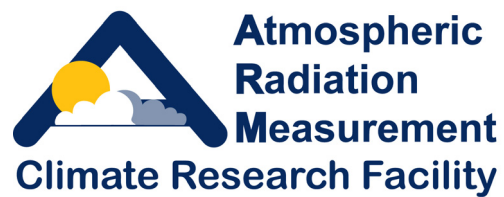


**Atmospheric Radiation Measurement Program  
Climate Research Facility Operations  
Quarterly Report**

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) 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 then are 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 of 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 are caused by downtime (scheduled or unplanned) of the individual instruments. Therefore, data availability is related directly 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 is somewhat misleading. The AMF radar data ingest software is being modified and the data are being stored in the DMF for data processing. While the data are not at the Archive (the basis of data availability), 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, all of which have facilities that can be visited. The NSA locale has the Barrow and Atkasuk 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, 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 Atkasuk 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 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 that 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 also can have remote access to any ACRF instrument or computer system at any ACRF site, which requires an off-site device account. These accounts also are 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 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 are classified as scientific users. 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 July 1, 2008 – June 30, 2009. Only scientific users are being officially counted and they are determined by the sum of unique scientific users for each of the ACRF 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 October 1, 2008 – September 30, 2009. While the number of ACRF users was 1209 in total, 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, 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 July 1 – September 30, 2009. There were no recordable lost workday cases or reportable injury 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 provided in Table 4 as a summary of safety statistics 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 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 cases: 1) A technician sustained a tick bite in April 2006, seen by a physician, and treated with an antibiotic. There was no lost time from this incident.

FY2007-2008 (UPDATE): 45 lost days and 10 restricted days due to an alleged back injury. 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               |