

November 2003

# ARM Facilities Newsletter

ANL/ER/NL-03-11



## Water Vapor Experiment Concludes

The AIRS (atmospheric infrared sounder) Water Vapor Experiment — Ground (AWEX-G) intensive operations period (IOP) at the SGP central facility began on October 27 and ended on November 16, 2003. Researchers David Whiteman and Francis Schmidlin of the National Aeronautics and Space Administration (NASA), Holger Voemel of the National Oceanic and Atmospheric Administration (NOAA), Larry Miloshevich of the National Center for Atmospheric Research, and Barry Lesht of Argonne National Laboratory collected data in an effort to validate AIRS (atmospheric infrared sounder), a satellite-based atmospheric moisture sensor.

The AIRS instrument, built by the Jet Propulsion Laboratory, is onboard Aqua, an Earth Observing System (EOS) satellite launched by NASA in May 2002 to collect data on atmospheric moisture, clouds, temperature, ocean surface, precipitation, and soil moisture.

During the AWEX-G IOP, researchers launched several types of weather balloons (radiosondes) to measure specific atmospheric characteristics while the satellite passed overhead, as well to compare different radiosonde types. The IOP was marked by the



Figure 1. During the recent AWEX-G IOP, weather balloons were prepared in a special balloon inflation tent at the SGP central facility (Holger Voemel, NOAA and University of Colorado).

*ARM Facilities 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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first North American launch of the new Vaisala RS92 radiosonde on November 5, 2003. NASA also deployed a scanning Raman lidar (light detection and ranging) system to collect additional atmospheric moisture data. The lidar functions like a radar (radio detection and ranging) system, but the lidar's

measurement, provides much more data than can be collected by launching weather balloons manually. The results of this IOP will be used in an attempt to confirm that the ARM ground-based water vapor instruments can function as standards for validating the satellite-based AIRS instrument. The



Figure 2. Dr. Barry Lesht (left) of Argonne National Laboratory prepares to launch the very first Vaisala RS92 radiosonde in North America during the AWEX-G IOP. The radiosonde landed (right) in a field after collecting data as it rose through the atmosphere. The balloon expands during its rise through decreasing atmospheric pressure and bursts when the pressure inside the balloon is greater than the surrounding pressure (Holger Voemel, NOAA and University of Colorado).

probe of the environment is a light beam rather than a radio beam.

Researchers are comparing the AIRS data with ground-truth measurements from the radiosondes, both NASA's and ARM's Raman lidar systems, ARM's microwave radiometer, and the SuomiNet global positioning system (GPS). The AIRS instrument, one of the most accurate for water vapor

unprecedented solar flare activity forced NASA to shut down the AIRS instrument temporarily from October 29 through November 19 — during most of the IOP. Consequently, the IOP had to be refocused on its secondary goals: (1) intercomparison of the radiosondes and (2) comparisons between radiosondes, Raman lidars, microwave radiometers, and the GPS.

As a precaution, the Federal Aviation Administration closed airspace within five miles of the central facility while the NASA Raman lidar was operating



Figure 3. The NASA (left) and ARM (right) Raman lidars at the SGP central facility (David Whiteman, NASA/Goddard Space Flight Center).

during the AWEX-G IOP. The purpose was to ensure that no occupants of aircraft overhead could look into the laser beam of the lidar's light source. This precaution is not necessary for the permanently installed ARM Raman lidar, because its laser beam is eye safe at aircraft level.

## ARM Chief Scientist Elected AAAS Fellow

Tom Ackerman, Chief Scientist for the ARM Program, was elected a Fellow of the American Association for the Advancement of Science (AAAS) on September 19, 2003, becoming one of 348 new members. The AAAS recognizes individuals for exemplary efforts to advance science and its applications. Election as a Fellow of AAAS is an honor bestowed upon scientists by their peers. Dr. Ackerman has been recognized specifically for pioneering studies of radiative properties of aerosols, for developing millimeter-wave radar for

measuring cloud properties, and for leading the ARM Program's Science Team. The AAAS will honor all Fellows elected in 2003 at its February 2004 annual meeting in Seattle, Washington. The AAAS, the world's largest general scientific society and publisher of *Science*, seeks to advance science and innovation throughout the world for the benefit of all people.



Figure 4. Dr. Tom Ackerman, ARM Chief Scientist and new AAAS Fellow (ARM Photo).

## 2003-2004 Winter Forecast

The NOAA Climate Prediction Center has issued its annual winter weather outlook for the 2003-2004 winter season. Forecasters are predicting near-normal temperatures across most of the United States. Warmer-than-normal temperatures are predicted over the far West, Southwest, and Southern Plains, an area including Arizona, New Mexico, Texas, southeastern Oklahoma, Arkansas, Louisiana, Mississippi, and southern tip of Florida. Warm winter

temperatures are also expected in Hawaii and Alaska. Precipitation forecasts call for wetter-than-normal conditions in Texas and Oklahoma and western portions of Arkansas and Louisiana. The rest of the country can expect near-normal precipitation levels.

This year the winter season is lacking strong El Niño or La Niña influences, which can dictate winter weather patterns nationwide. Although a weak

El Niño is projected by the end of November, forecasters at the Climate Prediction Center do not anticipate major impacts during the 2003-2004 winter season. Because of this, forecasters must rely on historical trends of temperature and precipitation averages, in addition to dynamical and statistical weather models. This approach results in increased uncertainty in the seasonal forecast.

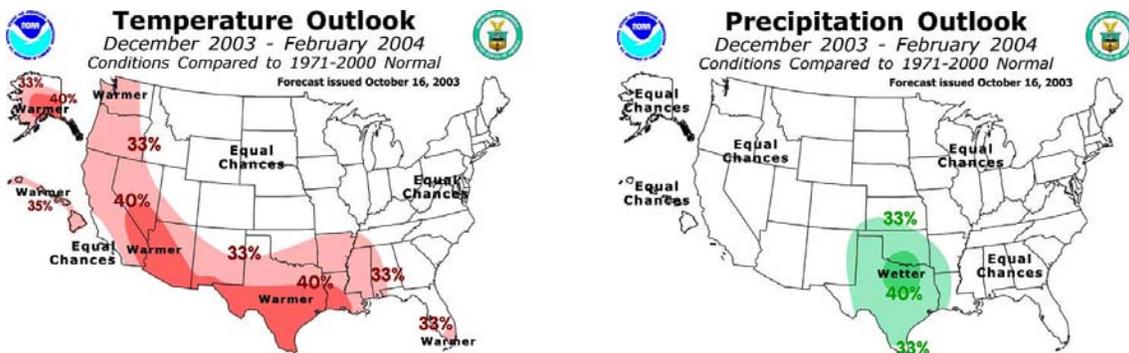


Figure 5. Temperature and precipitation outlook maps for winter 2003-2004 (NOAA).