U.S. DEPARTMENT OF ENERGY | Office of Science

DOE/SC-ARM-15-043

ARM Climate Research Facility Quarterly Ingest Status Report

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July 2015

ARM
CLIMATE RESEARCH FACILITY

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Third Quarter:
April 1, 2015 to June 30, 2015

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Work supported by the U.S. Department of Energy,
Office of Science, Office of Biological and Environmental Research

Abstract

The purpose of this report is to provide a concise status update for ingests maintained by the Atmospheric Radiation Measurement (ARM) Climate Research Facility. The report is divided into the following sections: (1) new ingests for which development has begun, (2) progress on existing ingests, (3) future ingests that have been recently approved, (4) other work that leads to an ingest, and (5) top requested ingests from the ARM Data Archive. New information is highlighted in blue text.

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 ingest development team for providing timely and complete updates to the Engineering Change Orders and Engineering Work Orders.

Acronyms and Abbreviations

ACSM	Aerosol chemical speciation monitor
AERI	Atmospheric emitted radiance interferometer
AMC	AmeriFlux measurement component
AMF	ARM Mobile Facility
AOS	Aerosol observing system
ARM	Atmospheric Radiation Measurement
ASSIST	Atmospheric Sounder Spectrometer for Infrared Spectral Technology
CAPS	Cavity attenuated phase shift
CEIL	Vaisala Ceilometer
CEILBLHT	Ceilometer Boundary Layer Height
CFH	Cryogenic Frostpoint Hygrometer
CLAP3W	Continuous Light Absorption Photometer - 3-wavelength
DL	Doppler Lidar
EBBR	Energy balance Bowen ratio
ECO	Engineering change order
ECOR	Eddy correlation
GVR	G-band (183 GHz) Vapor Radiometer
HDF5	Hierarchical data format 5
HTDMA	Humidified tandem differential mobility analyzer
IAPMFR	In situ aerosol profile multifilter radiometer
IRSI	Infrared sky imager
IRT	Infrared thermometer

IRTHR	Infrared thermometer high resolution
KAZR	Ka ARM Zenith Radar
KAZR2	Ka ARM Zenith Radar Version 2
KAZRSPEC	Ka ARM Zenith Radar Spectra Filter
LBNL	Lawrence Berkeley National Laboratory
MAERI	Marine atmospheric emitted radiance interferometer
MARINEMET	MARINE Meteorological Instrumentation at AMF
MASC	Multi-angle snowflake camera
MET	Meteorological Instrumentation at AMF
MFRAAF	ARM Aerial Facility Multifilter Radiometer
MFRCDL	Multifilter radiometer cloud detection Lidar
MPLPOLFS	Micropulse Lidar
MWACR	Marine W-Band ARM Cloud Radar
MWACRSPEC	Marine W-Band ARM Cloud Radar Spectra Filter
MWR	Microwave radiometer
NAV	Surface navigation
NetCDF	Network Common Data Form
NOAAAOS	National Oceanic and Atmospheric Administration Aerosol Observing System
ORG	Optical rain gauge
PNNL	Pacific Northwest National Laboratory
PRP	Portable radiation package
PSAP3W	Particle Soot Absorption Photometer - 3-wavelength
RAD	Radiation Measurements at AMF
RAIN	Rain gauge

RL	Raman Lidar
RP	Roll/pitch
RWP	Radar wind profiler
SEBS	Surface energy balance system
SIRS	Solar Infrared Station
SONDE	Balloon-borne sounding system
SP2	Single particle soot photometer
SURTHREF	Surface Temperature and Humidity Reference System for Sondes
SWATS	Soil water and temperature system
SWS	Shortwave spectroradiometer
THWAPS	Temperature, humidity, winds, and pressure system
TPS	Total precipitation sensor
TSI	Total sky imager
VDIS	Video disdrometer
WACR	W-band ARM cloud Radar
WACRSPEC	W-band ARM cloud radar spectra filter
XSAPR	X-band scanning precipitation Radar

A complete list of ARM acronyms can be found at http://www.arm.gov/about/acronyms.

Contents

1.0 New Ingests

This section describes new activities that have begun in the last quarter after being approved by the ARM Engineering Review Board. Ingest software development will be needed for the following instruments.

1.1 Aerosol Observing System (AOS) Cavity Attenuated Phase Shift (CAPS)

Mentor: Arthur Sedlacek, Brookhaven National Laboratory

Developer: Alison Tilp, Brookhaven National Laboratory

Status: Under development

Purpose: This ingest will generate:

- aoscaps.b1

The aoscaps ingest reads the data from the CAPS.

Recent Modifications: The aoscaps.b1 datastream is being reviewed. However, the aosimpactor.b1 data are also nearing production release, and the mentor wants to incorporate these aosimpactor.b1 data into the aoscaps.b1 datastream. Work on aoscaps.b1 is on hold until the aosimpactor.b1 data are available in production.

1.2 Aerosol Observing System Single Particle Soot Photometer – Housekeeping Files (AOSSP2)

Mentor: Arthur Sedlacek, Brookhaven National Laboratory

Developer: Cristina Marinovici and Brian Ermold, Pacific Northwest National Laboratory

Status: Under development; under Engineering Change Order-1174

Purpose: The datastream that will be generated by this ingest is:

- aossp2aux.a0

Recent Modifications: The aossp2_ingest processes the housekeeping datastream for the aossp2 instrument at the ARM Mobile Facility (AMF) site in Manacapuru, Brazil (MAO). It is currently being developed.

1.3 Cryogenic Frostpoint Hygrometer (CFH)

Mentor: Martin Stuefer, University of Alaska, Fairbanks

Developer: Christina Marinovici, Pacific Northwest National Laboratory

Status: Engineering Change Order-00769 was approved in 2009 for the addition of this instrument.

Recent Modifications: The ingest logic has been written and the cfh.a1 datastream is being developed. Work continues with help and advice from the mentor. The instrument is producing a network common data form (netCDF) file and we are waiting on the mentor for a new format before we can continue ingest development.

1.4 Ka ARM Zenith Radar Version 2 (KAZR2)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Engineering Work Order-1598 was approved to create the new ingest for this instrument.

Recent Modifications: Released to production in June 2015.

1.5 Scanning ARM Cloud Radar (SACR2)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: In development

Purpose: Read new format SACR2 data and generate netCDF files.

Recent Modifications: The ingest is written and has been validated with existing test data from Oliktok Point, Alaska (OLI), and Eastern North Atlantic (ENA).

1.6 Multi-Angle Snowflake Camera (MASC)

Mentor: Martin Stuefer, University of Alaska Fairbanks

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: In development

Purpose: The masc_ingest is used to read data from the multi-angle snowflake camera.

Datastreams generated:

- masc.a1 – snowflake images
- masc.b1 – netCDF files containing snowflake fall speeds.

Recent Modifications: The masc_ingest logic has been written and testing has begun.

1.7 X-Band Scanning Precipitation Radar (XSAPR2)

Mentor: Scott Collis, Argonne National Laboratory

Developer: Jonathan Helmus, Argonne National Laboratory

Purpose: The XSAPR2 ingest process is used to read data from the XSAPR2 radar instruments. The data from these instruments come stored in the hierarchical data format 5 (HDF5) format with layout specified by Baron Services, Inc. The instrument vendor, Baron, has provided documentation on this format. During ingest, the radar moments and metadata contained in this format are read and converted into netCDF.

Recent Modifications: The code has been written. We are currently waiting for test data from the instrument to finalize the datastreams and contents.

1.8 Recalibration software for MWR3C Data (recal_mwr3c)

Mentor: Maria Cadeddu, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Recent Modifications: From time to time, the mwr3c data must be recalibrated. The recal_mwr3c software was released to production in June 2015.

2.0 Existing Ingests

This section describes the status of each ingest and the ongoing activities that were approved to enhance the performance of, or maintain, existing ingests. The information is abstracted primarily from the monthly updates provided by the development team to the Engineering Change Orders (ECOs).

In general, ingests read instrument raw data and generate one or more netCDF files from that input data. Once read, the raw data are properly named and prepared for shipment to the ARM Data Archive.

2.1 Aerosol Observing System (AOS) Aerosol Chemical Speciation Monitor (ACSM)

Mentor: Thomas Watson, Brookhaven National Laboratory

Developer: Alison Tilp, Brookhaven National Laboratory

Purpose: The aosacsm ingest reads the raw data from the ACSM.

Status: Operational

There are two data products for the ACSM:

- aosacsm.a1, generated by the aosacsm_ingest
- aosacsm.b1, generated by the aosacsmcal_ingest

Recent Modifications: The aosacsm_ingest has been moved to use the ARM Data Integrator (ADI) libraries and the data object design (DOD) has been updated for the new standards and approved in the metadata management tool. At the Data Quality Office's request, five diagnostic variables have been added to the datastream. The aosacsm_ingest was released to production in April 2015. The aosacsmcal_ingest is used to calibrate the data. The aosacsmcal_ingest was released to production in May 2015.

2.2 Atmospheric Emitted Radiance Interferometer (AERI)

Mentor: Denny Hackel, University of Wisconsin

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The aeri_ingest is used to read raw data generated by the AERI.

The following datastreams are generated:

- aerich1.b1 or aeri01ch1.a1, channel 1 data
- aerich2.b1 or aeri01ch2.a1, channel 2 data
- aeriengineer.b1 or aeri01engineer.a1, contains engineering data
- aerisummary.b1 or aeri01summary.a1, summary data

Recent Modifications: The aeri_ingest has been moved to ADI and was released to production in January 2014.

2.3 AmeriFlux Measurement Component (AMC)

Mentor: Marc Fischer, Lawrence Berkeley National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The amc_ingest is used to read the raw data of the AMC.

This ingest generates:

- amc.b1

Recent Modifications: The ingest was updated to process Oliktok data and was released to production in September 2014.

2.4 Aerosol Observing System (AOS)

Mentors: Anne Jefferson, National Oceanic and Atmospheric Administration, Stephen Springston, Brookhaven National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: To read both National Oceanic and Atmospheric Administration (NOAA) and Brookhaven National Laboratory (BNL) mentored AOS raw data from a variety of instruments and generate netCDF files.

The following datastreams are optionally generated:

- aosclap3w.b1, Continuous Light Absorption Photometer - 3-wavelength (CLAP3W) data, NOAA system only
- aospsap3w.b1, Particle Soot Absorption Photometer - 3-wavelength (PSAP3W) data, both NOAA and BNL systems
- aosnephdry.b1, reference nephelometer data, both NOAA and BNL systems
- aosnephwet.b1, “ramped” nephelometer data, both NOAA and BNL systems
- aosaeth.a1, aethelometer data, BNL system only
- aosccn100.a1, cloud condensation nuclei (CCN) data, both NOAA and BNL systems
- aosccn200.a1, dual CCN data, BNL system only
- aosco.a1, carbon monoxide data, BNL system only
- aoscpcf.a1, Condensation Particle Counter (CPC) “fine” data, BNL system only
- aoscpc.a1, CPC data, NOAA system only
- aoscpcu.a1, CPC “ultrafine” data, BNL system only
- aosflow1,a1, aosflow2.a1, aosflow3.a1, NOAA system only
- aosghg.a1, aosghgaux.a1, BNL system only
- aosimpactor.a1, impactor state data, BNL system only
- aosmet.a1, meteorological data collected by BNL system only
- aosnox.a1, nitrous oxide data collected by BNL system only
- aosozone.a1, ozone data collected by BNL system only
- aossmps.a1, Scanning Mobility Particle Sizer (SMPS) data collected by BNL system only

- aossmpstrh.a1, SMPS temperature and relative humidity (RH) data collected by BNL system only
- aosuhsas.a1, Ultra-High Sensitivity Aerosol Spectrometer (UHSAS) data collected by BNL system only

Recent Modifications: New functions have been added to handle the new "greenhouse gas" instrumentation. Recently, the aosco raw data format was changed to new columns. We used this opportunity to implement functionality to match column headings to the netCDF files. A similar change was made for an upcoming change to the aosso2 raw format. We also discovered that the aoscpcu raw format changed back in July 2014. The logic to support this change has been added and tested. Finally, the X1 (aosflow1.a1) raw data format is being standardized. Logic is still being validated in support of this raw format changes. We plan to release a new production release of the aos_ingest in early August 2015. As the harmonization effort will be ongoing, we will likely need to make software updates in the aos_ingest. This harmonization effort may take several months to complete.

2.5 Aerosol Observing System Humidified Tandem Differential Mobility Analyzer (AOS HTDMA)

Mentor: Gunnar Senum, Brookhaven National Laboratory

Developer: Alice Cialella, Brookhaven National Laboratory

Status: Operational

Purpose: To read AOS HTDMA raw data and generate netCDF files.

The aoshtdma.a1 datastream is generated.

Recent Modifications: The ingest has been moved to use the ADI libraries. The ingest will be released to production soon, pending datastream review.

2.6 Atmospheric Sounder Spectrometer for Infrared Spectral Technology (ASSIST)

Mentor: Connor Flynn, Pacific Northwest National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Recent Modifications: Released to production in May 2014, after the migration to use the ADI libraries.

2.7 Beam-Steered Radar Wind Profiler (BSRWP)

Mentor: Rich Coulter, Argonne National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Purpose: Read raw data from the 1290bsrwp (1290-MHz Beam-Steered Radar Wind Profiler) instrument and generate the 1290bsrwpprecipavg.b1 and 1290bsrwpwindavg.b1 datastreams. It is also currently renaming the moments and spectral files for archival. Currently, this ingest is only used to process Marine ARM GPCI[1] Investigation of Clouds (MAGIC) field campaign data.

Status: Operational

Recent Modifications: The bsrwp_ingest was released to production in May 2014 so the raw spectra data can be processed in production to generate netCDF files.

2.8 Ceilometer (CEIL)

Mentor: Victor Morris, Pacific Northwest National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: The ceil_ingest processes data collected from the Vaisala ceilometer (CEIL). Datastreams generated include the following:

- ceil.b1

Recent Modifications: This ingest has been moved to ADI and released to production. The datastreams and the ingest are being renamed to "ceil." This datastream change required an end-to-end reprocessing, which has been completed.

2.9 Planetary Boundary-Layer Height Ceilometer (CEILPBLHT)

Mentor: Vic Morris, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: ceilpblht_ingest processes raw ceilpblht data and generates:

- ceilpblht.a0

Recent Modifications: Released to production for the Finland deployment.

2.10 Disdrometer (DISDROMETER)

Mentor: Mary Jane Bartholomew, Brookhaven National Laboratory

[1]GPCI = GCSS Pacific Cross-section Intercomparison, a working group of GCSS
GCSS = GEWEX Cloud Systems Study
GEWEX = Global Energy and Water Cycle Experiment, a core project of the World Climate Research Programme.

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The disdrometer_ingest is used to read data from disdrometer instruments. Disdrometers are used to collect data from tipping bucket rain gauges.

The following netCDF datastreams are generated:

- disdrometer.b1

Recent Modifications: The disdrometer_ingest was released in October 2014 to handle missing values in old raw data files.

2.11 Doppler Lidar (DL)

Mentor: Rob Newsom, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational; released to production during January 2014 for the Finland deployment.

Purpose: The dl_ingest processes raw Doppler Lidar data to produce daily netCDF files.

The following datastreams are optionally generated:

- dlcal1.a0
- dlcal2.a0
- dlfpt.a0
- dlppi.a0
- dlppi2.a0
- dlrhi.a0
- dlrhi2.a0
- dlusr.a0

Recent Modifications: In October 2014, a new version of the ingest was released to handle new Oliktok data and to change the netCDF file extension from “cdf” to “nc.”

2.12 Energy Balance Bowen Ratio (EBBR)

Mentor: David Cook, Argonne National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: The ebbr_ingest reads data from the EBBR system. The following datastreams are generated:

- 5ebbr.b1, 5-minute data
- 15ebbr.b1, 15-minute data
- 30ebbr.b1, 30-minute data

Recent Modifications: The production release was accomplished in December 2014. The datastreams now follow the new ARM standards.

2.13 Eddy Correlation Flux Measurement System (ECOR)

Mentor: David Cook, Argonne National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: The ecor_ingest reads data from the ECOR and generates netCDF datastreams, which provide in situ, half-hour measurements of the surface turbulent fluxes of momentum, sensible heat, latent heat, and carbon dioxide.

Datastreams generated include the following:

- 30ecor.b1

Recent Modifications: This ingest was moved to ADI and released to production in April 2014. The configuration package was also updated for ENA; Gan Island, Maldives (GAN); and OLI data and released to production in June 2014.

2.14 G-Band Vapor Radiometer (GVR)

Mentor: Maria Cadeddu, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The gvr_ingest reads data generated by the 183.3-GHz radiometer and generates netCDF datastreams. The GVR is located at the North Slope of Alaska (NSA) Barrow site.

Datastreams generated include the following:

- gvr.a0
- gvr.b1

Recent Modifications: This ingest has been moved to the ADI libraries and released to production.

2.15 G-band Vapor Radiometer Profiler (GVRP)

Mentor: Maria Cadeddu, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The gvrp_ingest processes data generated by the MP183 radiometer. The instrument is located at the NSA Barrow site.

Datastreams generated by the ingest are:

- grvrpC1.b1
- gvrpC1.a1

Recent Modifications: This ingest has been moved to ADI and released to production.

2.16 High Spectral Resolution Lidar (Calibrated Files Produced by University of Washington) (HSRLUW)

Mentor: Connor Flynn, Pacific Northwest National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Recent Modifications: This ingest has been moved to ADI and released to production.

2.17 Infrared/Visible Sky Imager (IRSI)

Mentor: Victor Morris, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Engineering Change Order-15948 was approved to create the new ingest for this instrument.

Purpose: The irsi_ingest produces the following datastreams:

- Irsiir.b1
- Irsiircldmask.a1
- Irsiirskimage.a1
- Irsivis.b1
- Irsiviscldmask.a1
- Irsivisskyimage.a1

Recent Modifications: The irsi_ingest was released to production in October 2014.

2.18 Infrared Thermometer (IRT)

Mentor: Vic Morris, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: This ingest generates the following datastreams:

- irt.b1
- irt10m.b1
- irt25m.b1

The irt_ingest, similar to the irthr_ingest, reads data from the IRT instruments. However, this ingest is designed for the older IRTs that report data every 20 seconds.

Recent Modifications: In November 2014, the ingest was released to fix a bug discovered while reprocessing very old IRT data.

2.19 Infrared Thermometer – High-Resolution (IRTHR)

Mentor: Vic Morris, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The irthr_ingest reads data from the high-resolution IRT instruments distributed around the Southern Great Plains (SGP) site. Datastreams generated are for 200-millisecond, 2-second, and 1-minute sample intervals and include the following:

- irt200ms.a1, 200-millisecond data
- irt2s.b1, 2-second data
- irt.b1, 1-minute data

Recent Modifications: This ingest has been moved to use ADI libraries. In February 2014, the irt_ingest was released to production. In November, 2014 the ingest was updated to address Data Quality Problem Report-4393.

2.20 K-Band ARM Zenith Radar (KAZR)

Mentor: Karen Johnson, Brookhaven National Laboratory, Nitin Bharadwaj, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National

Status: Operational

Purpose: This ingest reads the KAZR (formerly the millimeter-wavelength cloud radar [MMCR]) zenith-pointing radar data, generating the kazraux.a0, kazrge.a1, kazrmd.a1, and kazrhi.a1 datastreams. The actual datastreams generated depend upon how the mentor configures the instrument.

The following datastreams are generated by this ingest:

- kazrge.a1
- kazrmd.a1
- kazrhi.a1

Recent Modifications: This ingest has been moved to ADI and released to production. Datastreams were renamed, and the data levels were modified. Kazraux.a1 became kazraux.a0, and kazr*.b1 became kazr*.a1. The historical KAZR data are being reprocessed.

2.21 Ka ARM Zenith Radar Filtered Spectral Data (KAZRSPEC)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Annette Koontz and Cristina Marinovici, Pacific Northwest National Laboratory

Status: Operational

Purpose: Filter large spectra files to eliminate non-cloud content, generate netCDF files, and “quicklook” data plots. The kazrspec_ingest was updated and released to production in February 2014.

The following datastreams are generated by this ingest:

- kazrspeccmaskhicopol.a0
- kazrspeccmaskmdcopol.ao
- kazrspeccmaskmdxpol.a0
- kazrspeccmaskgecopol.a0
- kazrspeccmaskgexpol.a0

Recent Modifications: The current production version of the kazrspec_ingest uses an older version of the ingest libraries. The ingest is currently being modified to use the ADI libraries.

2.22 Marine Atmospheric Emitted Radiance Interferometer (MAERI)

Mentor: Denny Hackel, University of Wisconsin

Developer: Yan Shi, Pacific Northwest National Laboratory

Status:

Purpose:

Recent Modifications: The aeri ingest was cloned as the new maeri_ingest.

2.23 ARM-Standard Meteorological Instrumentation, Marine (MARINEMET)

Mentor: Michael Reynolds, Remote Measurement and Research Company

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The marinemet_ingest processes raw meteorological instrumentation at AMF (MET) data at MAGIC to produce daily netCDF files.

The following datastreams are generated by the ingest:

- marinemet.b1
- marinemets1.b1

Recent Modifications: This ingest was released after a minor logic fix in May 2014. The minor fix is related to Engineering Work Order-14824.

2.24 Vaisala Automatic Weather Station (MAWS)

Mentor: Donna Holdridge, Argonne National Laboratory

Developer: Christina Marinovici, Pacific Northwest National Laboratory

Status: In Development

Purpose: There is a new Automatic Weather Station (MAWS) instrument for the SGP Central Facility (C1) site.

Datastreams generated:

- maws.b1

The new datastream follows the new standards and file names will end with the .nc extension.

Recent Modifications: In December 2014, the first production release of the maws_ingest was made.

2.25 Surface Meteorological Instrumentation (MET)

Mentor: Michael Ritsche, Argonne National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The met_ingest processes data collected from conventional in situ sensors measuring meteorological data such as wind speed, barometric pressure, and so on.

The following datastream is generated:

- met.b1

Recent Modifications: The MET ingest has been reprocessed end-to-end to convert data from the surface meteorological instruments for Tropical Western Pacific (TWP) and surface meteorological observation System Instruments for SGP to MET with consistent DODs. All of the data reprocessing has been completed and is at the data reviewing stage. The ingest was released in October 2014 after modifications were made to process these old data.

2.26 ARM Aerial Facility (AAF) Multifilter Radiometer (MFRAAF)

Mentor: Gary Hodges, National Oceanic and Atmospheric Administration

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: This ingest reads multifilter radiometer (MFR) data collected from routine airplane flights around the SGP Central Facility (C1). The MFR data are calibrated by the mfraaf_ingest.

The following datastreams are produced:

- sgpmfraafC1.a0
- sgpmfraafC1.b1

Recent Modifications: Previously known as In Situ Aerosol Profiles Multifilter Radiometer (IAPMFR), this ingest name was changed to mfraaf for MFR data collected from an instrument on the underside of an airplane wing. This change was requested via Engineering Change Order-1155. The modified ingest was released to production in June 2015.

2.27 Multifilter Radiometer Cloud Detection Lidar (MFRCDL)

Mentor: Gary Hodges, National Oceanic and Atmospheric Administration

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: This ingest processes MFRSR, NIMFR, MFR3M, MFR10M, MFR25M, and NFOV2CH raw data and generates raw and calibrated netCDF files.

The following datastreams are generated:

- mfrsr.a0
- mfrsraux.a0
- mfrsr.b1
- nimfr.a0
- nimfr.b1
- mfr3m.a0
- mfr3m.b1
- mfr10m.a0
- mfr10m.b1
- mfr25m.a0
- mfr25m.b1
- nfov2ch.b1

The ADI library version of the mfrcdl_ingest was released to production in April 2014. The new version includes several updates to better handle 24-hour daylight in the polar regions of the planet and more consistent nighttime offset computations. The ingest was released again in December 2014 to fix a few minor logic errors.

Recent Modifications: During recent historical reprocessing work, a new bug was discovered involving the sample time computations for very early binary raw data. This bug has been fixed. We also made minor updates to the mfr3m, mfr10m and mfr25m datastreams. The new version was released to production in March 2015.

2.28 Micropulse Lidar Polarized, Fast Sampling (MPLPOLFS)

Mentor: Rich Coulter, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The mplpol_ingest processes data from the micropulse lidar (MPL, “fast sampling”). Datastreams generated include the following:

- mplpolfs.b1

The mplpolfs_ingest was released for processing the Finland data in January 2014.

Recent Modifications: In May 2015, the preliminary_cbh field was dropped from the mplpolfs.b1 datastream. A few unit corrections were also made at the same time.

2.29 Microwave Radiometer (MWR)

Mentor: Maria Cadeddu, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The mwr_ingest processes data from the MWR. Datastreams generated include the following:

- mwrlos.b1, line-of-sight data
- mwrtip.a1 TIP data

Recent Modifications: A logic problem was discovered while processing some very old historical data. This problem required a new production release in April 2015

2.30 Microwave Radiometer – High Frequency (MWRHF)

Mentor: Maria Cadeddu, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The mwrhf_ingest processes 90/150-GHz microwave radiometer – high frequency (MWRHF) data.

The following datastreams are generated:

- mwrhf.b1
- mwrhfcal90.a1
- mwrhfcal150.a1

Recent Modifications: This ingest has been moved to ADI and was released to production in July 2013. In October 2014, a new version was released to fix a problem discovered while processing data from the mobile facility deployment in Brazil.

2.31 Marine W-Band ARM Cloud Radar (MWACR)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: This ingest reads data from the M-WACR and generates the following datastreams:

- magmwacrauxM1.a0
- magmwacrM1.a1

The mwacr_ingest was released for processing the Finland data in January 2014.

Recent Modifications: A new production release was made in January 2015 to fix a minor bug.

2.32 Marine W-Band ARM Cloud Radar Spectra Filter (MWACRSPEC)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Purpose: Filter huge spectra data files and eliminate non-cloud content. Generate netCDF files and quicklook data plots.

Recent Modifications: The mwacrspec_ingest was rewritten and released to production in September 2014. This version is written entirely in the interactive data language (IDL) language.

2.33 Microwave Radiometer – 3-Channel (MWR3C)

Mentor: Maria Cadeddu, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: Process data from the three-channel microwave radiometer.

The following datastreams are generated:

- mwr3c.b1
- mwrectip.a1

Recent Modifications: This ingest has been moved to ADI and released to production. Historical MWR3C data have been reprocessed.

In December 2014, a new version of the mwr3c_ingest was released to production to handle data from the ARM Cloud Aerosol Precipitation Experiment (ACAPEX) field campaign.

2.34 Microwave Radiometer Profiler (MWRP)

Mentor: Maria Cadeddu, Argonne National Laboratory

Developer: Maria Cadeddu, Argonne National Laboratory

Status: Operational

Purpose: The mwrp_ingest processes data collected from the MWRP. Datastreams generated include the following:

- mwrp.b1

This ingest was moved to ADI and released to production in June 2013. A new version of the mwrp_ingest was released to production in May 2014. The raw format was changed by the vendor for the instrument in the Azores.

Recent Modifications: Because of difficulties with calibration of the data from the Azores instrument, we are working on a brand new version of the ingest that will calibrate the data as they are ingested. This work is complicated, and so far only the logic for the Azores instrument is functional. Testing is ongoing and the mentor is working on logic for the other two formats of MWRP data currently in production. These are the first AMF (AMF1) and NSA raw data formats.

2.35 Surface Navigation Data (NAV)

Mentor: Richard Coulter, Argonne National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: This reads data from the mobile facility datastream for the MAGIC field campaign.

The following datastreams are generated:

- nav.a1
- navgps.a1

Recent Modifications: This ingest has been moved to ADI and was released to production in January 2015. The output datastreams now follow the new ARM standards.

2.36 NOAA AOS (NOAAAOS)

Mentor: Anne Jefferson, National Oceanic and Atmospheric Administration

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: Process quarterly mentor-edited and merged AOS data.

The following datastreams are generated:

- noaaaos.b1
- noaaaosavg.b1

Recent Modifications: The noaaaos_ingest was moved to ADI and released to production in January 2015.

2.37 Optical Rain Gauge (ORG)

Mentor: Mike Ritsche, Argonne National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The org_ingest processes ORG measurements.

The following datastreams are generated:

- org.b1

Recent Modifications: This ingest has been moved to ADI and released to production.

2.38 OTT Parsivel2 Laser Disdrometer (PARS2)

Mentor: Mary Jane Bartholomew, Brookhaven National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: pars2_ingest processes raw pars2 data and generates:

- pars2.b1

Recent Modifications: This ingest has been moved to ADI and released to production.

2.39 Portable Radiation Package (PRP)

Mentor: Mike Reynolds, Remote Measurement and Research Company

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: This ingest reads prprad, prptcm, prptcm, prpfrsr raw data currently in operation for the MAGIC field campaign. The following datastreams are generated:

- 6sprpfrsr.a0
- 1sprprad.a1
- 1sprptcm.a1
- 5sprpgps.a1
- prpfrsr.a0
- prpgps.a1
- prprad.a1
- prptcm.a1

Recent Modifications: In December 2014, a new version of the prp_ingest was made to correct a logic error that was causing the ingest to abort prematurely.

2.40 Radiation Measurements at the ARM Mobile Facility Niamey, Niger, Deployment (RAD)

Mentor: Peter Gotseff, National Renewable Energy Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The rad_ingest processes raw Sky Radiation (SKYRAD) and Ground Radiation (GNDRAD) data to produce daily netCDF files.

The following datastreams are generated:

- skyrad20s.a0
- skyrad60s.b1
- gndrad20s.a0
- gndrad60s.b1

Recent Modifications: Released to production to process the Finland data and migrated to ADI.

2.41 Rain Gauge (RAIN)

Mentor: Mary Jane Bartholomew, Brookhaven National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: The rain_ingest processes tipping bucket measurements.

The following datastreams are generated:

- rainaux.b1
- rain.a1
- rain.b1

Recent Modifications: This ingest has been moved to ADI and logic was added for five-minute accumulations. The rain_ingest was released to production in January 2015.

2.42 Raman Lidar (RL)

Mentor: Rob Newsom, Pacific Northwest National Laboratory

Developer: Laurie Gregory, Brookhaven National Laboratory

Status: Operational

Purpose: This ingest processes RL data.

The following datastreams are generated:

- rl.a0
- rllog.a0

Recent Modifications: Migrated to ADI and released to production in March 2015.

2.43 Roll/Pitch Ingest (RP)

Mentor: Rich Coulter, Argonne National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Purpose: The roll-pitch ingest processes position data (roll, pitch, and related data) from instruments on a moving platform. The ingest generates:

- rphtilt.a1
- rphcontrol.a1

Recent Modifications: This ingest has been moved to ADI. The ingest name was changed to avoid confusion and was released to production in December 2014. In addition, the output datastreams now follow the new ARM standards.

2.44 Radar Wind Profiler (RWP)

Mentor: Rich Coulter, Argonne National Laboratory

Developer: Brian Ermold and Christina Marinovici, Pacific Northwest National Laboratory

Purpose: The rwp_ingest reads data from the 50, 915, or 1290 RWP radio acoustic sounding system wind profiler.

The following datastreams are generated:

- 50rwptempcon.a1
- 50rwptempmom.a0
- 50rwptempspec.a0
- 50rwpwindcon.a1
- 50rwpwindmom.a0
- 50rwpwindspec.a0
- 915rwpprecipcon.a1
- 915rwpprecipmom.a0
- 915rwpprecipspec.a0
- 915rwptempcon.a1
- 915rwptempmom.a0
- 915rwptempspec.a0
- 915rwpwindcon.a1
- 915rwpwindmom.a0
- 915rwpwindspec.a0
- 1290rwpprecipcon.a1
- 1290rwpprecipmom.a0
- 1290rwpprecipspec.a0
- 1290rwpwindcon.a1
- 1290rwpwindmom.a0
- 1290rwpwindspec.a0

The new RWP instruments for Oliktok and ENA are different from the older RWPs deployed at the other sites. The differences required updates to the RWP ingest to read the new data formats, resulting in nine new datastreams:

- 915rwpwindmeanlow.a1
- 915rwpprecipmeanlow.a1
- 915rwpprecipmeanhigh.a1

- 915rwpwindmomentlow.a0
- 915rwpprecipmomentlow.a0
- 915rwpprecipmomenthigh.a0
- 915rwpwindspeclow.a0
- 915rwpprecipspeclow.a0
- 915rwpprecipspechigh.a0

These new datastreams follow the new standards and filenames will end with the.nc extension. The extensions of the older datastream will not change.

The rwp_ingest was released to production in October 2014. Additional logic was needed to handle data from Oliktok and ENA instruments.

The ingest was updated and released to production in March 2015:

- Convert the “signal to noise” units to “100*db” for the newer instruments
- Set moments fields to missing when the “signal to noise” values are 32767 for the older instruments.

Recent Modifications: The ingest was updated to read the new data format produced by the SRUN 1.27 instrument software and was released to production in May 2015.

2.45 Scanning ARM Cloud Radar (SACR)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory and Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Purpose: Read ARM scanning cloud radar data and generate a variety of datastreams, up to 66 different datastreams are possible, depending on radar configuration.

Recent Modifications: This ingest has been moved to ADI and released to production. In December 2014, another production release was made to make minor field-name changes.

Recent Modifications: A completely new raw data format will be generated for the SACR2 raw data version. The ingest work is underway.

2.46 Scanning ARM Cloud Radar (SACR) Spectra Filter (SACRSPEC)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Annette Koontz, Cristina Marinovici, and Brian Ermold, Pacific Northwest National Laboratory

Status: Engineering Work Order-16792 describes this task. This is the ingest for the old (current) format spectra, not the new sacr2 spectra. This ingest currently runs on Red Hat 5, not Red Hat 6.

Recent Modifications: Work on moving the ingest to Red Hat 6 and ADI is being performed.

2.47 Shortwave Array Spectroradiometer – he Measurements (SASHE)

Mentor: Connor Flynn, Pacific Northwest National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Purpose: Read data from SASHE instruments and generate netCDF files.

The following datastreams are generated:

- sashemfr.b1
- sashenir.b1
- sashenirhisun.a0
- sashenirlowsun.a0
- sashevia.b1
- sashevishisun.a0
- sashevislowsun.a0

The ingest was modified to read new responsivity files created by the SASHE AOS VAP. The ingest was released to production in September 2014 and rereleased in February 2015 after an update for a shadow band sequence change in Brazil.

Recent Modifications: Released in June 2015 after an update for a shadow band sequence change at SGP.

2.48 Shortwave Array Spectroradiometer – ze Measurements (SASZE)

Mentor: Connor Flynn, Pacific Northwest National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: This ingest reads sasze input files and generates netCDF output.

The following datastreams are generated:

- saszefilterbands.a1

- saszenir.a0
- saszenir.a1
- saszevis.a0
- saszevis.a1

Recent Modifications: This ingest was recently cloned from the sas_ingest, moved to ADI, and released to production. Responsivity files for the Brazil deployment were released in January 2015.

2.49 Surface Energy Balance System (SEBS)

Mentor: David Cook, Argonne National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The pars2_ingest processes raw SEBS raw data.

The following datastream is generated:

- sebs.b1

Recent Modifications: This ingest has been moved to ADI and released to production.

2.50 Solar Infrared Radiation Station (SIRS)

Mentor: Peter Gotseff, National Renewable Energy Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The sirs_ingest processes data collected from SIRS instruments. Datastreams generated include the following:

- sirs.b1
- sirs20s.a0
- brs20s.a0
- brs.b1

Recent Modifications: The instrument data loggers were upgraded to newer Campbell data loggers. This required changes to the ingest logic, and a few bugs have been found and corrected. This ingest has been moved to ADI and released to production.

2.51 Mini Sound Detection and Ranging (SODAR)

Mentor: Richard Coulter, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The sodar_ingest processes data collected from mini SODAR instruments. Datastreams generated include the following:

- sodar.b1
- sodarspec.a1

Recent Modifications: This ingest has been moved to ADI. It was released to production in May 2014.

2.52 Balloon-Borne Sounding System (SONDE)

Mentor: Donna Holdridge, Argonne National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The sonde_ingest processes data collected from the balloon-borne sounding system. Datastreams generated include the following:

- sondewnpn.b1

Recent Modifications: This ingest has been moved to ADI and released to production.

2.53 Surface Temperature and Humidity Reference (SURTHREF)

Mentor: Mike Ritsche, Argonne National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The surthref_ingest processes data collected from SURTHREF system instruments. Datastreams generated include the following:

- surthref.b1

This ingest has been moved to ADI and released to production.

Recent Modifications: The SURTHREF instrument has been retired and replaced by the MAWS.

2.54 Soil Water and Temperature System (SWATS)

Mentor: John Harris, Cooperative Institute for Mesoscale Meteorological Studies

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: The swats_ingest processes data collected from the SWATS. Datastreams generated include the following:

- swats.b1
- swatsspcp.b1

Recent Modifications: The swats_ingest was moved to ADI and calibrations and metadata added for the new E30 to E37 facilities at the SGP. The updates were released to production in March 2015.

2.55 Shortwave Spectroradiometer (SWS)

Mentor: Connor Flynn, Pacific Northwest National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The sws_ingest processes data collected from the SWS. Datastreams generated include the following:

- sws.b1
- swsaux.b1

Recent Modifications: The sws_ingest is being modified to generate netCDF data that are similar to sasze files. This new version is still in development.

2.56 Temperature, Humidity, Wind, and Pressure Sensors (THWAPS)

Mentor: Mike Ritsche, Argonne National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: The thwaps_ingest processes data collected from THWAPS instruments.

Datastreams generated include the following:

- thwaps.b1

Recent Modifications: The ADI library version of the thwaps_ingest was released to production in January 2014.

2.57 Total Precipitation Sensor (TPS)

Mentor: Mark Ivey, Sandia National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The tps_ingest processes data from the TPS, which measure precipitation rate and daily accumulated precipitation. The instrument is located at the NSA Barrow site. Datastreams generated by this instrument are nsatps.C1.b1 and nsatps.C1.00 (raw).

- tps.b1

Recent Modifications: The tps_ingest has been moved to ADI and released to production. A new version is being developed to handle a new raw data format. This version of the ingest has not been released to production yet. This work is related to Engineering Work Order-14846.

The current TPS sensor has failed. A replacement sensor is being sought.

2.58 Total Sky Imager (TSI)

Mentor: Victor Morris, Pacific Northwest National Laboratory

Developer: Annette Koontz, Pacific Northwest National Laboratory

Status: Operational

Purpose: The tsi_ingest process data from the TSI.

Datastreams generated by this instrument are:

- tsicldmask.a1
- tsiskycover.b1
- tsiskyimage.a1

Recent Modifications: A minor update to the file renaming was released to production in February 2015.

2.59 Facility-Specific Multi-Level Meteorological Instrumentation (TWR)

Mentor: David Cook, Argonne National Laboratory

Developer: Brian Ermold, Pacific Northwest National Laboratory

Status: Operational

Purpose: The twr_ingest processes data collected from meteorological instruments located on towers above the ground. The datastreams generated include the following:

- 1440twr21x.b1
- 1440twr25m.b1
- 1440twr60m.b1
- 1twr10x.b1
- 1twr25m.b1
- 1twr60mC1.b1
- 30twr10x.b1
- 30twr25m.b1
- 30twr60m.b1

2.60 Video Disdrometer (VDIS)

Mentor: Mary Jane Bartholomew, Brookhaven National Laboratory

Developer: Yan Shi, Pacific Northwest National Laboratory

Status: Operational

Purpose: The vdis_ingest reads and processes two dimensional video disdrometer data

Recent Modifications: In November 2014, the ingest was modified in preparation for deployment to the ENA site.

2.61 W-Band ARM Cloud Radar (WACR)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Purpose: The wacr_ingest reads and processes W-band radar data and generate wacr.b1 data files.

Recent Modifications: The wacr_ingest has been rewritten for the new wacr2 raw data format. This version of the ingest was released to production in June 2014. Data from Brazil are currently processing on the DMF. A fix for swapped polarizations was implemented and released to production in March 2015.

2.62 Cloud Radar Spectra Filter (WACRSPEC)

Mentor: Karen Johnson, Brookhaven National Laboratory

Developer: Krista Gaustad, Pacific Northwest National Laboratory

Status: Operational

Purpose: Filter huge spectra files to eliminate non-cloud content and generate netCDF files and quicklook data plots.

Recent Modifications: In September 2014, a new version of the ingest was released to production. This version was rewritten entirely in IDL.

2.63 X-Band Scanning Precipitation Radar (XSAPR)

Mentor: Scott Collis, Argonne National Laboratory

Developer: Jonathan Helmus, Argonne National Laboratory

Purpose: The XSAPR ingest process is used to read data from the four XSAPR radar instruments. The data from these instruments comes stored in the IRIS/Sigmet format developed by Vaisala. The IRIS/Sigmet format is a published radar data format. During ingest, the radar moments and metadata contained in this format are read in IRIS/Sigmet and converted into netCDF.

The following datastreams are generated:

- xsaprppi.a1
- xsaprrhi.a1
- xsaprvpt.a1

Recent Modifications: While reprocessing xsapr data from all sites a few problem files were encountered. A new version of the xsapr_ingest was released in June 2015. Data reprocessing continues.

3.0 Ingest Metrics

Metrics from the ARM Data Archive were not available at the time this report was published.

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