ARM
CLIMATE RESEARCH FACILITY

FACT SHEET

U.S. Department of Energy

Atmospheric Radiation Measurement Climate Research Facility

The Atmospheric Radiation Measurement (ARM) Climate Research Facility is a U.S. Department of Energy scientific user facility that provides the climate research community with strategically located in situ and remote sensing observatories for measuring clouds, aerosols, and other parameters that influence Earth's climate system. Scientists use these data to improve their understanding of clouds and aerosols, their interactions and coupling with Earth's surface, and how these processes are represented in climate and earth system models. This scientific infrastructure, including several highly instrumented fixed, mobile, and aerial sites, and a comprehensive data archive, is available for use by scientists worldwide.

ARM Facility Locations and Instruments

ARM's permanent research sites represent four different climatic regimes: the Southern Great Plains, the North Slope of Alaska, the Tropical Western Pacific, and the Eastern North Atlantic. Respectively, these sites address a range of climatic conditions: (1) variable midlatitude climate conditions, (2) land and land-sea-ice Arctic climate, (3) the tropical warm pool in the western Pacific Ocean, and (4) an abundance of marine boundary-layer clouds. Using a broad range of instruments, each fixed site continuously collects massive amounts of climate data that are archived and made available to the scientific community. In addition, three separate ARM Mobile Facilities are available for short-term deployments (about 1 year) at other locations, and the ARM Aerial Facility provides airborne measurements required to supplement ground-based measurements. Collectively, the permanent research sites, mobile facilities, and aerial facility are referred to as the ARM Facility.

User Information

The ARM Facility provides a broad array of instruments to study climate processes and is capable of hosting guest instruments to augment measurement capabilities. Researchers can use ARM's facilities and data in a number of ways:

- Access data gathered during normal operations or field campaigns
- Propose and conduct a field campaign
- Make an in-person or virtual visit to a site.

Costs

There is no "fee" for taking advantage of the ARM scientific infrastructure. In lieu of costs, users are expected to contribute collaborative funding for their research and to acknowledge ARM in publications as appropriate.

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Recovery Act Enhancements

Through the American Recovery and Reinvestment Act of 2009, the ARM Climate Research Facility received $60 million dollars from the U.S. Department of Energy's Office of Science to build the next-generation facility for climate change research. With these funds, ARM purchased and deployed dual-frequency scanning cloud radars to all the ARM sites, enhanced several sites with precipitation radars and energy flux measurement capabilities, and invested in new aerosol sampling and aerial instrumentation.

ARM Data Archive

The ARM Data Archive supports the scientific field experiments of the ARM Climate Research Facility by storing and distributing the multi-year collection of data obtained from observation and experiments. These data are used to study atmospheric radiation balance and cloud feedback processes, which are critical to the understanding of global climate change. The data are freely available to anyone free of charge.

As a general condition for using the ARM Facility, users are required to include their data in the ARM Data Archive. The data policy for the ARM Climate Research Facility is derived from the policies of the U.S. Global Change Research Program, which encourages free and open access to data and research results.

Conducting a Field Campaign

Any ARM operation that requires an augmentation of routine data acquisition at a site, even for a short period of time, is designated a field campaign. For example, the support of guest instrumentation at a research site is considered a field campaign. At the other end of the scale, a major field experiment might include ships or aircraft activities at or near a research site, requiring extensive planning of a year or more.

A field campaign can originate with any scientist proposing research directly related to the ARM Climate Research Facility's scientific mission. Proposals for using the ARM Facility are reviewed based on scientific merit, feasibility, and associated costs. While ARM does not provide direct funding for scientific research, small amounts of funding may be provided to allow the ARM Facility to assist with logistics, the development of datastreams and archiving, and other infrastructure activities associated with using the ARM Facility.

Scientists are encouraged to submit proposals for field campaigns of any size and scope using the Field Campaign Preproposal form. For information and guidelines about proposing a field campaign, see the Campaigns web page at ***http://www.arm.gov/campaigns***.

Example of an ARM Field Campaign

From July 2012 to June 2013, the ARM Mobile Facility is operating at Cape Cod National Seashore for the Two-Column Aerosol Project (TCAP). Cape Cod's unique geography makes it an ideal location to measure cloud and aerosol properties as air moves between North America and the Atlantic Ocean. Continuous measurements by the mobile facility were supplemented by research flights in July 2012 and February 2013 to gather data from two atmospheric "columns:" one above the mobile facility and another above the ocean, about 155 miles from the coast. Scientists will use data from the TCAP campaign to compare the impacts of aerosols during summer and winter, during polluted and clean times, and in different weather conditions.

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