U.S. DEPARTMENT OF ENERGY | Office of Science

DOE/SC-ARM-13-020

Atmospheric Radiation Measurement Climate Research Facility Operations Quarterly Report

July 1–September 30, 2013

ARM

CLIMATE RESEARCH FACILITY

DISCLAIMER

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Atmospheric Radiation Measurement Climate Research Facility Operations Quarterly Report

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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, we calculate the ratio of the actual number of processed data records received daily at the 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 concern 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 – [ACTUAL/TARGET])
- the TARGET and VARIANCE numbers account for unplanned downtime.

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

- North Slope of Alaska (NSA) locale is **1987.2** hours (0.90 x ACTUAL)
- Southern Great Plains (SGP) locale is **2097.6** hours (0.95 x ACTUAL)
- Tropical Western Pacific (TWP) locale is **1876.8** hours (0.85 x ACTUAL).

The SGP locale has a spatial dimension of 150 km x 150 km, including the Central Facility, five extended facilities, eight new surface characterization facilities, four radar facilities, and three profiler facilities sited within the domain. The NSA locale has the Barrow site. The TWP locale has the Manus, Nauru, and Darwin sites.

The first ARM Mobile Facility (AMF1) is packed up after having completed the Two-Column Aerosol Project (TCAP) at Cape Cod, Massachusetts. The AMF1 is in the process of being shipped to Brazil to participate in the GreenOceanAmazon (GOAMAZON) field campaign, which begins in January 2014.

The second AMF (AMF2), which had been deployed on the cargo ship Horizon in support of the Marine ARM GPCI Investigation of Clouds (MAGIC) field campaign, is now in the teardown and packing mode. The AMF2 system will be shipped to Finland for the Biogenic Aerosols – Effects on Clouds and Climate (BAECC) field campaign. The BAECC field campaign operation begins February 2014.

The 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 that have been received by the Data Archive. Therefore, data availability is directly related to individual instrument

uptime expressed in hours. Data not at the Data Archive are caused by downtime (scheduled or unplanned) of the individual instruments. Missing data due to scheduled downtime are not included in the metrics. Thus, the average percentage of data in the Data Archive represents the average percentage of the time the instruments were operating this quarter.

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 AMFs operate episodically, the AMF statistics are reported separately and not included in the aggregate average with the fixed sites. The average of the fixed sites met our goal this quarter.

Table 1. Operational statistics for the fixed ARM sites and mobile facilities for this reporting period.

Site	Hours Of Operation			Data Availability	
	Target	Actual	Variance	Goal	Actual
NSA	1987.2	2119.68	-0.0667	90.00%	96.00%
SGP	2097.6	2119.68	-0.0105	95.00%	96.00%
TWP	1876.8	1766.4	0.0588	85.00%	80.00%
Site Average	**1987.2**	**2001.92**	**-0.0074**	**90.00%**	**90.67%**
AMF1 Cape Cod, MA	N/A	N/A	N/A	N/A	N/A
AMF2 Horizon- CA, HI	N/A	N/A	N/A	N/A	N/A

2.0 Scientific Users

2.1 Description

Users can participate in field experiments at the sites and mobile facilities, or they can participate remotely. Therefore, there are a variety of mechanisms provided to users to access site information. 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. 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 site and mobile facility locations. The eight computers for the research accounts are located at the Barrow site; SGP Central Facility; TWP Manus, Nauru, and Darwin sites; AMFs; and DMF. 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 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 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 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 Data Archive. The Data 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 U.S. Department of Energy 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 Data Archive accounts. This information is maintained but not presented in this report. Visitor role and visit purpose information are peer-reviewed to identify scientific users.

Scientific users[1] are defined as members of the scientific community and infrastructure who are using the ARM Facilities or data to perform peer-reviewed science and research. For the ARM Infrastructure, this includes the 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, **off-site** services, or **data** services during the defined reporting period.

2.2 Summary

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

ARM CLIMATE RESEARCH FACILITY SCIENTIFIC USERS

FY2013 Q4 Unique Science User Summary

Description	Users
On Site	145
Off Site	457
Data	381
TOTAL	**983**

FY2013 Q4 Unique Scientific Users

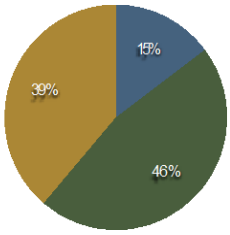

Figure 1. Summary of ARM scientific users

3.0 Safety

For reporting purposes, the three ARM sites and the two AMFs 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

[1] Beginning in FY2013, the approach used to count scientific users for the ARM Climate Research Facility was revised to align with other DOE Office of Science user facilities. Please contact Jimmy Voyles at jimmy.voyles@pnnl.gov with any questions related to the information presented here about the facility statistics.

by any employee, 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 reported.

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

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

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 to the end of this reporting quarter, September 30, 2012.

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

ES&H Category	NSA	SGP	TWP	AMF1	AMF2
Days Worked without a Lost-Time Incident	5476	2243	5476	3559	1188
Days Worked without a Recordable Accident	5476	2243	5111	3559	1188
Days Worked without a Property Damage Incident	5476	5476	5476	3559	1188
Days Worked without a Reportable Loss to Vehicles	5476	5476	5476	3559	1188

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

- FY1998: Two lost days 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.

SGP 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.

SGP 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. No change as of March 31, 2010. Note: The SGP site is under new management; thus, this incident has been closed out effective July 1, 2010.

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 2012, the number of publications for 2013, and the total of publications for 1990 through September 2013. Publications numbers may vary from year to year as items 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 2012	January to September 2013	1990 to September 2013
Abstracts or Presentations	3023	283	4546
Technical Reports	385	9	394
Books	14	0	14
Book Chapters	66	0	66
Journal Articles	2830	114	2944
Conference Papers	2010	0	2010

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