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ARM Archive Sets Record for User Accounts

The ARM Archive stores and distributes the large quantities of data generated by routine operations and scientific field campaigns at the ACRF sites. Scientists use the data to study atmospheric radiation balance and cloud feedback processes, which are critical for understanding global climate change. In the reporting period October–December 2006, ACRF recorded 961 Archive users — more than in any previous quarter!

The U.S. Department of Energy requires national user facilities to report facility use by total visitor days and to track actual visitors and active user research computer accounts. Historical data show that the total number of users is related to the size of field campaigns or intensive operational periods (IOPs). Large campaigns using many site resources will result in large numbers of site visits and site visit days, research accounts, and device accounts. The users involved typically collect and analyze data in near-real time for an ongoing site-specific field campaign.

To track Archive accounts, however, an individual is counted as only one unique user per site, even though he or she may open and close an account several times to obtain different data at one or more sites. The Archive accounts represent persistent (year-to-year) ACRF data users who often draw information from the entire collection. This includes routine data from the fixed and mobile ACRF sites, as well as cumulative IOP data sets. The number of Archive data users continues to increase steadily, independent of field campaign size.

New Lidar Performs Well in Unattended Operation

Scientists routinely use light detection and ranging (lidar) systems to gather data about cloud and aerosol layering and optical properties. In October 2006, ARM scientists spending a week at the ACRF Southern Great Plains (SGP) site used both the established micropulse lidar (MPL) and the new EZ Lidar for measurements of aerosols and cloud structure at the SGP central facility. Direct comparison of the data collected by the two systems will enable validation of the EZ Lidar as a new tool for automated retrievals of aerosol and cloud measurements.

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The EZ Lidar is a compact, trouble-free, automated, eye-safe system. Leosphere (http://www.leosphere.com/) developed the EZ Lidar as a standardized tool that is easy for atmospheric researchers, operational meteorological networks, and pollution agencies to integrate into an all-weather remote sensing platform. During simultaneous observations at the SGP central facility on October 24, 2006, comparison of MPL retrievals processed by the operations staff with the automatically obtained EZ Lidar retrievals confirmed the new system's ability to detect cloud structures and quantify aerosol loads (see Figures 1 and 2).

The large collection of instruments at the SGP is ideally suited for this study for another reason. The EZ Lidar real-time software not only captures the lidar signal, but it also retrieves backscatter and extinction coefficient profiles, backscatter ratio profiles, optical depth, boundary layer and cloud heights, and more. Sophisticated automated retrieval schemes have inherent limitations that demand definition and quantitation of accuracy. A wide variety of SGP instruments will be used to evaluate various aspects of the EZ Lidar's performance, so that further hardware and software improvements can reduce uncertainty in the lidar results.

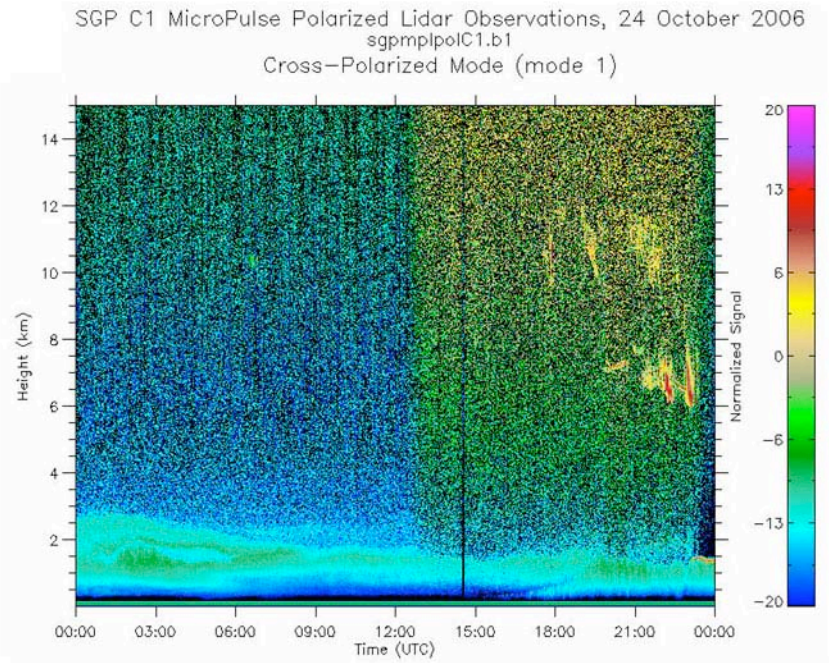

Figure 1. Signatures of clouds and aerosols, captured in post-processed MPL retrievals from measurements taken on October 24, 2006, at the SGP site. The cloud structures (left) were detected in range-corrected profiles, and the aerosol loads in the atmospheric boundary layer (right) were quantified from profiles of backscatter ratio (ARM image).

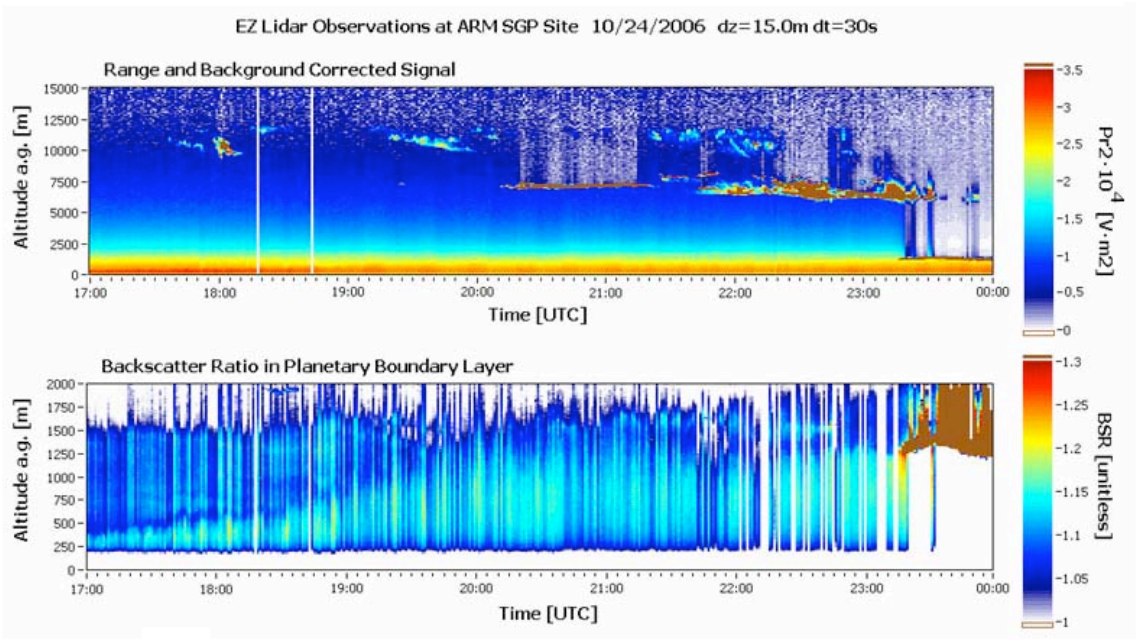

Figure 2. EZ Lidar retrievals obtained on October 24, 2006, showing simultaneous detection of cloud structure signatures in range-corrected profiles (upper panel) and boundary layer aerosols in backscatter ratio profiles (lower panel) (ARM image).