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DOE Scientists Sample the Skies

UPTON, NY — This summer, scientists from the U.S. Department of Energy's (DOE) Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), and Pacific Northwest National Laboratory (PNNL) will take 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.

"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, lead researcher for the Brookhaven/DOE team. Other ICARTT collaborators include the National Atmospheric and Oceanographic Administration (NOAA), the National Aeronautics and Space Administration (NASA), the University of New Hampshire, and others in Canada and Europe (see http://www.al.noaa.gov/ICARTT/).

The DOE scientists, funded and coordinated by the Office of Biological and Environmental Research (OBER) within DOE's Office of Science, will focus on evaluating the effects of aerosol pollutants on Earth's radiation balance and climate forcing for a portion of the study known as the NorthEast Aerosol eXperiment (NEAX). They will conduct regional air-sampling flights from Latrobe Airport, located about 25 miles east of Pittsburgh, Pennsylvania, from July 20 – August 15. The aircraft, a G-1 Gulfstream operated by PNNL, will carry research-grade instruments developed at both BNL and PNNL. Additional ground-based instruments deployed by ANL and PNNL scientists will provide complementary data.

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"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 will conduct studies of aerosol formation and growth in plumes from point sources such as power plants, and in urban plumes with different characteristics. They'll also conduct 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 regarding how aerosols are formed and distributed in the atmosphere and how they change the properties of clouds is one the key factors preventing more accurate predictions of climate change," Daum said.

In addition to $1 million for the G-1 aircraft and approximately 10 DOE-funded scientists, the Atmospheric Sciences Program within OBER 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.

NOTE: Journalists will be invited to meet the DOE scientists and tour the G-1 aircraft at Latrobe Airport on a special media day in early August. Details to follow.

Note to local editors: Peter Daum lives in Shoreham, New York.

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