



U.S. DEPARTMENT OF  
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# **Atmospheric Radiation Measurement Climate Research Facility Operations Quarterly Report**

July 1-September 30, 2016  
Revised April 2017



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Climate Research Facility  
Operations Quarterly Report**

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Work supported by the U.S. Department of Energy,  
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## 1.0 Data Availability

### 1.1 Description

Individual datastreams from instrumentation at the Atmospheric Radiation Measurement (ARM) Climate Research Facility fixed and mobile research sites are collected and routed to the Data Management Facility (DMF) for processing in near-real-time. Instrument and processed data are then delivered approximately daily to the ARM Data Archive, where they are made freely available to the research community. For each instrument, ARM calculates the ratio of the actual number of processed data records received daily at the ARM Data 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 dating back to 1998.

The U.S. Department of Energy requires national user facilities to report time-based operating data. The requirements involve the:

- Actual hours of operation (ACTUAL) – 24 hours per day, **92** days or **2208** hours for this quarter
- Estimated maximum operation or uptime target (TARGET)
- Variance (VARIANCE), which is equal to  $(1 - [\text{ACTUAL}/\text{TARGET}])$
- TARGET and VARIANCE numbers account for unplanned downtime.

Differences in TARGET performance reflect the complexity of local logistics and the frequency of extreme weather events. It is impractical to measure TARGET for each instrument or datastream. Data availability reported here refers to the average of the individual, continuous datastreams received by the ARM Data Archive. Therefore, data availability is directly related to individual instrument uptime expressed in hours. Data not at the ARM Data Archive are caused by downtime (scheduled or unplanned) of the individual instruments. Missing data caused by scheduled downtime are not included in the metrics. Thus, the average percentage of data in the ARM Data Archive represents the average percentage of the time the instruments were operating for the quarter.

For this reporting period, the TARGET uptimes for the fixed ARM research sites are:

- North Slope of Alaska (NSA) locale is **1987** hours ( $0.90 \times \text{ACTUAL}$ )
- Southern Great Plains (SGP) locale is **2098** hours ( $0.95 \times \text{ACTUAL}$ )
- Eastern North Atlantic (ENA) locale is **1877** hours ( $0.85 \times \text{ACTUAL}$ ).

Beginning in FY2014 and continuing through FY2016, the ARM Facility is being reconfigured to focus on the improvement of high-resolution atmospheric process models. This strategy includes the formation of two megasites: The first will be located at the SGP for continental U.S. process measurements; the second is at NSA for arctic process measurements. Supporting this reconfiguration, the tropical facilities have been shut down and their systems and components have been relocated to the continental U.S. megasite.

Detailed information on ARM Facility sites can be found at <http://www.arm.gov/sites>. A summarized list is included here:

**SGP Megsite:** The SGP locale in central Oklahoma has a spatial dimension of 150 km x 150 km, including the Central Facility, extended facilities with surface characterization, radar, and profiling sites within the domain.

**NSA Megsite:** The measurement strategy for the NSA megasite includes the Barrow, Alaska, site, the deployment of the third ARM Mobile Facility (AMF3) located at Oliktok Point, Alaska, and supporting aerial measurements.

**ENA Site:** The fixed ENA site is located on Graciosa Island, in the Azores, and became fully operational on October 1, 2014.

**AMF1:** The first ARM Mobile Facility (AMF1) began routine operations on June 1, 2016, on Ascension Island in support of the Layered Atlantic Smoke Interactions with Clouds (LASIC) field campaign. Following LASIC, AMF1 is scheduled to support the Cloud, Aerosol, and Complex Terrain Interactions (CACTI) campaign in Argentina to begin late summer of 2018.

**AMF2:** The second ARM mobile facility (AMF2) is installed and online supporting the ARM West Antarctic Radiation Experiment (AWARE) campaign in Antarctica. The operational start date for AWARE was January 1, 2016, and will be operational through December 2016. Following AWARE, AMF2 is scheduled for two marine deployments; the first deployment is to support the Measurement of Aerosols, Radiation, and Clouds over the Southern Oceans (MARCUS) beginning in fall of 2017 and the second deployment will support the Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAIC) campaign in 2018.

**AMF3:** The third ARM mobile facility (AMF3) is located at Oliktok Point, Alaska, for an extended deployment and became fully operational on October 1, 2014.

## 1.2 Summary

Table 1 shows the accumulated maximum operation time (planned uptime), actual hours of operation, and variance (unplanned downtime) for the fixed sites. Because the mobile facilities operate episodically, the ARM Mobile Facility (AMF) statistics are available separately upon request and not included in the aggregate average with the fixed sites. The average of the fixed sites exceeds the target (goal) this quarter.

**Table 1.** Operational statistics for the fixed ARM research sites for this reporting period.\*

Site	Hours Of Operation			Data Availability	
	Target	Actual	Variance	Goal	Actual
NSA	1987.2	1920.96	-0.0333	90.00%	87.00%
SGP	2097.6	2163.84	0.0316	95.00%	98.00%
ENA	1876.8	2009.28	0.0706	85.00%	91.00%
<b>Site Average</b>	<b>1987.2</b>	<b>2031.36</b>	<b>0.0222</b>	<b>90.00%</b>	<b>92.00%</b>

*\*The ARM mobile facilities and aerial facility are not included in the operational baseline as they function intermittently.*

## 2.0 Scientific Users

### 2.1 Description

Users can participate in field experiments at the research sites and mobile facilities, or they can participate remotely. Therefore, there are a variety of mechanisms provided to users to access site information. The ARM Unified User Request form is a web-based service used to register and track visitors and science users at the fixed and mobile sites, all of which have facilities that can be visited. Users who have immediate (real-time) needs for data access use the same form to 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 site and mobile facility locations. The computers used for the research accounts are located at the NSA, SGP, ENA, AMF sites, and the ARM Data Center. The user registration process is actively managed and all entries are reviewed and approved. Quality assured ARM data are browsable and available through the ARM Data 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 gain 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 through the user request process.

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 ARM Data Archive. The ARM Data Archive receives fully quality-assured data within 24 to 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.

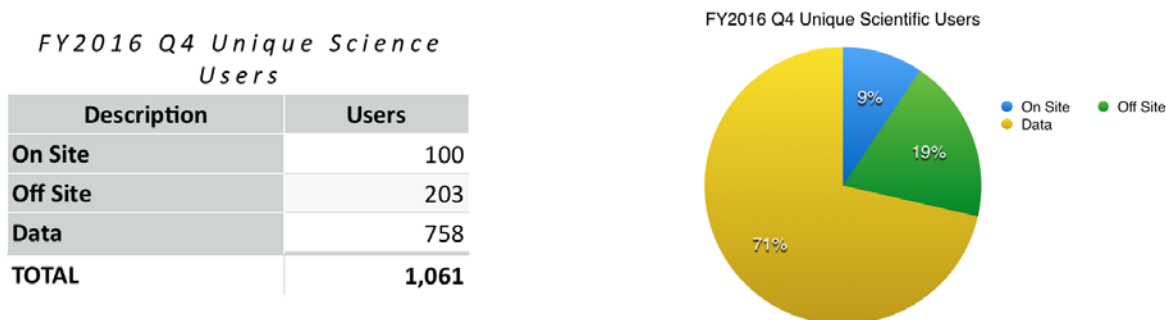
The U.S. Department of Energy requires national user facilities to report facility use by total visitor days—using the reporting criteria defined by the DOE Office of Science—for actual facility visits and user-research, computer, and ARM Data Archive accounts. This information is recorded and maintained, however not presented, in this report. Visitor role and visit purpose information are peer-reviewed by the Facility technical management to identify scientific users.

Scientific users are defined as members of the scientific community and infrastructure who are using the ARM facilities or data to perform science and research. For the ARM Infrastructure Team, this includes scientists and engineers who are involved in the development of synthesis products, value-added products, instrument performance analysis, and uncertainty quantification.

This quarterly report provides the number of unique scientific users. All user accounts are established for a period of up to one year and must be renewed. **Unique scientific users** are defined as a single use of an ARM Facility’s **on-site** assets, **remote** services, or **data** services during the defined reporting period.

## 2.2 Summary

### ARM CLIMATE RESEARCH FACILITY SCIENTIFIC USERS



**Figure 1.** Summary of unique scientific users for the previous 12 months.\*

*\*REVISED April 2017: Starting in the 2016 fourth quarter, additional requirements from the Office of Science for gathering project related information for scientific facility users resulted in a stricter classification of science users. As a result, the 2016 fourth quarter numbers were revised and finalized in December 2016 and published in April 2017.*

## 3.0 Safety

For reporting purposes, the fixed ARM sites and the mobile facilities operate 24 hours per day, 7 days per week, and 52 weeks per year. Time is reported in days instead of hours. If an employee incurs any amount of lost work time, it is counted as a workday loss. Table 2 reports the consecutive days since the last recordable or reportable injury or incident causing damage to property, equipment, or vehicles for this reporting period. There were no recordable lost workday cases or reportable injury or incidents causing damage to property, equipment, or vehicles.



**Table 2.** Consecutive days of injury-free\* operation for this reporting period.

ES&H Category	NSA	SGP	ENA	AMF1	AMF2	AMF3
Days Worked without a Lost-Time Incident	92	92	92	92	92	92
Days Worked without a Recordable Accident	92	92	92	92	92	92
Days Worked without a Property Damage Incident	92	92	92	92	92	92
Days Worked without a Reportable Loss to Vehicles	92	92	92	92	92	92
<i>*"Injury-free" is defined as days without a recordable lost-time incident or property damage incident.</i>						

Table 3 reports consecutive days since the last recordable lost-time incident or property damage incident:

- for the fixed sites for the period beginning October 1, 1998,
- for AMF1 for the period beginning January 1, 2004,
- for AMF2 for the period July 1, 2010,
- and for ENA and AMF3 from October 1, 2014.

**Table 3.** Consecutive days since the last recordable lost-time incident or property damage incident.

ES&H Category	NSA	SGP	ENA	AMF1	AMF2	AMF3
Days Worked without a Lost-Time Incident	6575	3238	731	4655	2284	731
Days Worked without a Recordable Accident	6575	6575	731	4655	2284	731
Days Worked without a Property Damage Incident	6575	6575	731	4655	2284	731
Days Worked without a Reportable Loss to Vehicles	6575	6575	731	4655	2284	731

SGP has had four lost workday cases and one recordable medical case to date:

- FY1998: two lost days due to restricted work for lower back sprain.
- FY1999: 14 lost days for fracture of wrist (slipped and fell on ice after hail storm).
- FY2000: 162 lost days and 130 restricted days due to an alleged injury from a congenital defect to back.
- FY2006: Recordable medical treatment cases: 1) 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: 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. There has been no change as of March 31, 2010. The SGP site is now under new management and this incident has been closed out effective July 1, 2010.
- Note: The SGP had no lost time or recordable accidents in fiscal years 2011, 2012, 2013, 2014, or 2015.

## 4.0 Publications

As an additional measure of performance, this quarterly report includes the number of publications that are based on ARM 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.

Table 4 shows the number of publications by category for 1990 through September 2015, the number of publications for FY2016, and the total of publications for 1990 through September 2016. Publications numbers may vary from year to year as items, mostly journal articles, are added retroactively to the database. Therefore, the most current report reflects the most accurate tally of publications.

**Table 4.** Number of publications that use ARM data.

Category	1990 to September 2015	FY 2016	1990 to September 2016
Abstracts or Presentations	3663	249	3912 <sup>1</sup>
Technical Reports	495	190	685
Books	17	1	17
Book Chapters	66	0	66
Journal Articles	3062	159	3899
Conference Papers	2056	0	2056

<sup>1</sup> The large increase for 2016 is due to an extra literature search for a review and a status update to “Published” (when they start to be counted) of many journal articles that were initially entered in the ARM database as “Submitted” or “Accepted.”



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