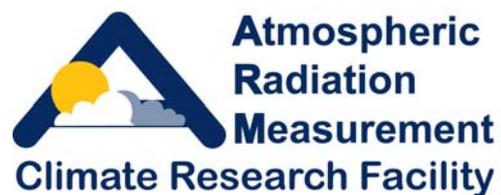


**Atmospheric Radiation Measurement Program  
Climate Research Facility Operations  
Quarterly Report**

July 1 – September 30, 2009



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# Atmospheric Radiation Measurement Program Climate Research Facility Operations Quarterly Report July 1 – September 30, 2009

## 1. Data Availability

**Description.** Individual raw data streams from instrumentation at the Atmospheric Radiation Measurement (ARM) Program Climate Research Facility (ACRF) 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 ACRF 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 data stream, 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 fourth quarter of FY 2009 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) was officially operational May 1 in Graciosa Island, the Azores, Portugal, 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 data stream. Data availability reported here refers to the average of the individual, continuous data streams that have been received by the Archive. Data not at the Archive result from 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 July 1 – September 30, 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. The fourth quarter comprises a total of 2,208 hours for the fixed and mobile sites. The average of the fixed sites well exceeded our goal this quarter. The AMF data statistic requires explanation. Since the AMF radar data ingest software is being modified, the data are being stored in the DMF for data

processing. Hence, the data are not at the Archive; they are anticipated to become available by the next report.

**Table 1.** Operational Statistics for the Fixed ACRF Sites and the AMF for the Period July 1 – September 30, 2009.

Site	Hours Of Operation			Data Availability	
	Opsmax	Actual	Variance	Goal	Actual
NSA	1,987.20	2,112.39	-0.0630	0.90	0.96
SGP	2,097.60	2,119.68	-0.0105	0.95	0.96
TWP	1,876.80	2,031.36	-0.0824	0.85	0.92
<b>Site Average</b>	<b>1,987.20</b>	<b>1,994.56</b>	<b>-0.0520</b>	<b>0.90</b>	<b>0.95</b>
AMF Azores	2,097.60	1,965.12	+0.0597	0.95	0.89

## 2. Scientific Users

**Description.** The Site Access Request System is a web-based database used to track visitors to the fixed and mobile sites. The NSA locale has the Barrow and Atqasuk sites. The SGP site has a central facility, 23 extended facilities, 4 boundary facilities, and 3 intermediate facilities. The TWP locale has the Manus, Nauru, and Darwin sites. The AMF began its 20-month deployment in Graciosa Island, Azores, Portugal, on May 1, 2009.

Users can participate in field experiments at the sites and mobile facility, or they can participate remotely. Therefore, various mechanisms are 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 Pacific Northwest National Laboratory. However, users are warned that data provided at the time of collection are not fully screened for quality and therefore are not considered to be official ACRF 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 ACRF data are officially requested through the ACRF Archive.

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

Official ACRF 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 ACRF NSA data streams and the important synergy that can be formed between a network of Arctic atmospheric observations, the SEARCH radar data are archived in the ACRF 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 ACRF 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 information provided by users about their role and visit purpose, scientific users are categorized as follows: Principal and Co-Principal Investigators, Postdoctorates, Graduate Students, Undergraduate Students, Infrastructure Instrument Mentors, and Infrastructure Chief and Site Scientists. Although other categories can be identified, they are considered nonscientific; they are reported here for completeness.

This quarterly report provides the cumulative numbers of scientific user accounts by site for the period July 1, 2008 – June 30, 2009. Only scientific users are being officially counted; they are determined by the sum of unique scientific users for each of the ACRF facility components. 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 nonscientific users for the period October 1, 2008 – September 30, 2009. Of the 1,209 ACRF users, 923 were characterized as scientific users. In addition to the AMF deployment in the Azores, the ACRF is supporting a field campaign that is not located with 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 users statistics of RHUBC-II were included with the AMF tally.

**Table 2.** Summary of ACRF Scientific Users for the Period October 1, 2008 – September 30, 2009.

ACRF Facility Component	Unique Scientific Users	Unique Non-Scientific Users
AMF (Azores+Chile)	20	21
NSA	30	39
SGP	62	89
TWP	40	13
DMF	27	49
Archive	744	75
Total	923	286

### 3. Safety

For reporting purposes, the three ACRF sites and the AMF-1 operate 24 hours per day, 7 days per week, 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. As shown in Table 3, there were no recordable lost workday cases or reportable injuries or incidents causing damage to property, equipment, or vehicles reported for the fourth quarter of FY 2009.

**Table 3.** Consecutive Days of Injury-Free Operation, \* July 1 – September 30, 2009.

ES&H Category	NSA	SGP	TWP	AMF
Days Worked without a Lost Time Incident	91	91	91	91
Days Worked without a Recordable Accident	91	91	91	91
Days Worked without a Property-Damage Incident	91	91	91	91
Days Worked without a Reportable Loss to Vehicles	91	91	91	91
*“Injury-free” is defined as days without a recordable lost time incident or property damage incident.				

This quarterly report also includes historical safety performance data, which are summarized in Table 4 for the period October 1, 1998 – September 30, 2009.

**Table 4.** Consecutive Days Since the Last Recordable Lost Time Incident or Property Damage Incident ACRF fixed sites for the Period October 1, 1998 – September 30, 2009 and the AMF for the Period January 1, 2004 – September 30, 2009.

ES&H Category	NSA	SGP	TWP	AMF
Days Worked without Lost Time Incident	4015	782	4015	2098
Days Worked without a Recordable Accident	4015	782	4015	2098
Days Worked without a Property-Damage Incident	4015	4015	4015	2098
Days Worked without a Reportable Loss to Vehicles	4015	4015	4015	2098

#### SGP:

FY 1998: 2 lost days for restricted work for lower back sprain;

FY 1999: 14 lost days for fracture of wrist (slipped and fell on ice after hail storm);

FY 2000: 162 lost days and 130 restricted days due to an alleged injury from a congenital defect to back.

FY 2006: Recordable medical treatment case: A technician sustained a tick bite in April 2006, was seen by a physician, and was treated with an antibiotic. There was no lost time from this incident.

FY2007-2008 (UPDATE): 45 lost days and 10 restricted days. A technician alleged that he injured his back when he stepped in a hole at a remote field site. An additional 125 lost days have been added for FY2008 for a total of 180 days lost. Said technician continues to be off work pending disposition by Workman's Compensation. No change as of 9/30/09.

## 4. Publications

**Description.** As an additional measure of performance, this quarterly report includes the number of publications that are based on ACRF data, with emphasis on this year's contribution but also summarizing historical data, collection of which began in 1990. The publication categories are (1) abstracts or presentations at conferences, (2) technical reports, (3) books, (4) book chapters, (5) journal articles, and (6) papers in conference proceedings.

**Summary.** Table 5 shows the number of publications by category for 1990 through September 2008, the number of publications for FY 2009, and the total of publications for 1990 through September 2009.

**Table 5.** Number of Publications that Use ACRF Data.

Category	1990–September 2008	FY 2009	1990–September 2009
Abstracts or Presentations	2,271	206	2,477
Technical Reports	203	26	229
Books	3	1	4
Book Chapters	52	1	53
Journal Articles	1,771	205	1,976
Conference Papers	1,794	19	1,813