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ARM Climate Research Facility Quarterly Value-Added Product Report

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October 2011

ARM CLIMATE RESEARCH FACILITY

DISCLAIMER

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Fourth Quarter:
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Abstract

The purpose of this report is to provide a concise status update for value-added products (VAP) implemented by the Atmospheric Radiation Measurement Climate Research Facility. The report is divided into the following sections: (1) new VAPs for which development has begun, (2) progress on existing VAPs, (3) future VAPs that have been recently approved, (4) other work that leads to a VAP, and (5) top requested VAPs from the archive. New information is highlighted in **blue text**. New information about processed data by the developer is highlighted in **red text.** The upcoming milestones and dates are highlighted in **green.**

Acknowledgements

This report is developed largely from the information submitted by the developers and task leads to the Extraview reporting system (http://ewo.arm.gov). Special thanks to our VAP development team for providing timely and complete updates to the Engineering Change Orders and Engineering Work Orders, Dana Dupont and Rolanda Jundt, who make sure that this information is posted accurately on the ARM website and to Stefanie Shamblin of Oakridge National Laboratory for providing the metrics report on VAPs.

Contents

1.0 New VAPs

This section describes new activities that have begun in the last quarter after being approved by the ARM Infrastructure and Science Team.

1.1 Radar VAPs

Translator: Scott Collis, Argonne National Laboratory

Developer: Scott Collis, Argonne National Laboratory

Engineering Change Order-00796 was approved to initiate and coordinate the development of the VAP generation procedures associated with data produced by Recovery Act-funded precipitation radars.

Next milestone: Complete implementation plans for precipitation radar VAP.

1.2 Vertical Velocity in Stratiform Rain (VVSR)

Engineering Change Order-00865 was approved to initiate and coordinate the development of a VAP to generate profiles of vertical air motion during large-scale stratiform liquid precipitation. It will include information on the horizontal and vertical sheer of the velocity.

Next milestone: Implement VAP in Integrated Software Development Environment (ISDE).

2.0 Existing VAPs

This section describes the status of each VAP and the ongoing activities that were approved to improve the performance of or maintain existing VAPs. The information is abstracted primarily from the monthly updates provided by the development team to the ECOs.

2.1 Atmospherically Emitted Radiance Interferometer Noise Filter (AERINF)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Tim Shippert, Pacific Northwest National Laboratory

Status: In Development

Tier: Production

Engineering Change Order-00449 has been approved to run AERINF at the ARM Mobile Facility (AMF) sites and adapt to the new Recovery Act-funded AERIs.

No progress has been made due to higher priorities. The VAP has stopped producing data due to a software problem with the input summary files.

Next milestone: Release a new AERINF product to run at AMF sites by December 31, 2011.

2.2 AERI Profiles of Water Vapor and Temperature (AERIPROF)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Tim Shippert, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no ECOs for this VAP.

2.3 Aerosol Best Estimate (AEROSOLBE)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: In Development

Tier: Evaluation

Engineering Change Order-00360 was approved to update the VAP to add logic to capture red and blue wavelength quantities, to update the quality check fields, and to use the latest Aerosol Intensive Properties (AIP) data. The VAP was estimated to be released by June 1, 2011.

This task is now waiting for the translator's approval of documentation and for feedback from a quality check.

Next milestone: Review by translator and release of the product. The milestone has been pushed back to November 01, 2011.

2.4 Aerosol Intensive Properties (AIP)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00363 was approved to update the VAP with various changes. Please see the ECO for details. After the VAP was released, the Data Quality Office provided review on the data.

The AIP VAP has been released to the Data Management Facility (DMF) for routine processing.

2.5 Aerosol Optical Depth Derived From Either MFRSR or NIMFR (AOD)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Connor Flynn, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00089 was approved to run the AOD VAP at the AMF sites.

The Io values were provided for AMF at Point Reyes, and the data have been processed but not yet released to the archive. The configuration files for the VAP to run for the Gan Island and India deployments have been released.

Next Milestone: The deadline for providing Io values and processing data for the Azores and China deployments has been pushed back to November 01, 2011.

2.6 Active Remote Sensing of Clouds (ARSCL)

Translator: Mike Jensen, Brookhaven National Laboratory

Developer: Karen Jones, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00086 has been approved to catch up on processing of ARSCL data, development of new ARSCL for upgraded KAZR system.

Due to higher ingest priorities, the development of new ARSCL for upgraded KAZR system has not begun. The implementation plan for this development is 90% completed.

Processing of data at Southern Great Plains (SGP) and North Slope of Alaska (NSA) has been completed. Processing of data at the Tropical Western Pacific (TWP) Manus site during the Year of Tropical Convention (May 1, 2008–April 30, 2010) has also been completed.

Next Milestone: Complete the implementation plan for the KAZR VAP and provide evaluation data by the Atmospheric System Research (ASR) Science Team Meeting in March 2012.

2.7 Best-Estimate Fluxes from EBBR Measurements and Bulk Aerodynamics Calculations (BAEBBR)

Translator: Shaocheng Xie, Lawrence Livermore National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.8 Broadband Heating Rate Profile (BBHRP)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Tim Shippert, Pacific Northwest National Laboratory

Status: Operational

Tier: Evaluation

Engineering Change Order-00219 has been approved to make updates to the BBHRP/Radiatively Important Parameters Best Estimate (RIPBE) interface, run the alpha version, analyze data, prepare a technical report, and deliver data to the evaluation area.

Processed four years of data (2002–2006) with the latest Radiatively Important Parameters Best Estimate (RIPBE) data and generated monthly plots to analyze.

Next milestone: Release the data to evaluation after analysis and create 30-minute average files.

2.9 Best-Estimate Surface Radiative Flux (BEFLUX)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.10 Cloud Classification (CLDCLASS)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Chaomei Lo, Pacific Northwest National Laboratory

Status: No Development

Tier: Evaluation

There are no open ECOs for this VAP.

2.11 Cloud Concentration Nuclei (CCN)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: In Development

Tier: Evaluation

Engineering Change Order-00813 (ECO) has been approved to begin implementation of the Ghan CCN Retrieval algorithm, develop a version of the code, provide one month of data for review, and add quality checks.

Began evaluating data with aircraft data from the Routine AAF CLOWD Optical Radiative Observations (RACORO) field campaign. The results were presented during the ASR Working Group Meeting in September 2011.

Next milestone: Release two years of data to the evaluation area, and complete evaluating the data with aircraft data before November 30, 2011.

2.12 Climate Modeling Best Estimate (CMBE)

Translator: Shaocheng Xie, Lawrence Livermore National Laboratory

Developer: Renata McCoy, Lawrence Livermore National Laboratory

Status: Operational

Tier: Evaluation

Engineering Change Order-00620 has been approved to make updates to run SGP, North Slope of Alaska (NSA) and Tropical Western Pacific (TWP) sites, publish CMBE to the Earth System Federated Grid (ESFG) and adhere CMBE to ARM data object design (DOD) standards to produce ARMBE.

Addition of clear sky radiative fluxes is in progress, and the development of ARMBE is complete.

Release enhanced version of CMBE at SGP and release ARMBE in ESFG and meet ARM DOD standards by October 30, 2011.

2.13 Cloud Retrieval Ensemble Dataset (CRED)

Translator: Shaocheng Xie, Lawrence Livermore National Laboratory

Developer: Chuanfeng Zhao and Renata McCoy, Lawrence Livermore National Laboratory

Status: Operational

Tier: Evaluation

Engineering Work Order-13590 has been approved to address the uncertainty in cloud retrievals and provide 3 different retrievals at the 5 ARM permanent research sites.

A paper titled "Toward understanding of differences in current cloud retrievals of ARM ground-based measurements" has been submitted to the Journal of Geophysical Research.

Next milestone: Review feedback provided by users.

2.14 G-Band Vapor Radiometer Precipitable Water Vapor (GVRPWV)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.15 Langley Regression (LANGLEY)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.16 Microwave Radiometer-Scaled Sonde Profiles (LSSONDE)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.17 Merged Sounding (MERGESONDE)

Translator: Mike Jensen, Brookhaven National Laboratory

Developer: David Troyan, Brookhaven National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00092 has been approved to add quality check fields, release the first version of the code to the DMF, and provide version 2 of the data to evaluation.

The product has been released for routine processing at the DMF.

Next milestone: Review feedback provided by the users on version 2 of MERGESONDE. The historical data for version 1 will be adapted to conform to ARM standards.

2.18 MFRSR Column Intensive Properties (MFRSRCIP)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: In Development

Tier: Evaluation

Engineering Change Order-00823 has been approved to develop a VAP to retrieve aerosol column intensive properties from the multifilter rotating shadowband radiometer (MFRSR) including single scattering albedo, asymmetry parameter, and bi-modal log-normal size distributions.

No progress has been made due to problems in installing libraries and licenses needed to run the code developed by the mentor.

Next milestone: Address problems with the libraries and produce data for evaluation.

2.19 Cloud Optical Depth from MFRSR (MFRSRCLDOD)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00287 has been approved to update the VAP to run with MWRRET as input, run and evaluate data at Azores, and release the product.

The VAP has been released to production for routine processing at the DMF.

Historical processing of SGP at facilities E1 and E13 has been completed.

Next milestone: Complete processing of historical data.

2.20 Continuous Baseline Microphysical Retrieval (MICROBASE)

Translator: Mike Jensen, Brookhaven National Laboratory

Developer: Maureen Dunn, Brookhaven National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00804 has been approved to update the VAP with quality checks and release to production.

The VAP has been released to the DMF for routine processing.

Historical processing at SGP and TWP has been completed.

Next milestone: Complete processing of historical data at NSA.

2.21 MICRO-ARSCL (MICROARSCL)

Translator: Mike Jensen, Brookhaven National Laboratory

Developer: Ed Luke, Brookhaven National Laboratory

Status: In Development

Tier: Evaluation

Engineering Change Order-00847 has been approved to solve the spectral imaging problem and porting MICROARSCL to the ARM computer cluster at Oak Ridge National Laboratory.

Porting the code to Oak Ridge National Laboratory is 70% complete. The task with spectral imaging has been 60% completed, and the development of KAZR MICRO-ARSCL is 95% completed.

Next milestone: Reprocess historical data at Oak Ridge National Laboratory. This milestone has been pushed back to October 30, 2011.

2.22 Micropulse Lidar Cloud Optical Depth (MPLCOD)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Chaomei Lo, Pacific Northwest National Laboratory

Status: No development

Tier: Evaluation

There are no open ECOs for this VAP.

2.23 Micropulse Lidar Polarized Average (MPLAVG)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.24 MPL Cloud Mask (MPLCMASK)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00778 is approved to process historical data.

A problem was discovered in which there was only one input of SONDE data. This problem has been fixed.

Next milestone: Release the new version of the code, and process historical data at TWP, SGP (1999–2004), and NSA.

2.25 Microwave Radiometer Retrievals (MWRRET)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00526 has been approved to transition the product from evaluation to production, release the product, and process historical data.

Next milestone: Run the VAP at AMF sites. Process data at the DMF.

2.26 Organic Aerosol Component Analysis

Translator: Jerome Fast, Pacific Northwest National Laboratory

Developer: Tim Shippert, Pacific Northwest National Laboratory

Status: In Development

Tier: Evaluation

Engineering Change Order-00838 has been approved to develop a VAP to estimate organic aerosol components from Aerosol Mass Spectrometers (AMS) and Aerosol Chemical and Speciation Monitors (ACSM) to be deployed at ARM's sites and as part of the Mobile Aerosol Observing System (MAOS).

Evaluation data have been produced using the Positive Matrix Factorization (PMF) commercial off-the-shelf (COTS) software on Unix and Linux machine using WINE software library.

Next milestone: Port the code with ingested ACSM data, and produce evaluation data before the ASR Science Team Meeting in 2012.

2.27 Data Quality Assessment for ARM Radiation Data (QCRAD)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00247 has been approved to run the VAP with Azores data, fix quality check problems, and analyze data.

Completed processing of QCRAD at the SGP Central Facility and of BEFLUX at SGP facilities E1, E2, E3 and the Azores deployment.

Next milestone: Complete reprocessing of historical data.

2.28 Raman Lidar Profiles—Aerosol Scattering Ratio (RLPROFASR)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-13736 has been approved to make changes to the VAP to run with the new Raman Lidar at Darwin.

The VAP has been released for routine processing at the DMF.

2.29 Raman Lidar Profiles—Best Estimate (RLPROFBE)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00106 has been approved to update the RLPROFBE VAP to input the new release of all its input data, add quality checks, and release the VAP.

The VAP has been released for routine processing at the DMF.

Historical data have been processed and archived.

2.30 Raman Lidar Profiles—Depolarization Ratio (RLPROFDEP)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-13736 has been approved to make changes to the VAP to run with the new Raman Lidar at Darwin.

The VAP has been released for routine processing at the DMF.

2.31 Raman Lidar Profiles—Extinction (RLPROFEXT)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-13736 has been approved to make changes to the VAP to run with the new Raman Lidar at Darwin.

The VAP has been released for routine processing at the DMF.

2.32 Raman Lidar Profiles—MERGE (RLPROFMERGE)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-13736 has been approved to make changes to the VAP to run with the new Raman Lidar at Darwin and fix the handling of glue co-efficients.

The VAP has been released for routine processing at the DMF.

2.33 Raman Lidar Profiles—Mixing Ratio (RLPROFMR)

Translator: Connor Flynn, Pacific Northwest National Laboratory

Developer: Chitra Sivaraman, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-13736 has been approved to make changes to the VAP to run with the new Raman Lidar at Darwin.

The VAP has been released for routine processing at the DMF.

2.34 Radiatively Important Parameters Best Estimate (RIPBE)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Tim Shippert, Pacific Northwest National Laboratory

Status: Operational

Tier: Evaluation

The ECO-00767 has been approved to fix bugs and enhance the product based on feedback from beta users.

Reprocessing of RIPBE data with new inputs from March 2002–2006 at SGP has been completed.

2.35 SGP Area Surface Cloud and SW Radiation Grid (SFCCLDGRID)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.36 Surface Spectral Albedo (SURFSPECALB)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

Engineering Change Order-00525 has been approved to review data, address quality check review, automate a test script, and prepare a technical report.

There are no open ECOs for this VAP.

2.37 SONDE Adjust (SONDEADJUST)

Translator: Mike Jensen, Brookhaven National Laboratory

Developer: David Troyan, Brookhaven National Laboratory

Status: In Development

Tier: Evaluation

Engineering Change Order-00824 has been approved to correct the documented biases in radiosonde humidity measurements.

Next milestone: The evaluation period has been completed. Evaluate feedback from users and release product.

2.38 Shortwave Flux Analysis (SWFLUXANAL)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.39 Tower Water-Vapor Mixing Ratio (TWRMR)

Translator: Sally McFarlane, Pacific Northwest National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Tier: Production

There are no open ECOs for this VAP.

2.40 Variational Analysis (VARANAL)

Translator: Shaocheng Xie, Lawrence Livermore National Laboratory

Developer: Renata McCoy, Lawrence Livermore National Laboratory

Status: Operational

Tier: Evaluation

Engineering Change Request-0096 (ECR-0096) has been approved to develop continuous large-scale forcing data.

Significant progress has been made to produce the ensemble large-scale forcing for the AMF China deployment. Multi-scale forcing is being evaluated for SGP for March 2000 and the Summer of 1997 Intensive Operation Period.

Next milestone: Release the data for AMF China.

2.41 W-Band ARM Cloud Radar Active Remote Sensing of Clouds (WACRARSCL)

Translator: Mike Jensen, Brookhaven National Laboratory

Developer: David Troyan, Brookhaven National Laboratory

Status: Operational

Tier: Evaluation

Engineering Change Request-00826 has been approved to run WACRARSCL at all AMF deployments and continue development at SGP.

Processing of WACRARSCL at SGP and the Black Forest deployment has been completed.

Next milestone: Conform historical data to DOD standards, and migrate data evaluation to production.

3.0 Future VAPs

This section describes new activities that have been approved in the last quarter by the ARM Science and Infrastructure and Science Steering Committee. Work on these activities will begin in the next quarter.

White papers are almost ready for KAZR-VAP, Precipitation Radar VAP, SACR-Mapped Moments VAP, Raman Lidar Temperature Profile VAP, and Planetary Boundary Layer VAP.

4.0 Other VAP related work

4.1 Pre-Mapping Corrections to SAPR Data

Translator: Scott Collis, Argonne National Laboratory

Developer: Scott Collis, Argonne National Laboratory

Engineering Work Order-13725 has been initiated to track the process of pre-mapping corrections that need to be performed on the new radar data. This EWO covers work involved in the researching and implementation of standard algorithms on the SAPR data for the purposes of generating evaluation data sets.

Significant progress has been made to accept an ARM sounding and to de-alias a C-SAPR or X-SAPR volume.

4.2 CARES Data Set

Translator: Jerome Fast, Pacific Northwest National Laboratory

Developer: Chen Song and Manish Shrivastava, Pacific Northwest National Laboratory

Engineering Work Order-13683 has been approved to create an evaluation product from the CARES data set for the Aerosol Modeling Testbed (AMT). For details on this work, please visit https://wiki.arm.gov/bin/view/Engineering/VAPWhitePapers.

Significant progress has been made with the CARES data set. Most of the CARES data on the ARM Archive have now been ported into the AMT format. Data that have not been ported to the AMT are ones in which the data are highly suspect (e.g., PILS) or cannot be handled easily by models (particle-resolved data).

5.0 VAP Metrics

This section lists the top 5 VAPs that were requested by users from the archive during the third quarter.

Instrument Class	Number of files requested	Number of unique requests	Number of unique users
ARSCL	287145	475	125
MFRSR*	202676	118	76
QCRAD	127521	214	127
MWRRET	104317	113	63
SWFANAL	103711	103	70

IOP data product	Number of files requested
SONDEADJUST	18147
MERGESONDE	3294
MPLCOD	1985
WACRARSCL	831
CRED	616

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