

Facts

Purpose

As a scientific user facility, the ARM Climate Research Facility (ACRF) is a unique asset for the study of global change research to a broader research community. Research at the ACRF includes, but is not limited to, the study of alterations in climate, land productivity, oceans or other water resources, atmospheric chemistry, and ecological systems that may alter the capacity of the Earth to sustain life.

Sponsor

The U.S. Department of Energy's Office of Science

Participants

Eight national laboratories and numerous government agencies, universities, private companies and foreign organizations participate in the ARM Program and ACRF. Each entity serves a vital role in managing and conducting the research, operations, and administration of the science program and user facility.

Features

- Three primary ACRF locations representing a range of climate conditions—Southern Great Plains, Tropical Western Pacific, and North Slope of Alaska—are in place and heavily instrumented to gather massive amounts of climate data.
- An ARM Mobile Facility (AMF) provides a flexible instrument platform for conducting atmospheric experiments from 6 to 12 months in any environment, from the cold of the Arctic to the heat of the tropics.
- As an integral component of the ACRF, the ARM Aerial Facility (AAF) provides key climate measurements using aerial platforms designed to contribute to the fundamental understanding of clouds, aerosols, and radiation.
- Serving nearly 4000 registered users from 13 U.S. agencies including two state-level agencies, 182 universities, and 58 countries, the ACRF Data Archive collects and delivers about 3 terabytes of data per month.

www.arm.gov



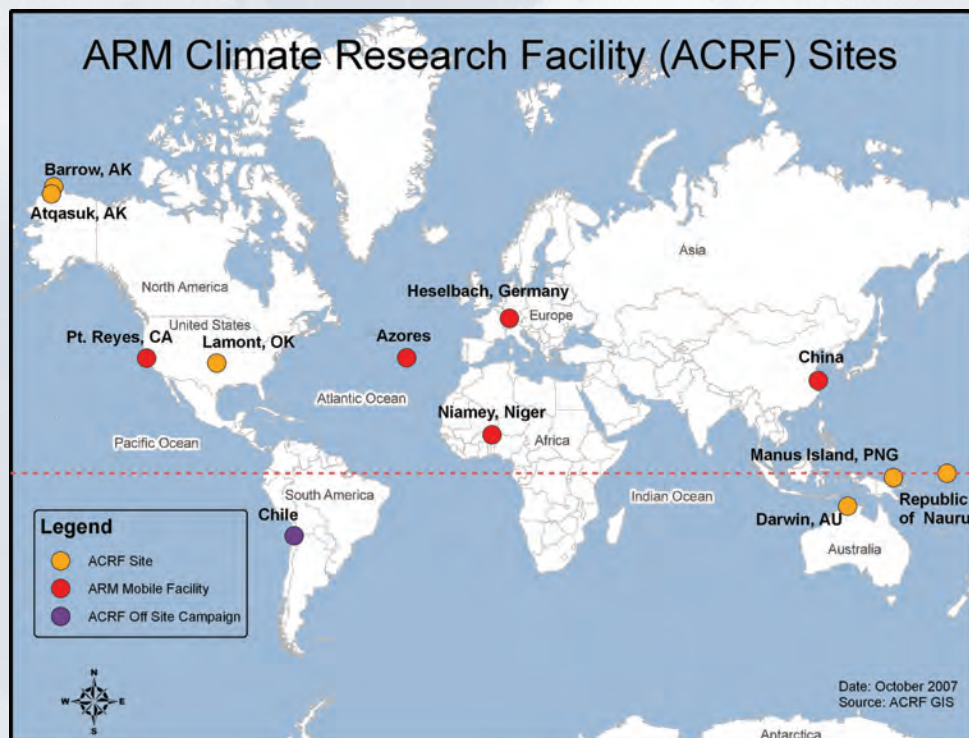
Atmospheric Radiation Measurement CLIMATE RESEARCH FACILITY

U.S. Department of Energy

Through the Atmospheric Radiation Measurement (ARM) Program, the U.S. Department of Energy (DOE) 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. This scientific infrastructure and resultant data archive are available to researchers around the world through the ARM Climate Research Facility (ACRF), a DOE scientific user facility.

A central feature of the ACRF is a set of instrumented field research sites located at climatically diverse regions around the world for measuring atmospheric radiation and the properties controlling this radiation, such as the distribution of clouds and water vapor. Using data from the ACRF sites, ARM Aerial Facility (AAF), and ARM Mobile Facility (AMF), scientists are studying the effects and interactions of sunlight, infrared radiation, and clouds to understand their impact on temperatures, precipitation, and other aspects of weather and climate. As part of this effort, ARM scientists and ACRF infrastructure staff analyze and test the data files to create enhanced data products. Software tools are provided to help open and analyze these products, which are made available for the science community via the ACRF Data Archive (www.archive.arm.gov) to aid in further research.

Each year, a call for proposals to use the ACRF is issued via advertisements in scientific news publications and on the ARM website (www.arm.gov/acrf/fc.stm).





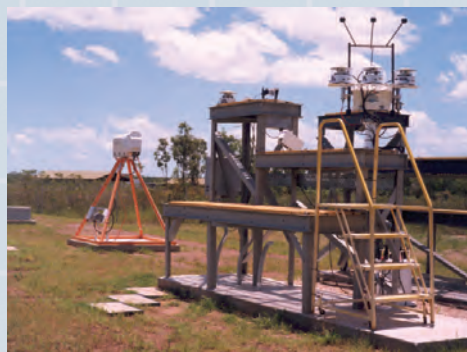
Southern Great Plains

The SGP site—located in north-central Oklahoma and south-central Kansas—was the first field measurement site established by ARM. This site is now the largest and most extensive climate research field site in the world. The SGP experiences a wide variety of cloud types and surface flux properties, as well as large seasonal variations in temperature and humidity. Collection of continuous measurements at this location began in 1994, with a complete suite of instruments operating since 1996.



ARM Mobile Facility

The AMF was designed to explore science questions beyond those addressed by the current fixed sites. With instrumentation and data systems similar to the fixed sites, the AMF can be deployed to locations around the world for campaigns lasting 6 to 12 months. It is designed to operate in any environment, from the cold of the Arctic to the heat of the tropics. The AMF was first deployed at Pt. Reyes, California, in 2005. Subsequently, the facility has been deployed to Niamey, Niger; Heselbach, Germany; Shouxian, China; and the Azores.



Tropical Western Pacific

Three instrumented sites operate in the TWP locale, which is characterized by warm sea temperatures, deep and frequent atmospheric convection, high rain rates, strong coupling between the atmosphere and ocean, and substantial variability associated with El Niño. The first of these sites was established in 1996 on Manus Island, Papua New Guinea. The second TWP site was established on Nauru Island in 1998, and a third site began operating in April 2002 in Darwin, Australia. All three sites are operated in cooperation with local governments.



ARM Aerial Facility

The AAF complements the long-term, ground-based measurements of cloud and atmospheric properties by emphasizing instrumented airborne measurement campaigns. In situ and remote sensing data acquired from instrumented aircraft at various altitudes provide critical information for studying how clouds interact with solar and infrared radiation.



North Slope of Alaska

The NSA locale, situated on the edge of the Arctic Ocean, provides important information because unique climate processes—such as planetary heat loss from the poles and extensive sheets of ice that affect solar absorption and sea level—occur at high latitudes. The NSA's principal instrumented facility was installed near Barrow in 1997, followed by a smaller remote site in Atkasuk in 1999. Routine operations at these sites are conducted in partnership with employees of Ukpėagvik Iñupiat Corporation/Science Division.

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