Baseline Capabilities

Measurement capabilities include the standard meteorological instrumentation, broadband and spectral radiometer suite, and remote sensing instruments. The ARM Mobile Facility (AMF) can accommodate other instruments in addition to, or in place of, the baseline collection.

- **95 GHz radar**
- **Micropulse Lidar and Laser Ceilometer**
- **Microwave Radiometer**
- **Microwave Radiometer Profiler**
- **Atmospheric Emitted Radiance Interferometer,** including a dedicated shelter
- **Sky Radiation System,** a collection of radiometers to measure diffuse, global, and direct visible and infrared solar radiation
- **Wind Profiler**
- **Radar Wind Profiler**
- **Total Sky Imager**
- **Ground Radiation System,** a collection of radiometers to measure visible and infrared radiation coming from the ground
- **Balloon-Borne Sounding System,** sondes launched each day at regular intervals
- **Aerosol Observing System**, including an aerosol sampling stack and dedicated shelter
- **Surface Meteorology Station**
- **Eddy Correlation System**
- **Cimel Sunphotometer**

Measurements obtained by all these instruments are collected by computers inside an **operations shelter**. This shelter houses numerous computer stations for data and communication systems. The AMF operates on a continuous 24/7 schedule and is maintained by ACRF staff. Because it is designed to collaborate with experiments from other agencies, the AMF can also host instruments other than the baseline collection.

AMF Science

The purpose of the AMF is to collect essential information about cloudy and clear atmospheres in under-sampled climatically important regions. In some of these regions, even the macroscopic cloud structure is relatively unknown. The AMF produces data sets for use by the atmospheric community to test and improve parameterizations in global climate models. Data from the AMF instruments are processed using specialized routines to produce cloud and clear-sky data products specifically designed to address the scientific issues in a particular climatic region. These data are evaluated by ACRF scientific staff for overall quality and then processed by the ACRF Data Quality Office. Data are then made available to the community in near real time.

Details on the AMF proposal process can be found at *http://www.arm.gov/acrf/submit_proposals.stm.* For more information, contact:

Mark Miller
AMF Site Scientist
(631) 344-2958
miller@bnl.gov

Mary Jane Bartholomew
Assoc. Site Scientist
(631) 344-2444
bartholomew@bnl.gov

AMF

ARM MOBILE FACILITY

Atmospheric Radiation Measurement
Climate Research Facility
U.S. Department of Energy

http://www.arm.gov/sites/amf.stm

Overview

The U.S. Department of Energy's Atmospheric Radiation Measurement (ARM) Climate Research Facility (ACRF) maintains field sites in Oklahoma, Alaska, and the tropics to obtain continuous measurements of cloud and radiative properties for improving climate models. In addition to these fixed sites, the **ARM Mobile Facility (AMF)** provides a flexible instrument platform for conducting atmospheric experiments lasting from 6 to 12 months in any environment, from the cold of the poles to the heat of the tropics.

Consisting of several portable shelters, a baseline suite of instruments, data communications, and data systems, the AMF is easily transported. The shelters house operations, data systems, communications, instrument computers, and several instruments. The AMF data undergo quality checks and are made available in near real time. An experienced two-person team is deployed with the facility to set up the shelters and instruments.

Because of its flexibility and portability, the AMF is an ideal platform for conducting collaborative research anywhere in the world. ACRF scientists are available for collaborative planning activities, and systems are available to provide local onsite or virtual support for collaborating scientists using the AMF for their research.

2006 — Niamey, Niger, West Africa

In January 2006, the AMF began a yearlong field campaign in West Africa to provide the first well-sampled direct estimates of the energy balance across the atmosphere.

During the "Radiative Divergence using ARM Mobile Facility, GERB data and AMMA Stations" project—better known by the abbreviation RADAGAST—the AMF is located at the airport in Niamey, Niger. It is situated beneath the Geostationary Earth Radiation Budget (GERB) instrument on the Meteostat satellite, which is collecting data over Niamey and the surrounding region. In addition to the airport location, a small ancillary site, located about 60 km from Niamey, is measuring gradients in atmospheric properties to help decipher localized effects.

The deployment coincides with field phases of the African Monsoon Multidisciplinary Analysis (AMMA) experiment, an ongoing study of the interactions between West African Monsoon dynamics and scale, continental water cycle, aerosols, atmospheric chemistry, food, water,

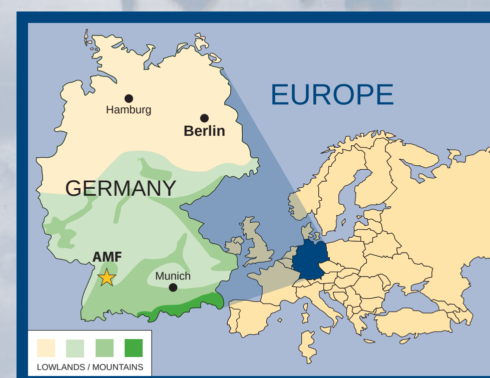
and health. To study these elements, AMMA scientists are collecting data using airplanes, satellites, and instrumented ground stations—including a station in Niamey.

Data from the 1-year deployment in Niamey will allow scientists to study how dust storms start, how far they spread, and what impact they have on incoming solar energy and the generation of monsoons. Because the dust can block incoming solar energy, and because solar energy drives weather and climate, scientists around the world are looking for ways to better understand these natural phenomena.

2007 — Black Forest, Germany

The AMF heads to southwest Germany as an integral part of a regional study aimed at improving precipitation forecasting in convective conditions. As one of four heavily instrumented supersites situated in the Black Forest region, the AMF will obtain continuous measurements of orographic precipitation (atmospheric uplift and subsequent rainfall induced by mountainous terrain) for 9 months during the Convective and Orographically-induced Precipitation Study (COPS) in 2007.

Each supersite will collect observations to document the state of the atmosphere, from the pre-convective environment to the initiation of convection clouds, and the development and decay of precipitation. These data will



be combined with satellite and radar data to improve the representation of convective clouds in models and to develop strategies for determining cloud climatologies in complex terrain.