U.S. DEPARTMENT OF ENERGY | Office of Science

DOE/SC-ARM-17-001

Atmospheric Radiation Measurement Climate Research Facility Operations Quarterly Report October 1-December 31, 2016

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January 2017

ARM
CLIMATE RESEARCH FACILITY

DISCLAIMER

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Office of Science, Office of Biological and Environmental Research

Acronyms and Abbreviations

ADC	ARM Data Center
AMF	ARM Mobile Facility
ARM	Atmospheric Radiation Measurement Climate Research Facility
AWARE	ARM West Antarctic Radiation Experiment
CACTI	Cloud, Aerosol, and Complex Terrain Interactions
DMF	Data Management Facility
DOE	U.S. Department of Energy
ENA	Eastern North Atlantic
LASIC	Layered Atlantic Smoke Interactions with Clouds
MARCUS	Measurement of Aerosols, Radiation, and Clouds over the Southern Oceans
MOSAIC	Multidisciplinary Drifting Observatory for the Study of Arctic Climate
NSA	North Slope of Alaska
SGP	Southern Great Plains

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1.0 Data Availability

1.1 Description

Individual datastreams from instrumentation at the U.S. Department of Energy (DOE) Atmospheric Radiation Measurement (ARM) Climate Research Facility fixed and mobile research observatories (sites) are collected and routed to the ARM Data Center (ADC). The Data Management Facility (DMF), a component of the ADC, executes datastream processing in near-real time. Processed data are then delivered approximately daily to the ARM Data Archive, also a component of the ADC, 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.

DOE requires national user facilities to report time-based operating data. The requirements involve:

- 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–[ACTUAL/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 x ACTUAL)
- Southern Great Plains (SGP) locale is **2098** hours (0.95 x ACTUAL)
- Eastern North Atlantic (ENA) locale is **1877** hours (0.85 x ACTUAL).

Beginning in FY2014 the ARM Facility entered a phased 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 observatories can be found at https://www.arm.gov/capabilities/observatories. A summarized list is included here:

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

ENA Observatory: The fixed ENA atmospheric observatory 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 in the 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 fixed ARM research sites for this reporting period. The ARM mobile facilities and aerial facility are not included in the operational baseline because they function intermittently.

Site	Hours Of Operation			Data Availability	
	Target	Actual	Variance	Goal	Actual
NSA	1987.2	2053.44	0.0333	90.00%	93.00%
SGP	2097.6	2119.68	0.0105	95.00%	96.00%
ENA	1876.8	2097.6	0.1176	85.00%	95.00%
Site Average	**1987.2**	**2090.24**	**0.0519**	**90.00%**	**94.67%**

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, users are provided with a variety of mechanisms 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 observatories, 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 computers or instruments 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.

DOE 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 ARM Infrastructure Team 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. A **unique scientific user** is 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

FY2017 Q1 Unique Science Users

Description	Users
On Site	133
Off Site	131
Data	816
TOTAL	1,080

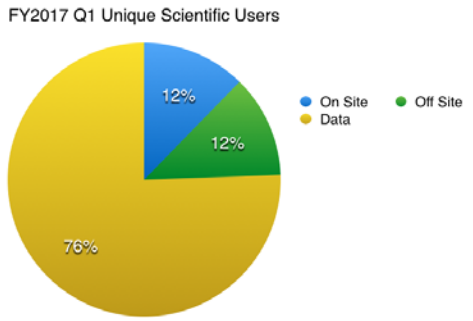

Figure 1. Summary of unique scientific users for the previous 12 months.

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 injuries 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
*"Injury-free" is defined as days without a recordable lost-time incident or property damage incident.						


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