

ARM Updates

ARM-ASR Joint User Facility PI Meeting

March 14, 2017

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ARM Program Managers



U.S. DEPARTMENT OF
ENERGY

Office
of Science

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and Environmental Research



- Jimmy Voyles, ARM Chief Operating Officer, is retiring from PNNL this fall after 23 years of working in various roles in ARM
- DOE acknowledges and thanks Jimmy for his exceptional contributions to ARM

New ARM Facility Capabilities

- New AOS at Oliktok Point and SGP
- UAS/TBS Capabilities & Activities
- LASSO simulations & transition to operations
- ARM high performance computing capabilities
- C-SAPR2
- Other instrument capabilities/upgrades
- New data products

Aerosol Observing System (AOS)

- 2 new Aerosol Observing Systems built and installed:
 - AMF3/Oliktok Point – Aug 2016
 - SGP – November 2016



Photos courtesy of Stephen Springston & Scott Smith, BNL



Unmanned Aerial & Tethered Balloon Systems

- New “ArcticShark” mid-size UAS officially accepted
 - Training, instrument integration 2017
 - Initial planned instrumentation: radiation, atmos state, aerosol
 - Engineering/testing deployments to Oliktok Point 2018
 - Expected to be available for PI proposals at Oliktok 2019



Photo courtesy of Mike Busitil.



Photo courtesy of Pete Carroll.

Unmanned Aerial & Tethered Balloon Systems

- ICARUS

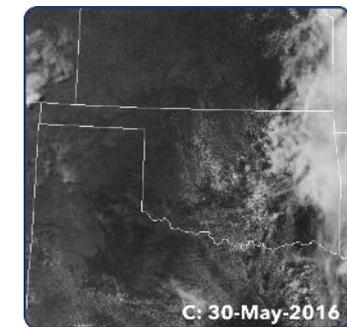
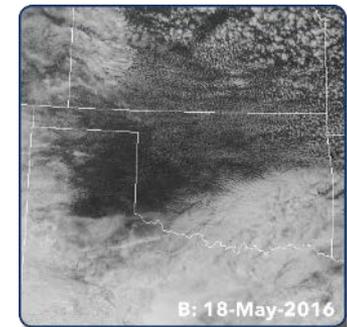
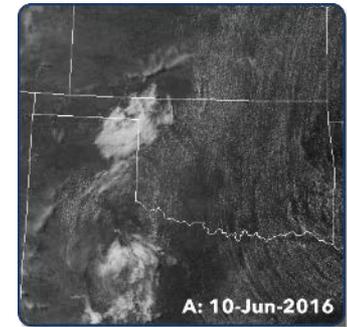
- “Inaugural Campaigns for ARM Research using Unmanned Systems”
- Routine ARM TBS and small UAS observations at Oliktok
- ARM activity led by SNL & PNNL w/ science guidance from Oliktok Site Science Team, UAS group, and ARM/ASR community
- Next set of flights planned May-Oct 2017
- Will focus on atmospheric state & thermodynamics, aerosol observations, supercooled water detection, turbulence



Photos courtesy of SNL

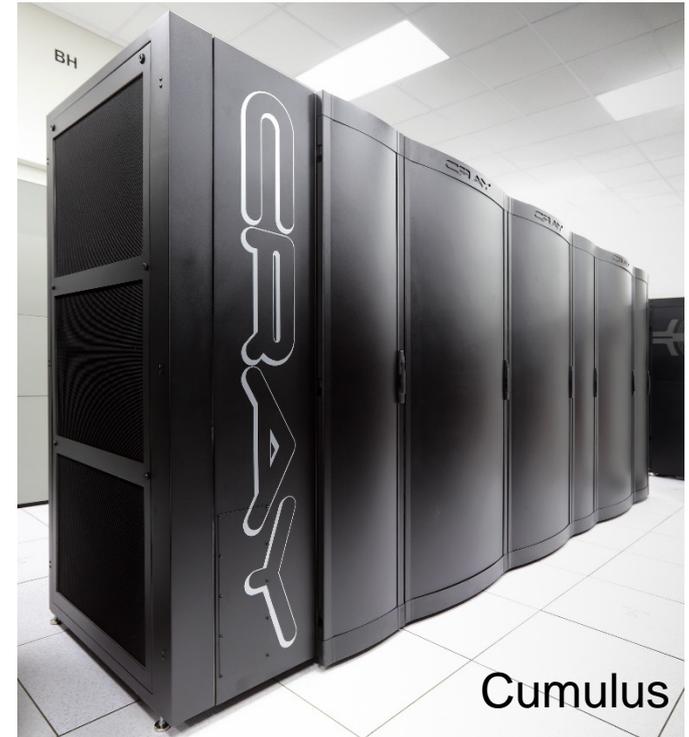
LASSO Status & Updates (1)

- **Nearing end of 2-year pilot phase** to develop a workflow for an operational LES modeling capability to enhance ARM observations
- **Alpha 1 release, July 2016**
 - ▶ 192 LES simulations for 5 shallow convection (ShCu) days from spring/summer 2015
 - ▶ Designed for initial community feedback regarding desired output, methodology, and searching capabilities
- **Alpha 2 release, expected May 2017**
 - ▶ 14 ShCu cases with various levels of forcing complexity
 - ▶ Incorporating observed ARM profiles in the data assimilation
 - ▶ Additional diagnostic and metric development



ARM Data Center Computing Facility

- **Cumulus Cluster**
 - ▶ LASSO model operations and large scale data analysis/visualizations
 - ▶ Phase I deployment: 112 nodes (4,032 cores), 2 PB GPFS storage.
- **Stratus Cluster**
 - ▶ Routine radar processing
 - ▶ Large-scale reprocessing
 - ▶ Complex VAP development
 - ▶ No-SQL based advanced visualizations
 - ▶ Big data extractions for science users
 - ▶ Long-term data quality analysis
 - ▶ 30 nodes (1,080 cores), 256 GB memory/node, 1.92 TB SSD/node, Lustre and NFS storage
- Both clusters will be connected to HPSS and ADC resources
- Developing process for requesting HPC resources through IOPR system
- Please visit Giri Prakash's poster for further details



C-SAPR2

- Transportable* C-band radar officially accepted
- Will deploy to Argentina for CACTI



* Requires 6 shipping containers

Other new instrument capabilities

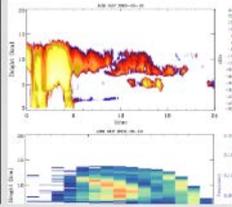
- Precipitation plan
 - SGP – Pluvio2 weighing bucket; 5 Parsivel2 laser disdrometers installed (2 at CF; 1 at each IF)
 - Pluvio weighing buckets in prep for AMF1, AMF2, ENA
 - Barrow: Theis laser precipitation monitor; three sonic snow depth sensors
 - Oliktok/AMF3: Geonor weight bucket; Theis laser precip monitor; three sonic snow depth sensors
- X-SAPRs at SGP
 - Substantial progress on upgrading radar control processors (RCPs)
 - Installed and tested at I5, planned installation at I4 & I6 this spring
- Stereo photogrammetry at SGP
 - Sites identified
 - Final design review next week

New data products

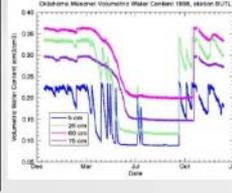
- ARM is continuously developing new data products & processing additional dates/sites for existing products
- Check ARM newsletter for 'Data Announcements'
- Provide input on data product priorities through Working Groups and Breakout Session reports
- ARM Data Booth – in Lobby
 - Questions about how to get ARM data?
 - Stop by during coffee breaks or break-out session times or sign up for a specific time
- Lunchtime tutorial today: Science product development through community collaboration

NEWS & EVENTS
DATA ANNOUNCEMENTS

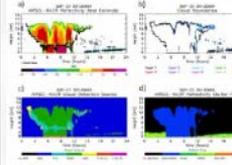
NEW RELEASE OF RADAR CFAD DATA PRODUCT FOR ARM RADAR SIMULATOR
Published: 15 February 2017
[Data Announcements](#)
Updated: Newly released data are now included from the Southern Great Plains, North Slope of Alaska, and the Tropical Western Pacific atmospheric observatories from 2011 to 2013. Previous radar CFAD data (nsaradarcfadCl.c1) for the period between 2006 and 2010 from the North Slope observatory has been removed due to a radar calibration issue. An ARM cloud radar simulator was developed to [...]
[Read more](#)



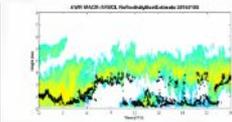
OKLAHOMA MESONET SOIL MOISTURE PRODUCT AVAILABLE FOR EVALUATION
Published: 15 February 2017
[Data Announcements](#)
Researchers supported by the U.S. Department of Energy's Atmospheric System Research (ASR) program are interested in studying land-atmosphere interactions at the meso-scale level around the ARM Southern Great Plains (SGP) atmospheric observatory. In order to help address these research needs, the ARM External Data Center (XDC) created a soil moisture value-added product (VAP) using the [...]
[Read more](#)

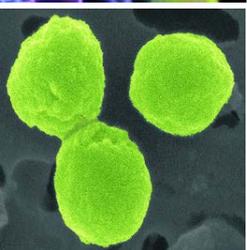
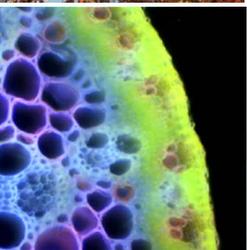
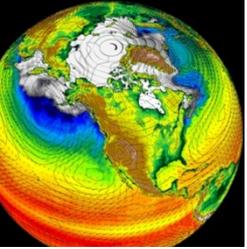


KAZR-ARSCL AND KAZRCOR PRODUCTS NOW AVAILABLE FOR 2011-2014 DATA
Published: 16 November 2016
[Data Announcements](#)
Updated 3/1/2017: Data has been updated from evaluation data to baseline production data. The Active Remote Sensing of Clouds product using Ka-band ARM Zenith Radars (KAZR-ARSCL) value-added product (VAP) and KAZR Corrected Data (KAZRCOR) VAP together are successors to the retired ARSCL VAP. The ARSCL VAP was based on the Millimeter Wavelength Cloud Radar (MMCR), ARM's original [...]
[Read more](#)



NEW WACR RADAR DATA AVAILABLE FOR AWARE CAMPAIGN
Published: 16 November 2016
[Data Announcements](#)
The W-band ARM Cloud Radar-Active Remotely-Sensed Cloud Locations (WACR-ARSCL) provides cloud boundaries and best-estimate time-height fields of radar moments. WACR observations are corrected for velocity aliasing, and then significant detection masks are produced. The corrected WACR measurements are combined with observations from the micropulse lidar, ceilometer, soundings, rain gauge, and [...]
[Read more](#)





Recent/Current/Upcoming Campaigns



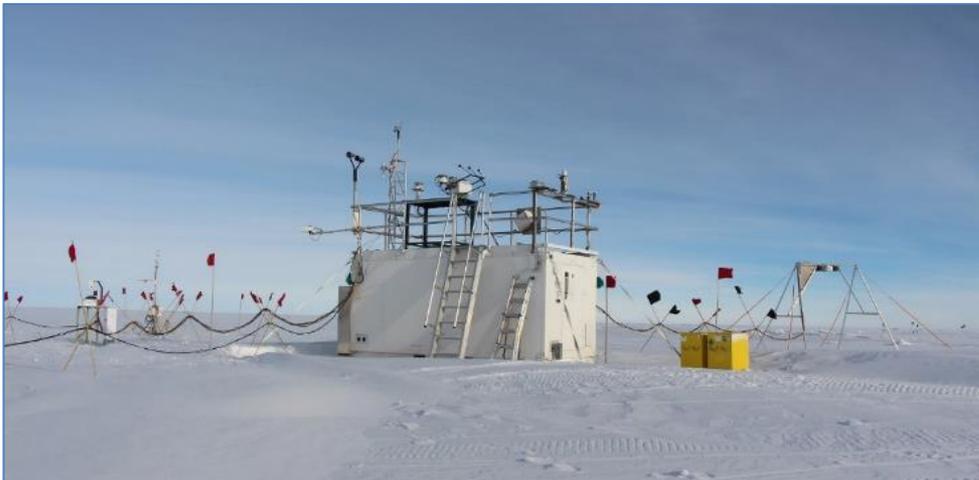
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Recent/Current AMF campaigns

- AWARE – ARM West Antarctic Radiation Experiment
 - AMF2 at McMurdo Dec 2015- Dec 2016
 - PI Dan Lubin, Scripps
 - SKIP deployed at West Antarctic Ice Sheet Dec 2015 – Jan 2016
 - Presentations in:
 - **High Latitude Processes WG (Tues aft)**
 - **Plenary (Thurs morning)**



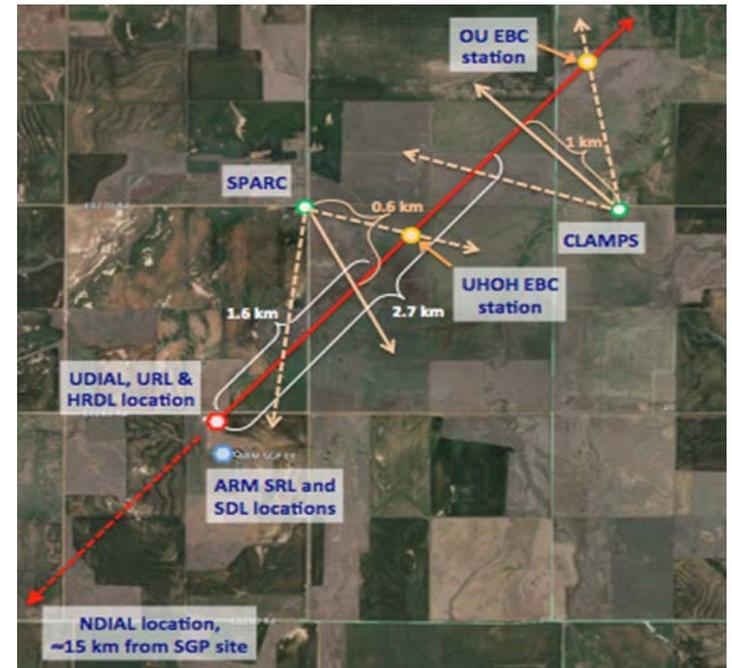
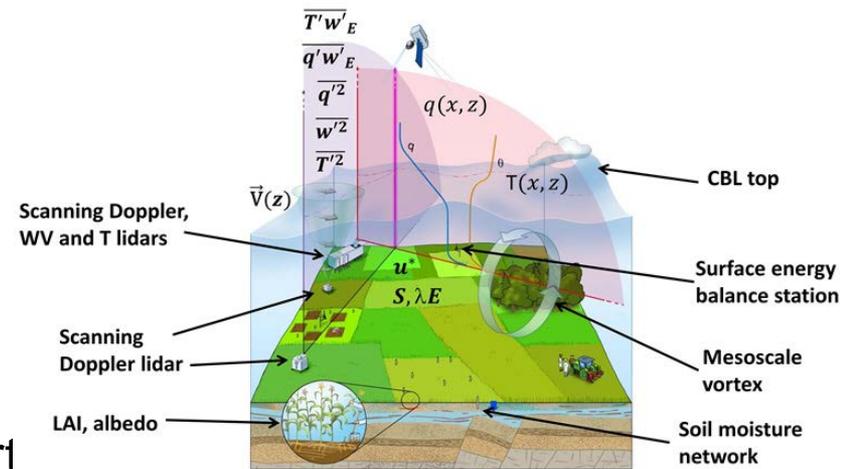
Recent/Current AMF campaigns

- LASIC – Layered Atlantic Smoke Interactions with Clouds
 - PI Paquita Zuidema, U. Miami
 - AMF1 at Ascension Island June 2016 – Oct 2017
 - **Breakout session Wed morning**



Upcoming Campaigns (1)

- **Land-Atmosphere Feedback Experiment (LAFE)**
 - PI Volker Wulfmeyer, U. Hohenheim
 - August 2017 at SGP
 - Deployment of multiple state-of-the-art scanning lidar systems to study land-atmosphere feedback processes
 - Collaborative funding agencies: DLR, NOAA, NASA



Upcoming campaigns (2)

- **ACE-ENA (Aerosol and Cloud Experiments in the Eastern North Atlantic)**
 - PI Jian Wang, BNL
 - G-1 campaigns around ENA in June-July 2017 and Jan-Feb 2018
 - Comprehensive in-situ characterizations of boundary layer structure, and associated vertical distributions and horizontal variabilities of low clouds and aerosol over the Azores
 - **Breakout session Wed afternoon**
- **MARCUS (Measurement of Aerosols, Radiation and CloUds over the Southern Oceans)**
 - PI Greg McFarquhar, U. Illinois
 - AMF2 deployed on *Aurora Australis* as it conducts multiple supply transits between Tasmania and Antarctica; Sep 2017 – Apr 2018
 - Goal: improve understanding of clouds, aerosols, air-sea exchanges and their interactions over the Southern Ocean
 - **Breakout session Wed afternoon**



Photo: Wendy Pyper

Aurora Australis; Australian Antarctic Division

Upcoming campaigns (3)

- CACTI (Cloud, Aerosol, and Complex Terrain Interactions)
 - PI Adam Varble, U. Utah
 - AMF1 deployed to Sierras de Córdoba mountain range of north-central Argentina; Aug 2018 – April 2019
 - Goal: improve understanding of cloud lifecycle and organization in relation to environmental conditions in order to improve cumulus, microphysics, and aerosol parameterizations
 - **Breakout session yesterday**

- MOSAiC Atmosphere

- PI Matt Shupe, U. Colorado/NOAA
- AMF2 deployed on *Polarstern* icebreaker, which will be frozen into and drift with Central Arctic sea-ice for 1 year; Sep 2019 – Oct 2020
- Target atmosphere and atmosphere-surface interactions that are critically under-observed in the Arctic and are leading contributors to model uncertainties in the region
- **Breakout Session Thurs morning**



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Polarstern
Alfred Wegner Institute