U.S. DEPARTMENT OF ENERGY

DOE/SC-ARM-11-022

# Atmospheric Radiation Measurement Climate Research Facility Operations Quarterly Report

July 1–September 30, 2011

ARM

CLIMATE RESEARCH FACILITY

## DISCLAIMER

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## 1.0 Data Availability

**Description.** Individual raw datastreams from instrumentation at the Atmospheric Radiation Measurement (ARM) Climate Research Facility 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 ARM Archive, where they are made available to users. For each instrument, we calculate the ratio of the actual number of processed data records received daily at the 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 (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 – (ACTUAL/OPSMAX)], which accounts for unplanned downtime. The OPSMAX time for the fourth quarter of FY2011 for the Southern Great Plains (SGP) site is 2097.6 hours (0.95 × 2208 hours this quarter). The OPSMAX for the North Slope Alaska (NSA) locale is 1987.2 hours (0.90 × 2208) and for the Tropical Western Pacific (TWP) locale is 1876.8 hours (0.85 × 2208). The first ARM Mobile Facility (AMF1) deployment is undergoing start-up activities in the Ganges Valley, India. Therefore, there are no data statistics to report this quarter. The AMF2 facility is undergoing setup activities on Gan Island, Maldives. 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 datastream. Data availability reported here refers to the average of the individual, continuous datastreams that have been received by the Archive. Therefore, data availability is directly related to individual instrument uptime expressed in hours. Data not at the 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 Archive represents the average percentage of the time (24 hours per day, 92 days or 2208 hours 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, 2011, 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. This quarter comprises a total of 2208 possible hours for 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 the period July 1–September 30, 2011.

| Site | Hours Of Operation | | | Data Availability | |
|---|---|---|---|---|---|
| | Opsmax | Actual | Variance | Goal | Actual |
| NSA | 1987.2 | 2009.28 | -0.0111 | 0.90 | .91 |
| SGP | 2097.6 | 2053.44 | +0.0211 | 0.95 | 0.93 |
| TWP | 1876.8 | 2075.52 | -0.1059 | 0.85 | 0.94 |
| Site Average | 1987.2 | 2046.08 | -0.0296 | 0.90 | .92.67 |
| AMF1 Nanital, India | N/A | N/A | N/A | N/A | N/A |
| AMF2 Gan Island, Maldives | N/A | N/A | N/A | N/A | N/A |

# 2.0 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 site. The SGP site has historically had a Central Facility, 23 extended facilities, 4 boundary facilities, and 3 intermediate facilities. Beginning in October 2009, the SGP began a transition to a smaller footprint (150 km x 150 km) by rearranging the original and new instrumentation made available through the American Recovery and Reinvestment Act (ARRA). The Central Facility and 4 extended facilities will remain, but there will be up to 12 new surface characterization facilities, 4 radar facilities, and 3 profiler facilities sited in the smaller domain. This new configuration will provide observations at scales more appropriate to current and future climate models. The transition to the smaller footprint is ongoing through this quarter. The TWP locale has the Manus, Nauru, and Darwin sites. These sites will also have expanded measurement capabilities with the addition of new instrumentation made available through ARRA funds. It is anticipated that the new instrumentation at all the fixed sites will be in place by the end of fiscal year 2011. The AMF1 is currently in the start-up phase in India this quarter, and the new ARRA observational capabilities are being added. The second ARM Mobile Facility (AMF2) is in the setup phase on Gan Island, Maldives.

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. 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; the SGP Central Facility; the TWP Manus, Nauru, and Darwin sites; the AMFs; and the DMF at PNNL. However, users are warned that data provided at the time of collection are not fully screened for quality and therefore 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 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 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.

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. 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–September 30, 2011. Only scientific users are officially counted, and they are determined by the sum of unique scientific users for each of the ARM 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, 2010–September 30, 2011. While the number of ARM unique users was 1664 in total, 1217 were characterized as unique scientific users. In addition to the AMFs and fixed site campaigns deployments, ARM supports field campaigns that are not located with any of the fixed sites (i.e., off-site campaigns). For a complete listing of all field campaigns, please refer to the ARM web link: http://www.arm.gov/campaigns/table.

**Table 2**. Summary of ARM Scientific Users for the Period October 1, 2010–September 30, 2011.

| ARM Facility Component | Unique Scientific Users | Unique Non-Scientific Users |
|---|---|---|
| AMF1 (Azores) | 19 | 16 |
| AMF2 (Colorado) | 156 | 43 |
| NSA | 41 | 40 |
| SGP | 149 | 178 |
| TWP | 34 | 28 |
| Off-Site Campaigns | 0 | 0 |
| DMF | 48 | 67 |
| Archive | 770 | 75 |
| Total | 1217 | 447 |

# 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 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 vehicles for the period July 1–September 30, 2011. 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 FY2011.

**Table 3**. Consecutive Days of Injury-Free Operation,* July 1–September 30, 2011.

| 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 4 reports consecutive days since the last recordable lost time incident or property damage incident, for the fixed sites for the period October 1, 1998–September 30, 2011; for AMF1 for the period January 1, 2004–September 30, 2011; and for AMF2 for the period July 1, 2010–September 30, 2011.

**Table 4**. Consecutive Days Since the Last Recordable Lost Time Incident or Property Damage Incident for NSA, SGP, and TWP from October 1, 1998–September 30, 2011; for AMF1 from January 1, 2004–September 30, 2011; and for AMF2 from July 1, 2010–September 30, 2011.

| ES&H Category | NSA | SGP | TWP | AMF1 | AMF2 |
|---|---|---|---|---|---|
| Days Worked without Lost Time Incident | 4745 | 1512 | 4745 | 2828 | 457 |
| Days Worked without a Recordable Accident | 4745 | 1512 | 4745 | 2828 | 457 |
| Days Worked without a Property-Damage Incident | 4745 | 4745 | 4745 | 2828 | 457 |
| Days Worked without a Reportable Loss to Vehicles | 4745 | 4745 | 4745 | 2828 | 457 |

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

FY1998: 2 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 5 shows the number of publications by category for 1990 through September 2010, the number of publications for FY2011, and the total of publications for 1990 through September 2011. 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 5**. Number of Publications that Use ARM Data.

| Category | 1990–September 2010 | FY2011 | 1990–September 2011 |
|---|---|---|---|
| Abstracts or Presentations | 2542 | 239 | 2781 |
| Technical Reports | 336 | 23 | 359 |
| Books | 13 | 0 | 13 |
| Book Chapters | 64 | 1 | 65 |
| Journal Articles | 2590 | 117 | 2707 |
| Conference Papers | 2007 | 0 | 2007 |


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