



Southern Great Plains Newsletter

FEBRUARY 2005
ANL/ER/NL-05-02

ARM MOBILE FACILITY BEGINS FIRST FIELD DEPLOYMENT

The new ARM Mobile Facility (AMF) is in place at its first field research site in scenic Point Reyes, California. The AMF, an array of instruments in a pair of movable shelters, will complement the more permanent ARM Climate Research Facility (ACRF) sites in the Southern Great Plains (SGP), the Tropical Western Pacific (TWP), and the North Slope of Alaska (NSA), making similar measurements in important but little studied climates and locales. Researchers will use the more complete data sets generated to accelerate the improvement of global climate models.

The AMF houses the following baseline set of instruments: (1) a balloon-borne sounding system (weather balloons) for vertical measurements of atmospheric state variables such as temperature, humidity, pressure, and winds; (2) a microwave radiometer profiler to measure temperature, water vapor, and liquid water content; (3) a W-band cloud radar, a microwave radiometer, a micropulse lidar, a Vaisala ceilometer, and a total-sky imager for cloud measurements; (4) an array of photometric instrumentation, such as broadband and spectral radiometers, to measure solar radiation; (5) surface meteorology stations for standard weather measurements on the ground; and (6) an eddy correlation flux system to measure surface energy fluxes. These instruments mirror the sets at the fixed ACRF sites.



Figure 1. The ARM Mobile Facility, deployed at Point Reyes, California (ACRF photo).

The rugged design of the AMF was tested during its shipment to California. The flatbed tractor-trailer hauling the shelters and equipment to their destination had to swerve to avoid another vehicle, causing the truck and AMF to slide off the road and into a steep ravine. Fortunately, no one was injured, and the AMF sustained only minor damage to an air conditioner on one shelter. A crane returned the truck to an upright position and reloaded the AMF shelters, and the journey to Point Reyes was completed.

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.

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The demilitarized military-specification tactical shelters used for the AMF withstood the accident without damage, and the equipment and computers inside the shelters were unharmed due to expert packing.



Figure 2. Deployment location for the ARM Mobile Facility in 2006 at Niamey, Niger, Africa (ACRF Photo).

Researchers begin a six-month field campaign in mid-March 2005, to study the microphysical and radiative characteristics of marine stratus clouds, particularly marine stratus drizzle processes. Very few actual measurements of these microphysical processes exist, despite an extensive body of computer modeling studies. The lack of global-scale quantitative data for comparison with model predictions has limited research progress in this area during the past decade. Data gathered by the AMF at Point Reyes will fill a crucial gap.

The next deployment of the AMF will come in 2006, when the facility will be dispatched to Niamey, Niger, Africa. The AMF will be part of a multi-national study focusing on direct estimation of the divergence of solar and thermal radiation across the atmosphere.

The ability of the AMF to deploy instruments in remote locations is a great advantage to the ARM Program. Installation

of more permanent sites takes more time, effort, and financial support. By saving costs and enabling faster deployment and more rapid data availability, the AMF will give researchers in the global climate community a measurement capability free from many limitations of past installations. Combined with the vast quantity of long-term data from the fixed ACRF sites in the SGP, the TWP, and the NSA, the focused AMF data sets from selected crucial locations will spur progress toward the ARM goal of developing reliable models for predicting climate change.

Climate Capsule

"Climate Capsule" is a monthly feature introducing climate and weather definitions.

STRATUS

: one of the three basic cloud forms (in addition to cirrus and cumulus). One of the most common of all low clouds, stratus is a sheetlike cloud that does not exhibit individual elements. Thick and gray, it is seen in low, uniform layers rarely extending higher than 5,000 feet above Earth's surface. A veil of stratus can give the sky a hazy appearance. Fog can form from a stratus cloud that touches the ground. Although it can produce drizzle or snow, a stratus cloud rarely produces heavy precipitation.

DRIZZLE

: slowly falling precipitation in the form of tiny water droplets with diameters less than 0.02 inches or 0.5 millimeter. Drizzle falls from stratus clouds and is often associated with low visibility and fog.