

# ARM Facility Update

JIM MATHER  
ARM TECHNICAL DIRECTOR

ARM/ASR Joint User Facility and Principal Investigator Meeting  
March 20, 2018

# New Leadership Roles

- Associate Director for Operations
  - ▶ Nicki Hickmon (Replacing Jimmy Voyles)



- Site Manager for the Southern Great Plains
  - ▶ Mike Ritsche (Replacing Nicki Hickmon)

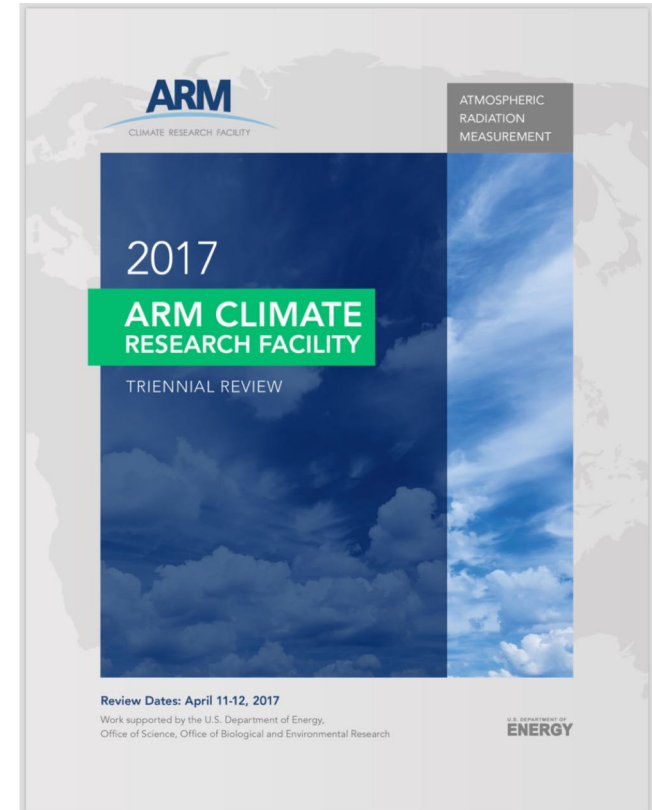


<https://www.arm.gov/about/management-structure>

# Triennial Review

Successfully completed the triennial review including submission of plans to address panel recommendations:

- Metrics for outreach and science impact
- Broaden reach beyond DOE and ASR users
- Plan for timely release of Value Added Products (VAPs) for AMF campaigns
- Continued improvements to the Data Discovery Tool
- Process for reviewing ARM priorities
- Plans for radars and develop plan for aerosol measurements
- Plan for LASSO including scope, goals, metrics, and next steps



# Engineering Activities Supporting the Radar Plan

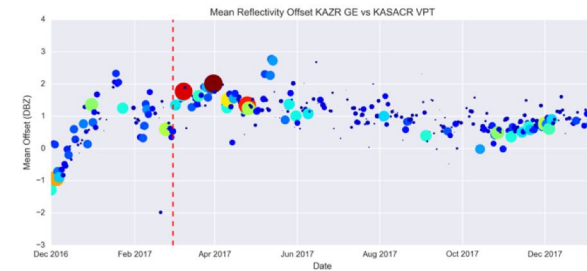
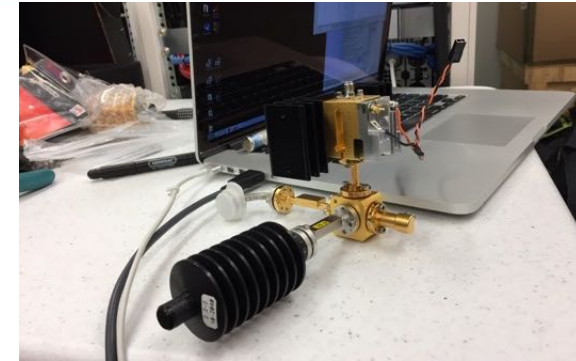
## Recent

- New field calibration methodology used to characterize SACR/KAZR at ENA and AMF3
- SGP XSAPRs redesigned and operating
- XSAPR2 operating as of January 2018

## Current

- Implementing full suite of a1/b1 data products
- Preparing SACR and CSAPR2 for CACTI (CSAPR2 radome installed at SGP)
- Oliktok SACR being prepared for move to Barrow

**Radar Science and Operations meeting Thurs 4:00-6:00**



# Developing an Aerosol Measurement Strategy

## Goals

- Identify and address impediments to using ARM aerosol measurements
- Optimize ARM resources to meet science needs



## Timeline of Activities to Date

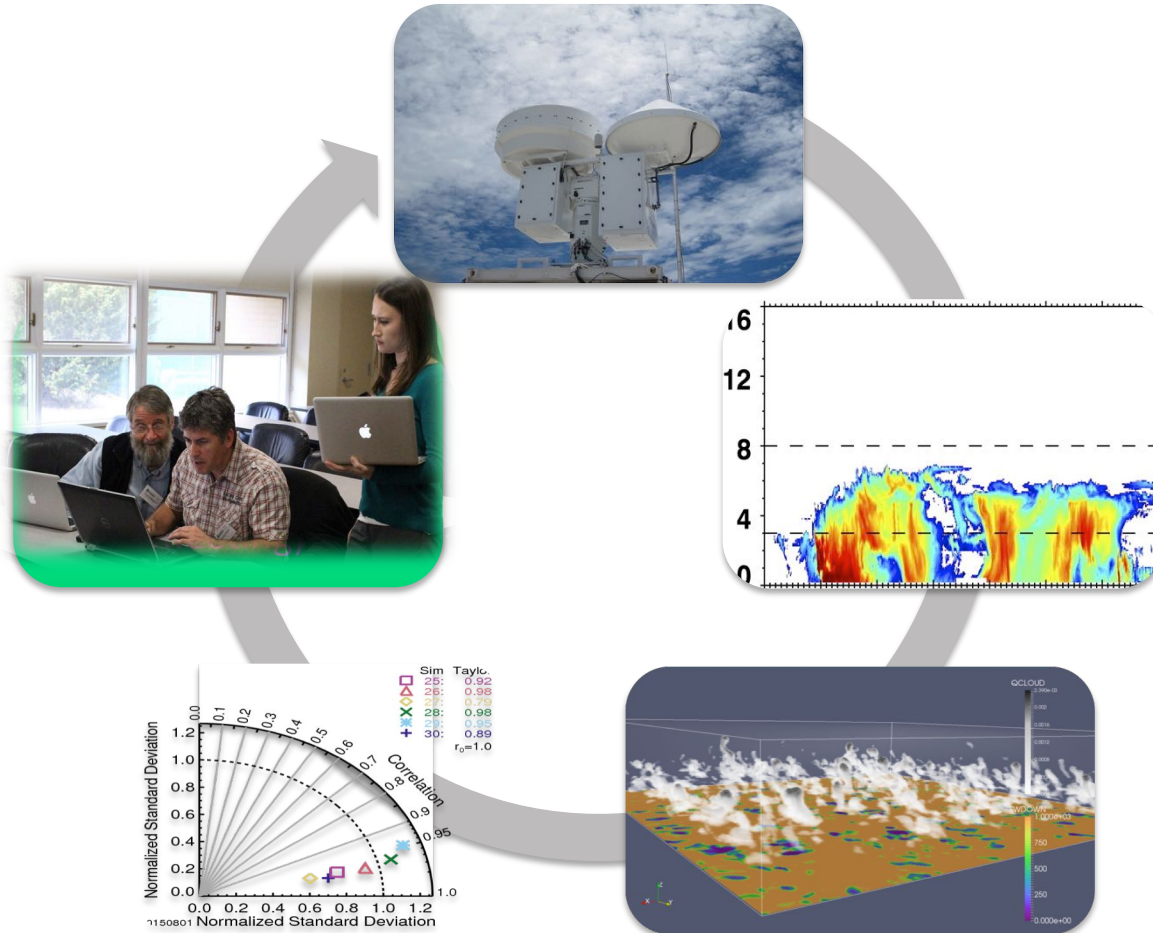
- May 2016: Breakout at the ARM/ASR spring meeting
- Feb 2017: Aerosol Measurements and Science Group Workshop
- Feb 2018: Draft plan to address AMMSG issues

**Wednesday 10:30-12:30 breakout to review status and solicit input**

Workshop Report is Now Available at:

<https://www.arm.gov/about/constituent-groups/amsg>

# LES ARM Symbiotic Simulation and Observation (LASSO)



## LASSO activities

- Alpha2 simulations released
- Recommendations for operations provided to ARM management
- Preparing to run 2017 season
- Soliciting feedback and ideas for next phase

<https://www.arm.gov/capabilities/modeling/lasso>

**Breakout session**  
**Thursday 10:45-12:45**

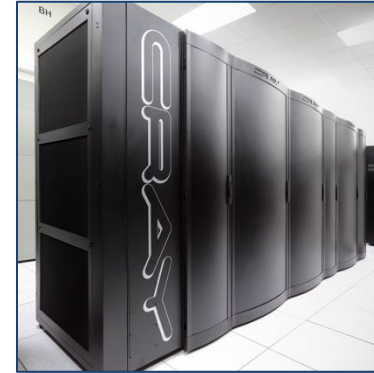
# ARM Data Center Computing Facility



## Stratus cluster

- ▶ 30 nodes
- ▶ 1,080 cores

- ▶ Routine radar processing
- ▶ Large-scale reprocessing
- ▶ Complex data product development



## Cumulus cluster

- ▶ 112 nodes
- ▶ 4,032 cores

Possible expansion depending on resources and need.

- ▶ LASSO model operations & large scale data analysis/ visualizations

More information at:

<https://www.arm.gov/capabilities/computing-resources>

## Related Posters

- ▶ Cluster overview B1/145
- ▶ Exploring Big Data Analysis B1/163
- ▶ Interactive plotting requirements B1/126

# Engage with Members of the ARM Data Services Team at this Meeting!



**ARM**  
CLIMATE RESEARCH FACILITY

## ARM Data Services Helpdesk

- Navigate Data Discovery
- Obtain Data from the ARM Data Center Archive
- Understand the Structure of ARM Data
- Use ADI, PyART, OME and Other Visualization Tools
- Acquire Computing Resources

*Ask us how!*

ATMOSPHERIC RADIATION MEASUREMENT CLIMATE RESEARCH FACILITY

[www.arm.gov](http://www.arm.gov)

The graphic features a background of a grid with a blue and green data visualization at the bottom, showing a fluctuating line graph.



# New Capabilities and Development Efforts

## Arctic Shark UAS



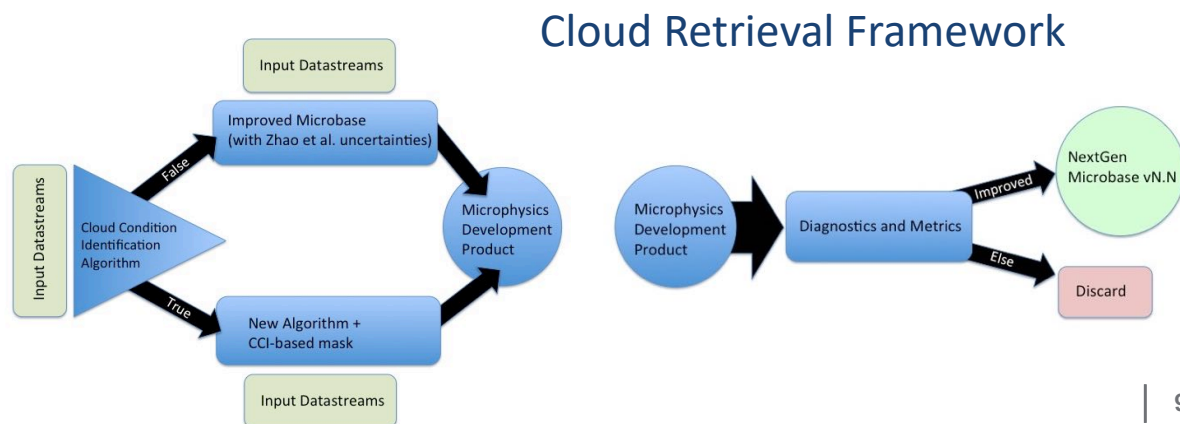
## Upgraded MFRSR



## Photogrammetry



## Tethered Balloon at Oliktok

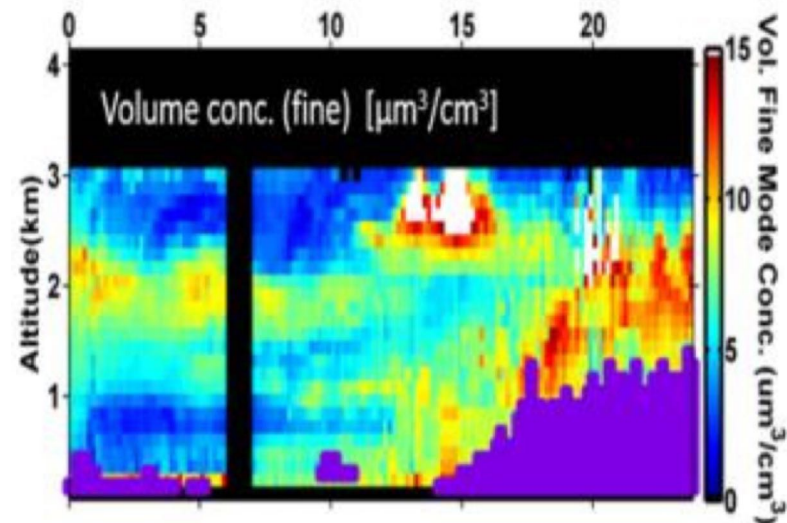


# New Measurement Capabilities

- New Aerosol Observing System at SGP B1/136
- 1625 nm MFRSR channels B1/133
- Unmanned Aerial Systems
  - ▶ Small UAS B1/140
  - ▶ Mid-size UAS (ArcticShark)
  - ▶ Tethered Balloon B2/25

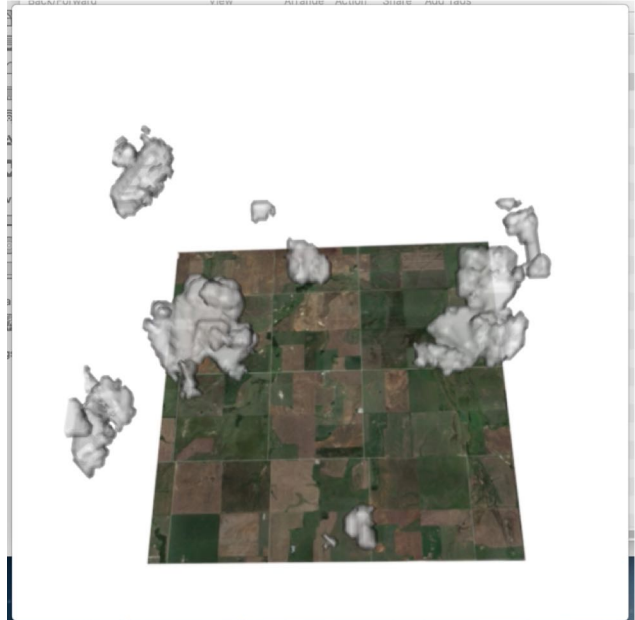
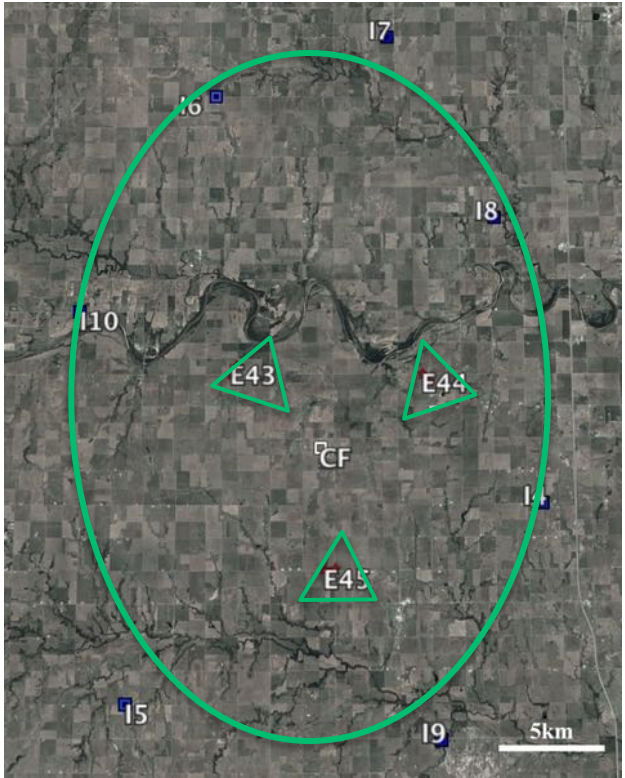
## Guest/Temporary Measurements

- NASA Precipitation Imaging Package (PIP) at Oliktok
- 3- $\lambda$  lidar combination at SGP (CHARMS) B2/100



# Stereo Photogrammetry at the SGP

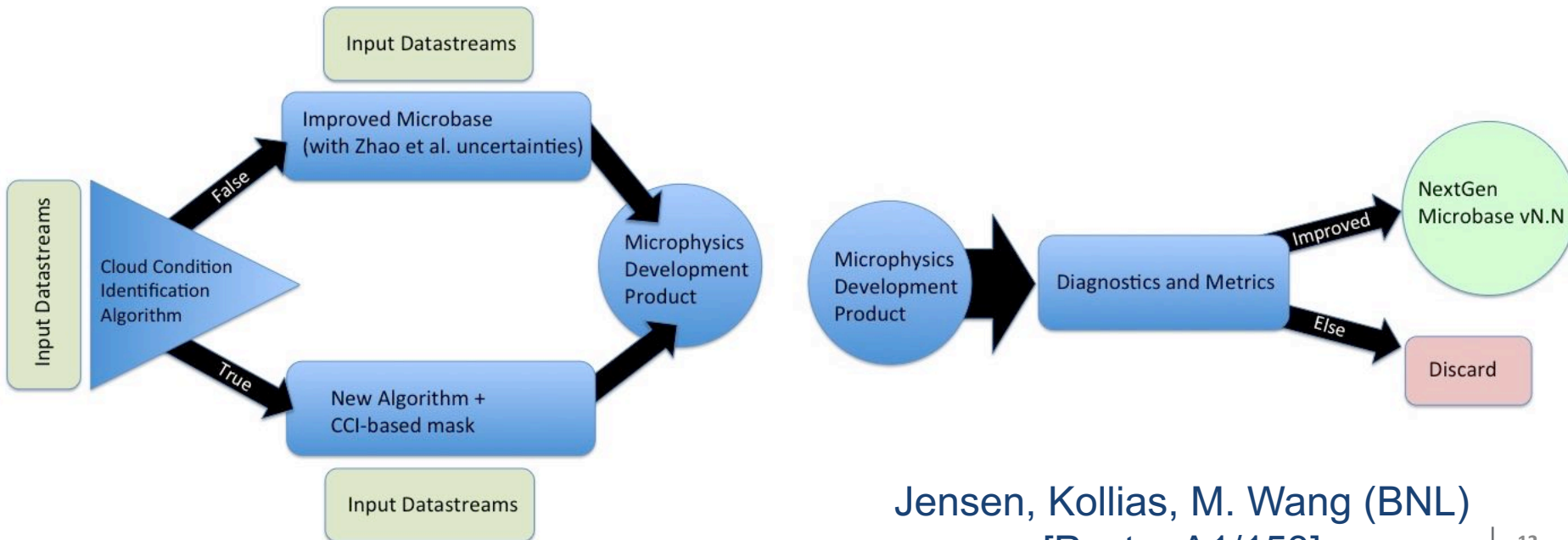
Network of three pairs of cameras provide high-temporal resolution cloud boundaries: Led by David Romps and Rusen Oktem (LBNL)



Poster A2/66

# Operational Ground-Based Retrieval Evaluation for Clouds (OGRE-CLOUDS)

- Framework for development, testing and improvement of continuous cloud microphysics product
- Use existing MICROBASE (+ uncertainties) product as a background
- Enable merging of new conditional retrievals with background
- Evaluate new merged product with radiative closure, in situ, and OSSE



Jensen, Kollias, M. Wang (BNL)  
[Poster A1/153]

# Machine Learning to Support Data Quality and Parameter Retrievals



- On-going work at BNL:
  - ▶ Sun photometer error detection
  - ▶ Detection of local aerosol sources at ENA
  
- Three new Machine Learning projects
  - ▶ Problem detection in MWR, SWATS, and STAMP (LLNL)
  - ▶ Problem detection in radars (PNNL)
  - ▶ Sea clutter identification (BNL)

As well as investigator-driven efforts

Breakout session  
Tuesday 1:30-3:30

# Science Product Development Led by Team of Scientists

## Translators



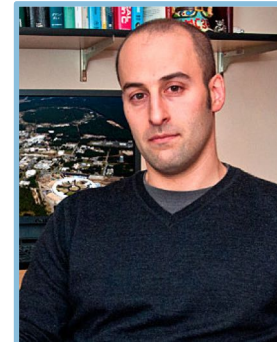
Laura Riihimaki  
Clouds & Radiometric



Connor Flynn  
Aerosols



Scott Collis  
Precipitation Radar



Scott Giangrande  
Cloud Radar



Shaocheng Xie  
Modeling



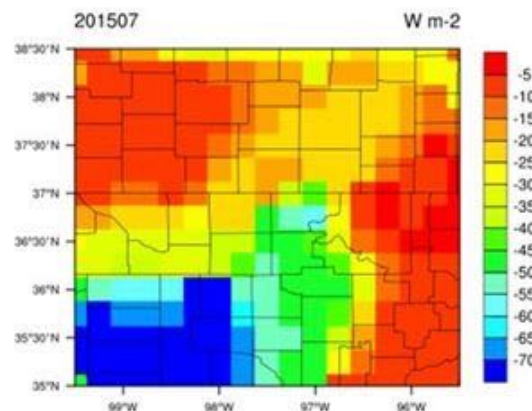
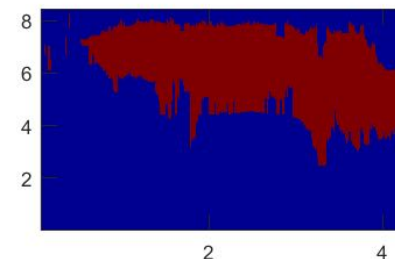
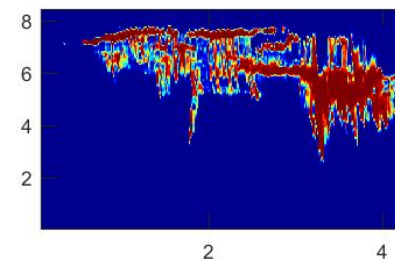
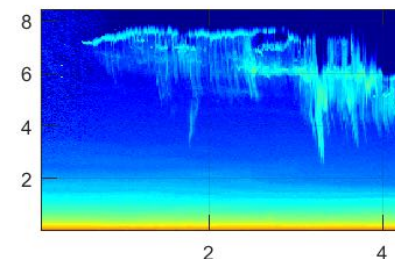
Krista Gaustad  
Software and  
Processing



Justin Monroe  
Data  
Quality

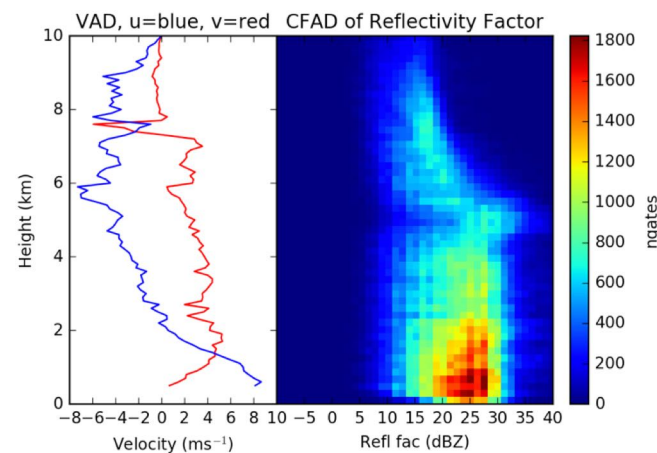
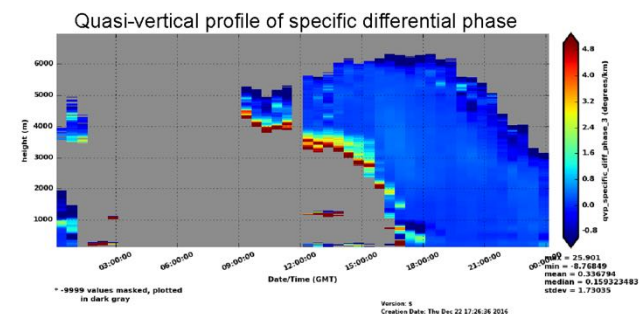
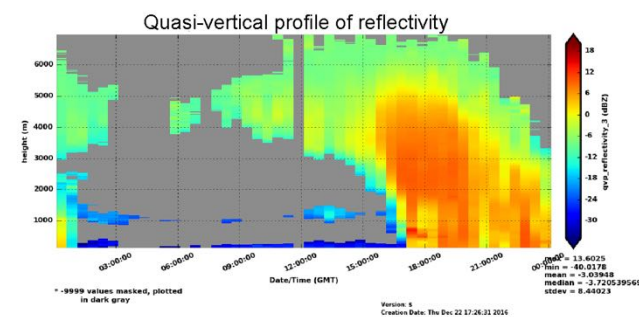
# Value Added Products

- Core products for AMFs (Laura's talk)
- Products supporting LASSO B1/77
  - ▶ Improved Liquid Water Path from IR + Microwave
  - ▶ Improved lidar cloud-mask A1/116
  - ▶ RWP-based Boundary Layer winds
- 3D model forcing
- ARM Best Estimate (ENA planned this year)
- Diagnostic Package for global models B1/159
- ARM Cloud Radar Simulator for global models



# Value Added Products

- “Instant” and up-to-date ARSCL
- Corrected radar Moments in Antenna Coordinates (CMAC2)
- Scanning radar derivative products (for mm- and cm-wavelength radars)
  - ▶ Quasi-Vertical Profiles (QVP)
  - ▶ Velocity Azimuth Display (VAD) winds
  - ▶ 3D Gridding
- Python ARM Radar Toolkit (PyART) Roadmap B1/124
- Disdrometer Best Estimate
- Precipitation uncertainties





# Engaging with ARM Staff

## ATMOSPHERIC RADIATION MEASUREMENT • CLIMATE RESEARCH FACILITY

### CONNECT WITH ARM

CREATE ACCOUNT

ORGANIZATION



Reviewed December 2016

### POLICIES

DATA POLICIES

CAMPAIGN GUIDELINES

LINKING POLICIES

PRIVACY & SECURITY NOTICE

### HELP

ASK US

DATA QUESTIONS

FAQS

ACCOUNT MANAGEMENT

### RESOURCES

MEDIA

OUTREACH

ACRONYMS

GLOSSARY

### WORKING WITH ARM

USE ARM FACILITIES

ACKNOWLEDGE ARM

SUBMIT A PROPOSAL

FIND EMPLOYMENT

VIEW ARM PRIORITIES



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**TECHNICAL**

[Sarah Fillmore](#)

**ASSOCIATE**

[Nicki Hickmore](#)

**ENGINEERING**

[Jennifer Combs](#)

**DATA AND OPERATIONS**

[Giri Prakash](#)

**COMMUNICATIONS**

[Hanna Goss](#)

**MAILING ADDRESS**

**ARM Climate**  
Pacific Northwest National Laboratory  
P.O. Box 999  
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509-375-2111

**Instrument Mentors**

**ARM Data Center**

**Data Quality Office**

**Cyber Security**

**Constituent Groups**

**Translators**

**LASSO**

**ADDITIONAL CONTACTS**

U.S. Department of Energy

Technical Director's Office

Associate Director of Operations

Engineering and Process Management

Communications and Media

Infrastructure Management Board (IMB)

Science Board

ARM-ASR Coordination Team (AACT)

Architecture and Services Strategy Team (ASST)

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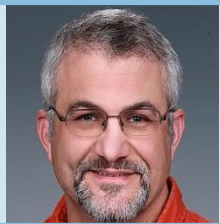
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- Data Quality Office
- Cyber Security
- Constituent Groups
- Translators
- LASSO

# Links to the ARM User Community



Larry Berg  
PNNL



Sebastian Biraud  
LBNL



Christine Chiu  
Reading



Jiwen Fan  
PNNL



Graham Feingold  
ESRL



Andrew Gettelman  
NCAR



Gannet Hallar  
DRI



Jim Haywood  
UK Met Office



Pavlos Kollias  
Stony Brook



Erika Roesler  
Sandia



Courtney Schumacher  
Texas A&M



Matt Shupe  
ESRL

# User Executive Committee



- Primary interface between ARM and the science user community
- Provides feedback to facility regarding what's working, what is not
- Over the past year – this group has been looking at how to better connect to the broader science community
- They would like to hear from you – how they can help to improve ARM or help you better engage with ARM

Visit them at their poster – or throughout the week.



# Opportunity to Engage with Members of the ARM Data Services Team

# ARM

## *Special Announcement: Deadline Approaching*

**REMINDER: Summer training event applications are due Friday, March 30, 2018.**

**Calling all graduate students and early career scientists!**

The second ARM Summer Training and Science Applications event on observations and modeling of clouds and precipitation will take place **July 14 to 21, 2018**. The training will be held at the National Weather Center in Norman, Oklahoma.



**Email Applications** to Sarah Fillmore ([Sarah.Fillmore@pnnl.gov](mailto:Sarah.Fillmore@pnnl.gov)) and Jim Mather ([Jim.Mather@pnnl.gov](mailto:Jim.Mather@pnnl.gov))