocean," said Peter Daum of BNL's Environmental Sciences (ES) Department, lead researcher for the BNL/DOE team. Other ICARTT collaborators include the National Atmospheric & Oceanographic Administration, the National Aeronautics and Space Administration, the University of New Hampshire, and others in Canada and Europe (see [www.al.noaa.gov/ICARTT/](http://www.al.noaa.gov/ICARTT/)).

The DOE scientists, funded and coordinated by OBER, focus on evaluating the effects of aerosol pollutants on Earth's radiation balance and climate forcing for a part of the study known as the NorthEast Aerosol eXperiment (NEAX). Team members working with Daum include: Larry Kleinman, Yin-Nan Lee, Gunnar Senum, and Jian Wang, all of BNL's ES; Judy Lloyd, State University of New York at Old Westbury; Jun Zheng, graduate student from Stony Brook University; Brian Giebel, Old Westbury undergraduate; and Wes Reid, Southampton College undergraduate. On July 20, they started conducting regional air-sampling flights from

Latrobe Airport, located about 25 miles east of Pittsburgh, Pennsylvania. They are scheduled to finish by August 15. The aircraft, a G-1 Gulfstream operated by PNNL, carries research-grade instruments developed at both BNL and PNNL. Additional ground-based instruments deployed by ANL and PNNL scientists provide complementary data.

"This large multi-agency study is a good example of how organizations with common goals can collaborate, pool resources, and accomplish something that they cannot do by themselves," said Daum.

Aerosols such as sulfur compounds result from emissions by fossil-fuel-burning power plants and other industrial sources. By themselves, and by affecting the brightness of clouds, they may increase the amount of incoming sunlight that is reflected

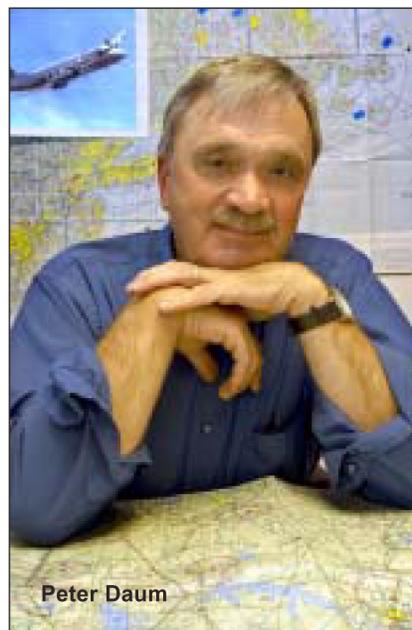
back into space, thereby exerting a partial cooling effect on Earth's climate. "But because their concentrations are highly variable and because they are removed from the atmosphere fairly quickly, it is difficult to assess these effects and the impact of aerosols on climate without collecting data in the ambient atmosphere," said Daum.

So the scientists participating in NEAX are conducting studies of aerosol formation and growth in plumes from point sources such as power plants, and in urban plumes with different characteristics. They are also conducting air-mass scale studies to see how the chemical, microphysical, and optical properties of aerosols

evolve as the air-mass ages and is transported to the east away from its sources. Ultimately, they hope to characterize how much aerosols and aerosol precursors in the Midwest contribute to the aerosol burden over the western North Atlantic Ocean.

"Lack of knowledge about how aerosols are formed and distributed in the atmosphere and how they change the properties of clouds is a key factor preventing more accurate predictions of climate change," Daum said. — Karen McNulty Walsh

*Note: The DOE scientists hosted reporter visits at the Latrobe airport on Monday, August 2. For a story, see [www.pittsburghlive.com/x/tribune-review/trib-regional/s\\_206329.html](http://www.pittsburghlive.com/x/tribune-review/trib-regional/s_206329.html).*



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