

## Visiting Scientists and Researchers

Proposals for use of the fixed and mobile ACRF sites are welcome from all members of the scientific community. The ACRF is an ideal platform on which to develop and test new instrumental approaches. Activities conducted by ACRF users may include a visit to one of the research sites for informational or educational purposes; an effort to test or validate new instruments; a short-duration period of data acquisition or a longer, more permanent type of data acquisition effort. Scientists and educators wishing to visit an ACRF site can submit an application at any time by completing the appropriate site visit request form from the ARM website: [www.arm.gov](http://www.arm.gov).

Users who wish to participate in or initiate a field campaign at an ACRF site should submit a request application (available from the ARM website). Proposals will be reviewed by the ACRF Science Board and ranked based on the scientific objective of the research, the requested resources, and the impact on ongoing site operations. If extensive support coordination is anticipated, applications should be received at least one year in advance of the anticipated start date. While the ACRF does not provide direct funding for scientific research, small amounts of funding may be provided to allow the facility to assist with logistics, the development of datastreams and archiving, and other infrastructure activities associated with using the facility.

## ARM Data Archive and User Reporting Requirements

A significant attribute of the ARM Program is the large multi-year collection of ARM data that is stored and accessible to users. Resources for the storage and distribution of data by the Archive can be made available to ACRF users. As a general condition for use of the facilities, users are required to include their data in the ARM Archive. The data policy for the ACRF program is derived from the policies of the U.S. Global Change Research Program, which encourages "free and open" access to data and research results.

## Example of an ACRF Project

An example of an ACRF project is the Cloud and Land Surface Interaction Campaign (CLASIC) to be conducted at the SGP field measurement site during the summer of 2007. The purpose of this study is to advance the understanding of how land surface processes influence cumulus convection. Continental cumulus convection is strongly modulated by land surface conditions, while at the same time influencing the land



surface itself through rain-induced changes in soil moisture and through its impact on photosynthesis. This project will cover a period of 1-3 months and will straddle the winter wheat harvest when large changes in the land surface lead to large changes in the surface albedo, latent heat flux, and sensible heat flux. The results of this research will lead to improved representation of cloud and land surface feedbacks in climate models. This project will also enhance ACRF capabilities by expanding into cross-disciplinary research with enhanced inter-agency cooperation. The Climate Change Science Program has designed the campaign as the core of the near term focus area for its Interagency Water Cycle Working Group.

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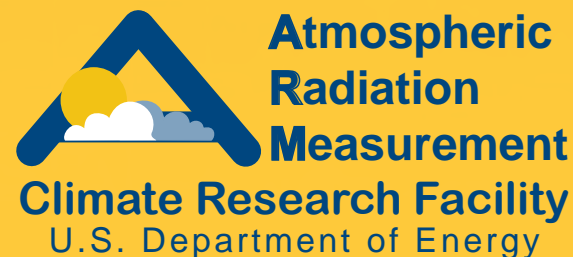
##### ACRF User Requests

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Atmospheric Radiation Measurement Program

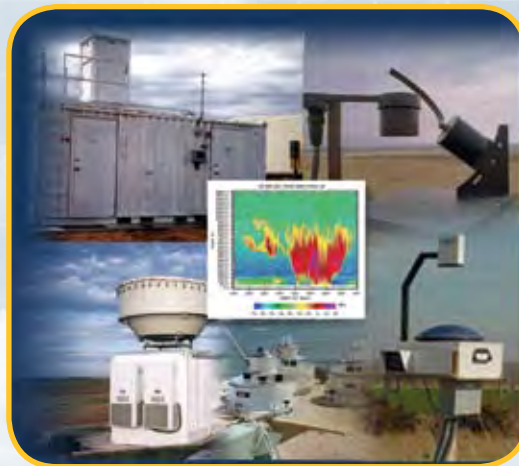
# ARM Climate Research Facility (ACRF)

## About ACRF

The U.S. Department of Energy (DOE) established the Atmospheric Radiation Measurement (ARM) Program in 1989. The ARM Program has supported a combination of field measurements and modeling studies designed to improve the representation of clouds in understanding and predicting changes in the earth's climate. Through the ARM Program, the DOE has funded the development of several highly instrumented ground stations for studying cloud formation processes and their influence on radiative transfer, and for measuring other parameters that determine the radiative properties of the atmosphere. These capabilities complement atmospheric observations made by satellites via other research programs. The scientific infrastructure created as part of the ARM Program is a valuable national and international asset for advancing scientific knowledge of earth systems. To provide more research capability for the global scientific community, the ARM Program sites are now available for use by scientists worldwide. The resulting new ARM Climate Research Facility (ACRF) has enormous potential to contribute to a wide range of interdisciplinary science in areas such as hydrology, ecology, and weather forecasting to name only a few. The ACRF Science Board serves as an independent science review body and makes recommendations on use of the ACRF for scientific research.

## ACRF Locations and Instruments

ACRF's permanent research sites represent three different climatic regimes: the Southern Great Plains (SGP), the North Slope of Alaska (NSA), and the Tropical Western Pacific (TWP) Ocean. Respectively, these sites address a range of climatic conditions: (1) variable mid-latitude climate conditions, (2) land and land-sea-ice arctic climate, and (3) the tropical warm pool in the western Pacific Ocean. In addition, the ARM Mobile Facility (AMF) is available for short-term deployment (about 1 year) at sites determined by the ACRF Science Board. Details on instrumentation and locations can be found on the ARM website at [www.arm.gov](http://www.arm.gov).



Examples of ARM instrumentation and data

## Southern Great Plains

The SGP field measurement site is a series of in situ and remote-sensing instrument clusters arrayed across approximately 143,000 square kilometers (55,000 square miles) in north-central Oklahoma and south-central Kansas. The ARM SGP site is the largest and most extensive climate research field site in the world and can be viewed as a real observatory. The site includes a Central Facility with extensive core instrumentation. Routinely operating instruments at the Central Facility include one of the few continuously operated Raman Lidars in existence, a millimeter-wavelength cloud radar, a microwave radiometer, and multiple radar wind profilers. Additional subsets of instrumentation are situated at more than 30 locations distributed across the SGP site. In addition to the study of clouds and radiation, scientific activity ongoing at the SGP site includes studies of the carbon, water and energy cycles at the landscape scale and research on boundary layer meteorology. Because the SGP facility contains one of the largest collection of ground-based remote sensors and continuous measurements for atmospheric research in the world, it is an ideal site for major collaborative field projects.

## North Slope of Alaska

The NSA site is providing data about cloud and radiative processes at high latitudes. These data are being used to understand cloud processes in the Arctic and to refine models and parameterizations as they relate to arctic climate. The facility

consists of a primary site at Barrow, Alaska, which includes a subset of the instruments at the SGP Central Facility; and a second, but more sparsely instrumented site at Atkasuk, 100 km inland from Barrow.

## Tropical Western Pacific

The TWP site includes an area at the equator near Indonesia. This region of the world plays a large role in the interannual variability observed in the global climate system. For instance, the El Niño/Southern Oscillation phenomenon has far reaching implications for weather patterns over much of the Northern Hemisphere, and perhaps the entire planet. The TWP consistently has the warmest sea surface temperatures on the planet and is referred to as the Pacific "warm pool." The warm pool supplies heat and moisture to the atmosphere above it, resulting in the formation of deep convective cloud systems, which in turn, produce high-altitude cirrus clouds that spread out over much of the region. The TWP facility is composed of sites at Manus Island in Papua New Guinea, the island Republic of Nauru, and Darwin, Australia. Data are transmitted continuously from each site by satellite relay for distribution and archival.

## ARM Mobile Facility

The AMF is a new capability first deployed in 2005. AMF instrumentation is similar to that at permanent ARM sites. The AMF is available for deployments in different climate regimes lasting up to a year. Proposed deployment sites will be recommended by the ACRF Science Board based on an evaluation of the scientific and collaborative opportunities as well as projected demands on available resources.

