

December 2002

ARM Facilities Newsletter

ANL/ER/NL-02-12



Radiometer Characterization System

The new Radiometer Characterization System (RCS) installed on the Guest Instrument Facility mezzanine (Figure 1) at the SGP central facility will permit side-by-side evaluations of several new and modified broadband radiometers and comparisons with radiometers currently in use. If the new designs or modifications give substantially more accurate measurements, ARM scientists might elect to replace or modify the existing broadband radiometers. The RCS will also permit ARM scientists to determine whether the radiometers need cleaning more frequently than the current biweekly schedule, and an automatic radiometer washer will be evaluated for reliability and effectiveness in daily cleaning.



Figure 1. The Guest Instrument Facility mezzanine at the SGP central facility will house the new Radiometer Characterization System.

ARM Facilities Newsletter is published by Argonne National Laboratory, a multiprogram 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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A radiometer is an instrument used to measure radiant energy. ARM uses a pyranometer (Figure 2) to measure the solar radiation reaching Earth's surface. Clouds, water vapor, dust, and other aerosol particles can interfere with the transmission of solar radiation. The amount of radiant energy reaching the ground depends on the type and quantity of absorbers and reflectors between the sun and Earth's surface. A



Figure 2. An Eppley PSP pyranometer installation at the ARM SGP central facility.

pyranometer can also measure solar radiation reflected from the surface.

A pyranometer has a thermoelectric device (a wire-wound, plated thermopile) that produces an electric current proportional to the broadband shortwave solar radiation reaching a detector. The detector, which is painted black, is mounted in a precision-ground glass sphere for protection from the elements. The glass must be kept very clean, because dirt and dust scatter and absorb solar radiation and make

the measurement incorrect. Accurate measurements of solar radiation are needed so that scientists can accurately replicate the interactions of solar radiation and clouds in global climate models — a major goal of the ARM program.

TX-2002 AIRS Validation Campaign Winding Down

The TX-2002 Atmospheric Infrared Sounder (AIRS) Validation Campaign ended on December 13, 2002. The National Aeronautics and Space Administration (NASA) conducted this intensive operations period, in which a high-altitude ER-2 aircraft made measurements over the CART site. These measurements are being compared to data from ground-based ARM instruments to validate measurements by the AIRS instrument aboard the Earth Observing System (EOS) Aqua satellite. (See *June 2002 ARM Facility Newsletter* for details on Aqua.)