

**ASR Science Team Meeting**  
**18 March 2013**  
**Bolger Center, Potomac, Maryland**

**Wanda R. Ferrell**  
**ARM Program Manager**

# ARM Climate Research Facility

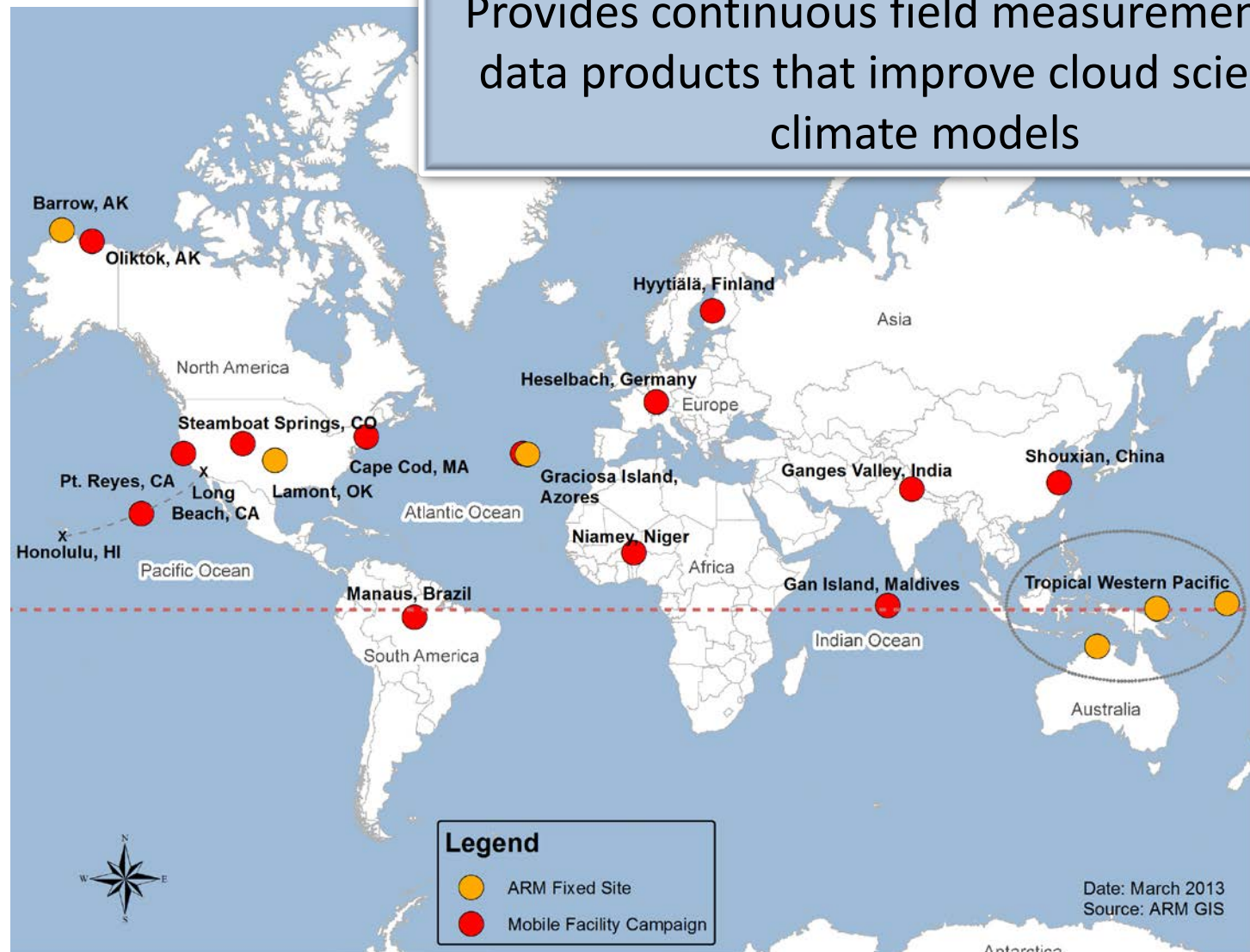
The ARM Climate Research Facility provides observations that are essential for addressing the role of clouds and aerosols in climate.

ARM operates *in situ* and remote sensing observatories in climatically distinct locations to sample continental and marine conditions in tropical, midlatitude, and Arctic environments.

- Four fixed sites (U.S. Southern Great Plains, Tropical Western Pacific, North Slope of Alaska, and the Azores)
- Three mobile facilities for experiments in under observed regions critical for model improvement.
- Aerial measurement capability to complement the ground measurements.

# DOE Scientific User Facility ARM Climate Research Facility

Provides continuous field measurements and data products that improve cloud science in climate models

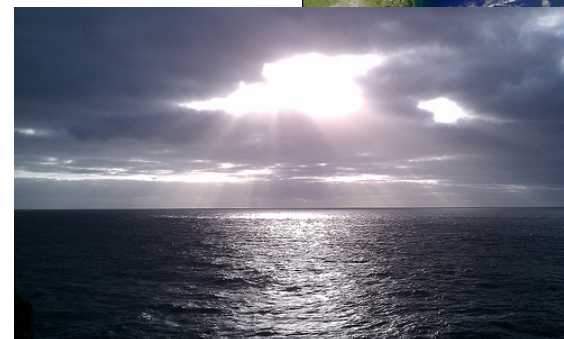


# Supporting Climate Research

- Continuously enhance the facility to provide better service
- Convene workshops for recommendations on site enhancements and use
- ASR working groups provide input on facility priorities
- ARM Science Board reviews all major resource requests for use of the sites
- OMB tracks operations and user metrics on quarterly basis

# ARM Current Activities

- Two Column Aerosol Project continues. Both intensive operations periods incorporating the G1 and the MAOS completed
- The MAGIC campaign is capturing valuable marine cloud data
- Between June and October, the ARM Aerial Facility will deploy the Gulfstream-1 (G-1) research aircraft to measure aerosol and trace gas emitted by biomass burning
- Flights continue to measure trace gases over and around the ARM Southern Great Plains site





# ARM Current Activities

- Plans are underway to send the second mobile facility to Finland to investigate the formation and evolution of organic aerosols from northern boreal forests (Feb. 3, 2014)
- Plans continue for the GOAmazon experiment for study of coupled atmosphere-cloud-terrestrial tropical systems. (2014-2015)
- Plans continue to deploy the AMF2 and G-1 along with NOAA resources to obtain measurements to characterize atmospheric processes over the Pacific (2015)







Hyytälän  
Metsäasema

SACR  
Roof of  
BLDG A

Instrument  
Field  
and  
Containers

AOS

A

Hyytäläntie

Hyytäläntie

Hyytäläntie



INPA Base Camp/  
BIONTE

Blowdown  
Plots

N/S Trans

TACAP  
E

LBA Tower

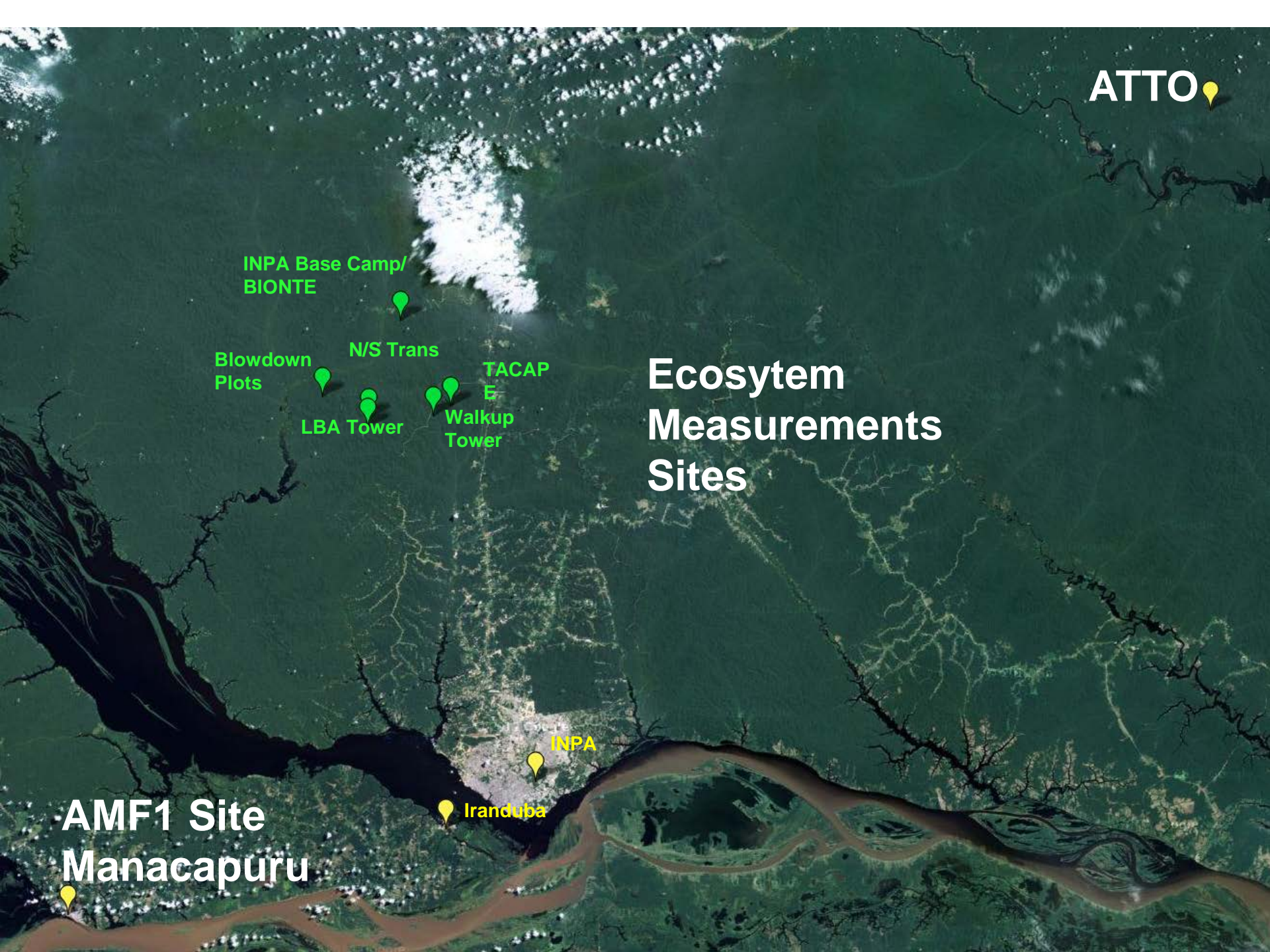
Walkup  
Tower

# Ecosystem Measurements Sites

AMF1 Site  
Manacapuru

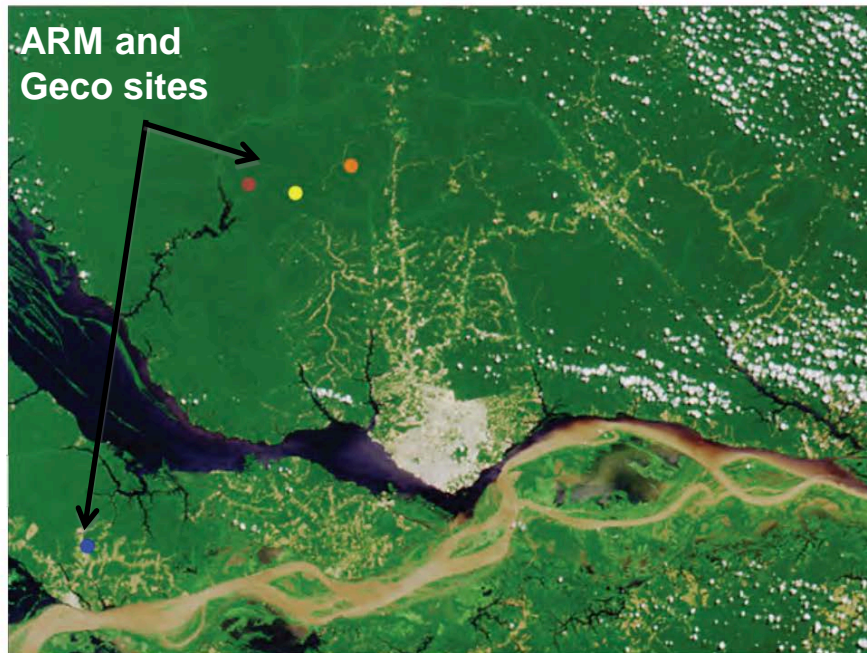
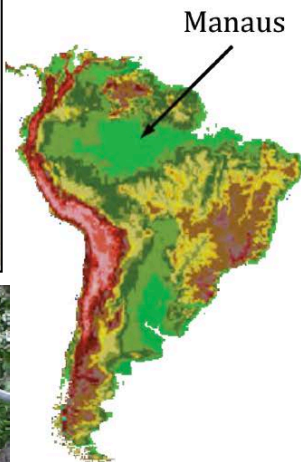
INPA

Irinduba





# Green ocean Amazon (GoAmazon) terrestrial ecosystem (Geco) project



Leaf level, tower-based, and airborne approaches for quantifying forest-atmosphere BVOC fluxes

**Geco will provide processes-level BVOC fluxes for the GoAmazon campaign**

# ARM/ASR/European Workshop

- November 6–8, 2012 in Washington, DC
- 36 noted scientists were invited – 18 US and 18 European
- 8 Countries represented: Finland, France, Germany, Ireland, Italy, the Netherlands, United Kingdom, United States
- Observational, process research, and modeling experts were represented
- Report available on [http://science.energy.gov/~media/ber/pdf/CESD\\_EUworkshop\\_report.pdf](http://science.energy.gov/~media/ber/pdf/CESD_EUworkshop_report.pdf)



# Workshop Goals and Scope

## Goals

- Identify outstanding climate change science challenges of common interest to US and the EU
- Develop joint observational strategies and data sharing to address common challenges
- Explore a set of actions to enhance collaborations via funding instruments and common infrastructures

## Scientific scope:

- Process studies: clouds, aerosols, and precipitation
- Observational strategies: ground- and aerial-based observations.

## **Scientific Questions – common to EU and DOE - derived from working groups**

1. What is the distribution of aerosol properties for the Atmospheric Model Intercomparison Project (AMIP) period (i.e., since 1979)?
2. What is the coupling among microphysics, aerosols, and cloud dynamics as a function of scale and regime (e.g., vertical velocity or stability)?
3. How are precipitation, water vapor and cloudiness coupled, and what roles does organization play in this coupling?
4. How do clouds and precipitation couple with surface properties?
5. What is the response of clouds to warming?
6. What is the response of the probability density function (PDF) of precipitation to warming?



# Key Workshop Recommendations

1. Establish a bilateral steering committee
  - Develop collaboration mechanisms and instruments
  - Oversee parallel bilateral working groups
  - Develop and execute strategies of common interest
2. Establish a set of six working groups (WGs) to coordinate among the key DOE and EU ground-based remote sensing centers
  - Radar calibration
  - Microwave radiometry
  - Retrievals including instrument simulators
  - Integrated Data Portal
  - Initialization Data Sets
  - Operational use of Large Eddy Simulations at supersites and during field campaigns

# Key Workshop Recommendations

3. Coordinate participation in major field campaigns
  - GOAmazon FY14-15
  - Atlantic Observations FY14-15
  - Arctic Sea Ice Study FY16
  - Southern Ocean Observations tbd

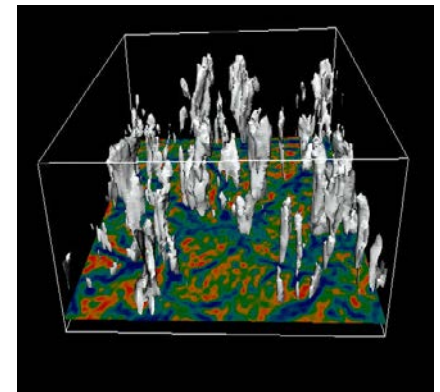
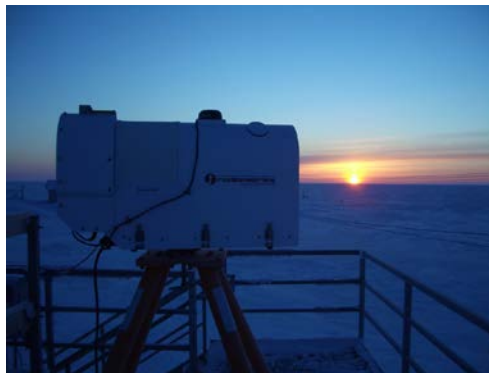


# Subsequent actions: post-workshop

1. Steering Committee established, meeting once each month to ensure progress, and coordinate bilateral team meetings, develop strategies, and execute plans
  - Wanda Ferrell, BER
  - Susanne Crewell. University of Cologne
  - Ashley Williamson, BER
  - Gelsomina Pappalardo, Institute of Methodologies for Environmental Research - Italian National Research Council
  - Björn Stevens, Max-Planck-Institut für Meteorologie
- First action
  - Establish the six working groups, each with mission to explore actionable collaborations to be taken to Steering Committee for decision (and execution).

# ARM/ASR/European Working Groups

- Radar calibration (Nitin Bharadwaj and Herman Russchenberg)
- Microwave radiometry (Nico Cimini and Maria Cadeddu)
- Retrievals (Jennifer Comstock and Ulrich Löhnert)
- Integrated Data Portal (Ewan O'Connor and Jimmy Voyles)
- Initialization Data Sets (Shaocheng Xie and Martial Haeffelin)
- Operational use of LES (Felix Ament and Graham Feingold)



# Collaboration with India

## MOU with Indian Institute of Science

- Conduct joint experiments
- Support exchange of scientists
- Data sharing





# Collaborative Tools

- Online Metadata Editor
- Data Portal
- Wiki

**Online Metadata Registry Tool**  
Ground-based Remote Sensing Observations for Clouds, Aerosols, and Precipitation

*\*This record has been previously saved as a working draft, but its not yet submitted* Logout

**Metadata Contact Information:** Required Expand All Clear All Back

*Enter the contact information about the author of THIS metadata record.*

Full Name (First Name followed by Last Name): \*  
*Please enter the contact information about the author of this metadata record.*

ARM Archive User Services

Organization Name: \*  
Atmospheric Radiation Measurement (ARM) Climate Research Facility

Position Name:

Telephone Number: \*  
645-241-4951

Email: \*  
amove@arm.gov

Address:  
Street: \* P.O. Box 2008, MS 6407  
City: \* Oak Ridge Country: \* USA  
State/Province: \* Tennessee Zip Code: \* 37831

**Describe your data. To create a citation for your data, the following information is needed:**

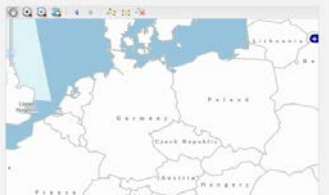
What is the Title of the Dataset (include "where", "what", and "when" in the title of your dataset)? \*  
*E.g. ARM Best Estimate Data Products (BEDPs) for Cloud Radiation measurements*  
ECOE: surface vertical fluxes of momentum, sensible heat, and latent heat, 30-min avg at Black Forest, Germany: Mobile Facility

Who is the Dataset Author/Organizer/Organization:  
*The person(s) who developed the dataset.*

Tammy Martin, tmartin@arm.gov  
Edwin Campos, ecampos@arm.gov  
David Cook, dcook@arm.gov  
[More Author/Organizer/Organization](#) Remove Last Author/Organizer/Organization

Spatial Domain

What is the location of the data collection for the project?  
*Provide a short textual description of the location where data was collected e.g. Maricopa Watershed or Ponds and Reservoirs Large-Batch 2, area in Jefferson county, Colorado*  
Black Forest, Germany: Mobile Facility Black Forest, Germany



Bounding coordinates:  
West: 8.2963  
East: 8.54  
North: 48.54  
South: 48.3963

Data Portal for Ground-based Remote Sensing Observations for Clouds, Aerosols, and Precipitation



A U.S./European Search Portal to Discover and Access Data for Atmospheric Science and Climate Research

Data Search Tool

This data portal provides free and open access and an approach for sharing complementary data products and associated information between atmospheric science and climate research activities of the U.S. and Europe.

#### Data Types

Atmospheric State and Properties  
Cloud Properties  
Radiometric  
Aerosols  
Surface State and Properties  
Inter-comparison of Physical Retrievals  
Model Initialization  
Model Output and Performance

#### Data Providers

ARM Climate Research Facility [\[i\]](#)  
Aerosols, Clouds, and Trace gases Research Infrastructure Network (ACTRIS) [\[i\]](#)

## Data Portal for Ground-based Remote Sensing Observations

HOME > SEARCH TOOL

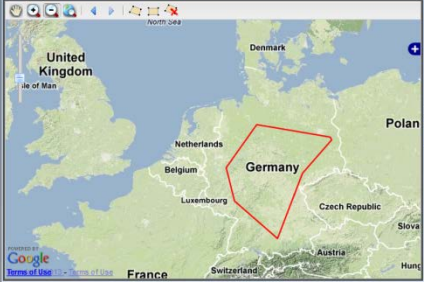
Search For: cloud properties

Hint: boolean operators, wildcards and phrases are allowed. ex: precipitation or (rain\* and "moisture content")

Fielded Search: FullText OR FullText OR FullText

Date Search: during 03/01/2009 thru 03/08/2013

Geographic Search



Include Global datasets?

List Areas In: USA \* WORLD

Select from list

Search Area:

North: 52.74959  
West: 7.470703  
East: 14.15039  
South: 48.16608

Data Type: Model Data Observational Data

Data Providers: Atmospheric Radiation Measurement (ARM) Aerosols, Clouds, and Trace gases Research Infrastructure Carbon Dioxide Information Analysis Center (CDIAC)

## Data Portal for Ground-based Remote Sensing Observations for Clouds, Aerosols, and Precipitation



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- Cloud Properties
- Radiometric
- Aerosols
- Surface State and Properties
- Inter-comparison of Physical Retrievals
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- Model Output and Performance

### Data Providers

- ARM Climate Research Facility ([1](#))
- Aerosols, Clouds, and Trace gases Research Infrastructure Network (ACTRIS) ([1](#))

## Data Portal for Ground-based Remote Sensing Observations

HOME > SEARCH TOOL > RESULTS

Your search found: 325 documents.  
Query: cloud properties during 03/01/2009 to 03/08/2013 AND ( datasource: [ arm ] )

Choose from: [Observational Data \(325\)](#)

| Filter by Project        | Filter by Topic               | Filter by Location        |
|--------------------------|-------------------------------|---------------------------|
| arm_observed_data (248)  | cloud_properties (113)        | arm_cl_southern_austral   |
| arm_derived_product (77) | aerosols (89)                 | arm_cerif_facility        |
|                          | atmospheric_state (79)        | armok_us_030              |
|                          | radiometric (33)              | armok_topical_western     |
|                          | radar (8)                     | armok_central_eastern     |
|                          | spectrum_width (7)            | armok_central_facility    |
|                          | trace_gas (1)                 | armok_south_australia_158 |
|                          | vertical_scattering_ratio (1) | armok_north_sea           |

Viewing Documents 1 - 10 out of 326 Prev 1 2 3 4 5 6 7 8 9 10 Next

Sort By: Relevance

**MPL: 30-second cloud mask using the first Z. Wang, et al algorithm at Gan Island, Maldives; Mobile Facility**

**Data provider:** Atmospheric Radiation Measurement **Data range:** 08/05/2011 - 02/08/2012  
An operational cloud boundary algorithm has been implemented for use with the ARM micropulse lidar (MPL) systems. In addition to releasing cloud boundaries above 500 m, the Micropulse Lidar Cloud Mask...

**MPL: 30-second cloud mask using the first Z. Wang, et al algorithm at Graciosa Island, Azores, Portugal; Mobile Facility**

**Data provider:** Atmospheric Radiation Measurement **Data range:** 04/11/2009 - 01/05/2011  
An operational cloud boundary algorithm has been implemented for use with the ARM micropulse lidar (MPL) systems. In addition to releasing cloud boundaries above 500 m, the Micropulse Lidar Cloud Mask...

**Vaisala Ceilometer (VCEIL): cloud base heights, 25,000 feet max range at Gan Island, Maldives, Mobile Facility**

**Data provider:** Atmospheric Radiation Measurement **Data range:** 09/27/2011 - 02/09/2012  
The Vaisala Ceilometer (VCEIL) is a self-contained, ground-based, active, remote-sensing device designed to measure cloud-base height, vertical visibility, and potential backscatter signals by aerosol...

**Vaisala Ceilometer (VCEIL): cloud base heights, 25,000 feet max range at Steamboat Springs CO, USA; Mobile Facility**

**Data provider:** Atmospheric Radiation Measurement **Data range:** 09/24/2010 - 04/29/2011  
The Vaisala Ceilometer (VCEIL) is a self-contained, ground-based, active, remote-sensing device designed to measure cloud-base height, vertical visibility, and potential backscatter signals by aerosol...

# Metadata Registry Tool

## Online Metadata Registry Tool

Ground-based Remote Sensing Observations for Clouds, Aerosols, and Precipitation



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### Metadata Contact Information: \* = required

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**Organization Name: \***  
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**Position Name:**

**Telephone Number: \***  
865-241-4851

**Email: \***  
armarchive@ornl.gov

**Address:**

**Street: \*** P.O. Box 2008, MS 6407

**City: \*** Oak Ridge **Country: \*** USA

**State/Province: \*** Tennessee **Zip Code: \*** 37831

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ECOR: surface vertical fluxes of momentum, sensible heat, and latent heat, 30-min avg at Black Forest, Germany; Mobile Facility

**Who is the Dataset Author/Originator/Organization:**  
*The person(s) who developed the dataset.*  
Timothy Martin, tjmartin@ornl.gov  
Edwin Campos, ecampos@ornl.gov  
David Cook, drcook@ornl.gov

[More Author/Originator/Organization](#) [Remove Last Author/Originator/Organization](#)

**Spatial Domain**

**What is the location of the data collection for the project?**  
*Provide a short, textual description of the location where data was collected e.g. Manistee Watershed or Ponds and Reservoirs larger than 2 acres in Jefferson county, Colorado.*  
Black Forest, Germany; Mobile Facility; Black Forest, Germany

**Bounding coordinates:**

**West:** 8.3968

**East:** 48.54

**North:** 48.54

**South:** 8.3968


[Clear Coordinates](#)



# Metadata Registry Tool

## Online Metadata Registry Tool

Ground-based Remote Sensing Observations for Clouds, Aerosols, and Precipitation



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armarchive@ornl.gov

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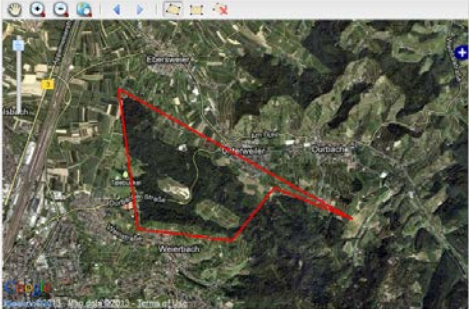
**Online Links/DOI (Please include online links to the dataset and the DOI if available):**

http://www.arm.gov/data/datastreams/30ecor

**Spatial Domain**

What is the location of the data collection for the project?

Black Forest, Germany



**Bounding coordinates:**

West: 7.9729843139x

East: 8.0244827270x

North: 48.501820021:

South: 48.479635442:

**Measurement**

**Scientific Measurements**

**Measurement# 1**

Please note the name of the primary measurement:

Cloud base height

Please list the variable names:

cloud\_base\_altitude

cloud\_area\_fraction

**Measurement# 2**

Please note the name of the primary measurement:

Atmospheric temperature

Please list the variable names:

air\_temperature\_at\_cloud\_top

**Measurement# 3**

Please note the name of the primary measurement:

Instrument Class

Please list the variable names:

Eddy Correlation Flux Measurement System

**Measurement# 4**

Please note the name of the primary measurement:

Instrument Categories

Please list the variable names:

Surface/Subsurface Properties

# ARM Data Sessions and Resources

- Lunch, Monday and Wednesday
  - ARM Data Archive User Interface
  - NetCDF Tutorials
- ARM Data Kiosk
  - Ask ARM
  - Online Metadata Editor demo
  - Portal demos
  - A sign-up sheet that will be provided at the registration desk for those interested in attending sessions at the Kiosk