



U.S. DEPARTMENT OF  
**ENERGY**

DOE/SC-ARM-10-001

# **Atmospheric Radiation Measurement Program Climate Research Facility Operations Quarterly Report**

October 1–December 31, 2009



## **DISCLAIMER**

This report was prepared as an account of work sponsored by the U.S. Government. Neither the United States nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the U.S. Government or any agency thereof.

**Atmospheric Radiation Measurement  
Program Climate Research Facility  
Operations Quarterly Report**

October 1–December 31, 2009

Work supported by the U.S. Department of Energy,  
Office of Science, Office of Biological and Environmental Research

## Contents

1.0 Data Availability.....	1
2.0 Scientific Users.....	2
3.0 Safety .....	4

## Tables

1 Operational Statistics for the Fixed ARM Sites and the AMF for the Period October 1–December 31, 2009. ....	1
2 Summary of ARM Scientific Users for the Period January 1, 2009–December, 2009.....	3
3 Consecutive Days of Injury-Free Operation, * October 1–December 31, 2009.....	4

## 1.0 Data Availability

**Description.** Individual raw datastreams from instrumentation at the Atmospheric Radiation Measurement (ARM) Climate Research Facility fixed and mobile sites are collected and sent to the Data Management Facility (DMF) at Pacific Northwest National Laboratory (PNNL) for processing in near real-time. Raw and processed data are then sent approximately daily to the ARM Data Archive, where they are made available to users. For each instrument, we calculate the ratio of the actual number of data records received daily at the Archive to the expected number of data records. The results are tabulated by (1) individual datastream, site, and month for the current year and (2) site and fiscal year (FY) dating back to 1998.

The U.S. Department of Energy (DOE) requires national user facilities to report time-based operating data. The requirements concern the actual hours of operation (ACTUAL); the estimated maximum operation or uptime goal (OPSMAX), which accounts for planned downtime; and the VARIANCE [ $1 - (\text{ACTUAL}/\text{OPSMAX})$ ], which accounts for unplanned downtime. The OPSMAX time for the first quarter of FY 2010 for the Southern Great Plains (SGP) site is 2,097.60 hours ( $0.95 \times 2,208$  hours this quarter). The OPSMAX for the North Slope Alaska (NSA) locale is 1,987.20 hours ( $0.90 \times 2,208$ ), and for the Tropical Western Pacific (TWP) locale is 1,876.8 hours ( $0.85 \times 2,208$ ). The ARM Mobile Facility (AMF) deployment in Graciosa Island, the Azores, Portugal, continues so the OPSMAX time this quarter is 2,097.60 hours ( $0.95 \times 2,208$ ). The differences in OPSMAX performance reflect the complexity of local logistics and the frequency of extreme weather events. It is impractical to measure OPSMAX for each instrument or datastream. Data availability reported here refers to the average of the individual, continuous datastreams that have been received by the Archive. The lack of specific data at the Archive is the result of downtime (scheduled or unplanned) of the individual instruments. Therefore, data availability is directly related to individual instrument uptime. Thus, the average percentage of data in the Archive represents the average percentage of the time (24 hours per day, 92 days for this quarter) the instruments were operating this quarter.

**Summary.** Table 1 shows the accumulated maximum operation time (planned uptime), actual hours of operation, and variance (unplanned downtime) for the period October 1–December 31, 2009, for the fixed sites. Because the AMF operates episodically, the AMF statistics are reported separately and not included in the aggregate average with the fixed sites. This first quarter comprises a total of 2,208 possible hours for the fixed and mobile sites. The average of the fixed sites well exceeded our goal this quarter.

**Table 1.** Operational Statistics for the Fixed ARM Sites and the AMF for the Period October 1–December 31, 2009.

Site	Hours Of Operation			Data Availability	
	Opsmax	Actual	Variance	Goal	Actual
NSA	1,987.20	2,104.89	-0.0592	0.90	0.95
SGP	2,097.60	2,038.65	+0.281	0.95	0.92
TWP	1,876.80	2,104.89	-0.1215	0.85	0.95
<b>Site Average</b>	<b>1,987.20</b>	<b>2,082.81</b>	<b>-0.0481</b>	<b>0.90</b>	<b>0.94</b>
AMF Azores	2,097.60	2,058.52	+0.186	0.95	0.93

## 2.0 Scientific Users

**Description.** The Site Access Request System is a web-based database used to track visitors to the fixed and mobile sites, all of which have facilities that can be visited. The NSA locale has the Barrow and Atqasuk sites. The SGP site has historically had a Central Facility, 23 extended facilities, 4 boundary facilities, and 3 intermediate facilities. Beginning this quarter, the SGP began a transition to a smaller footprint (150 km x 150 km) by rearranging the original and new instrumentation made available through the American Recovery and Reinvestment Act (ARRA). The Central Facility and 4 extended facilities will remain, but there will be up to 16 surface new characterization facilities, 4 radar facilities, and 3 profiler facilities sited in the smaller domain. This new configuration will provide observations at scales more appropriate to current and future climate models. The TWP locale has the Manus, Nauru, and Darwin sites. These sites will also have expanded measurement capabilities with the addition of new instrumentation made available through the ARRA funds. It is anticipated that the new instrumentation at all the fixed sites will be in place within the next 12 months. The AMF continues its 20-month deployment in Graciosa Island, Azores, Portugal, that began on May 1, 2009. The AMF will also have additional observational capabilities within the next 12 months.

Users can participate in field experiments at the sites and mobile facility, or they can participate remotely. Therefore, there are a variety of mechanisms provided to users to access site information. Users who have immediate (real-time) needs for data access can request a research account on the local site data systems. This access is particularly useful to users for quick decisions in executing time-dependent activities associated with field campaigns at the fixed sites and mobile facility locations. The eight computers for the research accounts are located at the Barrow and Atqasuk sites; the SGP Central Facility; the TWP Manus, Nauru, and Darwin sites; the AMF; and the DMF at PNNL. However, users are warned that data are provided at the time of collection are not fully screened for quality and therefore not considered to be official ARM data. Hence, these accounts are considered to be part of the facility activities associated with field campaign activities, and users are tracked. Fully screened and approved ARM data are officially requested through the ARM Archive.

In addition, users that visit sites can connect their computer or instrument to an ARM site data system network, which requires an on-site device account. Remote (off-site) users can also have remote access to any ARM instrument or computer system at any ARM site, which requires an off-site device account. These accounts are also managed and tracked.

Official ARM data collected through the routine operations and scientific field experiments at the fixed sites and mobile facility that have passed through the formal data quality review process are stored at and distributed through the Archive. The Archive receives fully quality- assured data within 24-48 hours of the collection and processing of data that takes place at the DMF. These data are available to the public free of charge.

The Archive also serves as a data repository for cloud radar data at the long-term Arctic atmospheric observatory in Eureka, Canada, (80°05' N, 86°43' W) as part of the multiagency Study of Environmental Arctic Change (SEARCH) Program. NOAA began providing instruments for the site in 2005. The intent of the site is to monitor the important components of the Arctic atmosphere, including clouds, aerosols, atmospheric radiation, and local-scale atmospheric dynamics. Because of the similarity of ARM NSA datastreams and the important synergy that can be formed among a network of Arctic atmospheric

observations, the SEARCH radar data are archived in the ARM Archive. Instruments will be added to the site over time. The designation for the archived Eureka data is YEU and is now included in the ARM user metrics.

DOE requires national user facilities to report facility use by total visitor days—broken down by institution type, gender, race, citizenship, visitor role, visit purpose, and facility—for actual visitors and for active user research computer and Archive accounts. This information is maintained but not presented in this report. Visitor role and visit purpose information are used to identify scientific users. Based on the user self-provided information about their role and visit purpose, the following types of users categorized as scientific users are: principal and co-principal investigators, post doctorates, graduate students, undergraduate students, infrastructure instrument mentors, and infrastructure chief and site scientists. Although there are other categories that can be identified, they are considered non-scientific. They are reported here for completeness.

This quarterly report provides the cumulative numbers of scientific user accounts by site for the period January 1, 2009–December 31, 2009. Only scientific users are officially counted, and they are determined by the sum of unique scientific users for each of the ARM Facility components. As before, all user accounts are established for a period of up to one year and must be renewed. To report users, we count the number of active users for the previous 12 months during the last month of the quarterly reporting period.

**Summary.** Table 2 shows the summary of cumulative scientific and non-scientific users for the period January 1, 2009–December 31, 2009. While the number of ARM unique users was 1186 in total, 914 were characterized as scientific users. In addition to the AMF deployment in the Azores, ARM is supporting a field campaign that is not located on any of the fixed sites. The Radiative Heating in Underexplored Bands Campaign (RHUBC-II) is an off-site campaign that is taking place from August to October 2009 at a location near Cerro Chajnantor in Chile, at an altitude of more than 5,400 m. The user statistics of RHUBC-II were included with the AMF tally.

**Table 2.** Summary of ARM Scientific Users for the Period January 1, 2009–December, 2009.

ARM Facility Component	Unique Scientific Users	Unique Non-Scientific Users
AMF (Azores+Chile)	23	26
NSA	31	36
SGP	61	78
TWP	41	13
DMF	30	48
Archive	728	71
Total	914	272

### 3.0 Safety

For reporting purposes, the three ARM sites and the AMF-1 operate 24 hours per day, 7 days per week, and 52 weeks per year. Time is reported in days instead of hours. If any lost work time is incurred by any employee, it is counted as a workday loss. Table 3 reports the consecutive days since the last recordable or reportable injury or incident causing damage to property, equipment, or vehicle for the period October 1–December 31, 2009. There were no recordable lost workday cases or reportable injury or incidents causing damage to property, equipment, or vehicles reported for the first quarter of FY2010.

**Table 3.** Consecutive Days of Injury-Free Operation, \* October 1–December 31, 2009.

<b>ES&amp;H Category</b>	<b>NSA</b>	<b>SGP</b>	<b>TWP</b>	<b>AMF</b>
Days Worked without a Lost Time Incident	92	92	92	92
Days Worked without a Recordable Accident	92	92	92	92
Days Worked without a Property-Damage Incident	92	92	92	92
Days Worked without a Reportable Loss to Vehicles	92	92	92	92
*“Injury-free” is defined as days without a recordable lost time incident or property damage incident.				

**ARM**

CLIMATE RESEARCH FACILITY

[www.arm.gov](http://www.arm.gov)



U.S. DEPARTMENT OF  
**ENERGY**