



Southern Great Plains Newsletter

MARCH 2005
ANL/ER/NL-05-03

ARM HOLDS 15TH ANNUAL SCIENCE TEAM MEETING

The Atmospheric Radiation Measurement (ARM) Program held its 15th Annual Science Team Meeting on March 14–18, 2005, in Daytona Beach, Florida. Some 300 participants from 10 countries gathered to exchange findings through poster sessions and plenary group meetings.

Dr. Wanda Ferrell, ARM Program Manager, highlighted ARM accomplishments over the past year. She focused on completion of the ARM Mobile Facility, a successful infrastructure review, and the award of funding to nine new principal investigators. Other significant news was the first increase in ten years to the proposed ARM science budget. "An increase in the science budget is a reflection of the positive view that the Office of Science and the Office of Management and Budget have for the ARM Program," said Dr. Ferrell.

Dr. Tom Ackerman, outgoing ARM Chief Scientist, reviewed his six years guiding the ARM Science Team by comparing his first state-of-ARM presentation to this year's. At an evening reception, colleagues acknowledged Dr. Ackerman's contributions and recalled memorable events during his tenure. A new Chief Scientist will take the helm October 1, 2005.

The ARM Program generates an unmatched source of research data through the work of nine U.S. Department of Energy laboratories, a number of private laboratories, more than 30 universities, and 18 international collaborations. The SGP site is an outdoor laboratory that can support guest scientists and their instruments and can host intensive operational periods (IOPs) to gather focused data sets for particular research needs.

AIRCRAFT-BASED CARBON MEASUREMENTS BEGIN

Carbon, one of the most important elements on Earth, is the principal building block of all living things. The flow of carbon through the atmosphere, water and oceans, and plants and soil is among the most complex, interesting, and important of the global cycles. The global carbon cycle is an important topic for researchers because it affects the global climate system and because human activities are significantly altering the carbon cycle. Activities such as burning of fossil fuels (coal, oil, and natural gas) and changes in land use (reduction in

ACRF Southern Great Plains Newsletter is published by Argonne National Laboratory, an Office of Science laboratory operated by The University of Chicago under contract W-31-109-Eng-38 with the U.S. Department of Energy.

Technical Contact: James C. Liljegren
Phone: 630-252-9540
Email: jliljegren@anl.gov
Editor: Donna J. Holdridge

forests) produce or release carbon dioxide as a by-product. According to the U. S. Global Change Research Program (<http://www.usgcrp.gov>), carbon dioxide levels have increased by 30% since 1750.

Molecular carbon, which is abundant on Earth, is the focus of global climate change researchers who consider how Earth's climate will change when atmospheric carbon dioxide levels increase. Carbon dioxide is considered a "greenhouse gas," because it affects both the amount of incoming solar radiation Earth receives from the sun and the outgoing longwave energy (heat) radiated from Earth's surface.

The ARM Program and Lawrence Berkeley National Laboratory (LBNL) have launched a program, the ARM Carbon Project at Berkeley Lab (<http://esd.lbl.gov/ARMCarbon/>), to measure and track carbon in the environment. The Carbon Project's research goals include improving predictions of the exchange or flux of carbon, water, and energy between the atmosphere and plants, as well as developing computer models of these processes. The models will be applied at the global scale to learn more about how land use and climate are linked to the surface fluxes of the components.

Many instruments in the SGP array, especially the eddy correlation system (Figure 1), make daily carbon-specific measurements. As part of the Carbon Project, LBNL is making several complementary measurements. In a new initiative, the Carbon Project group will use aircraft-based instrumentation for carbon measurements as part of the SGP Aircraft Carbon IOP. This IOP will involve regular atmospheric carbon dioxide measurements over the SGP site, from the surface to altitudes of approximately 7 km, by instruments aboard a Cessna 206 aircraft. The IOP will extend from March 1, 2005, to December 31, 2008.

Data collected in the Aircraft Carbon IOP will be useful for calibrating the National Aeronautics and Space Administration's Orbiting Carbon Observatory (<http://oco.jpl.nasa.gov/>), a satellite scheduled for launch in 2007. The Orbiting Carbon Observatory will generate precise maps of atmospheric carbon dioxide over the globe.

The ARM Climate Research Facility (ACRF) provides an outdoor laboratory for research focusing on climate and global climate change. ACRF is funded by the Department of Energy's Office of Science.



Figure 1. One of the eddy correlation systems located at the Southern Great Plains site (ARM photo).