Recent Updates on the ARM Value-Added Products for Warm Boundary Layer Processes

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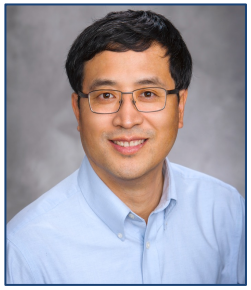
ARM/ASR PI Meeting, Jun 21, 2021

Science Product Development Led by a Team of Scientists

ARM CLIMATE RESEARCH FACILITY

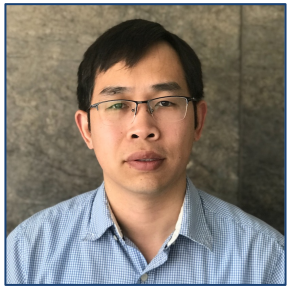
ARM Translator Group

Translators are liaisons between the scientific community and ARM infrastructure staff members, and develop Value-Added Products, or VAPs, from the direct output of ARM instruments.



Shaocheng Xie
Lead Translator
Modeling POC

John Shilling
Aerosol POC
TRACER POC



Damao Zhang
High-latitude POC
MOSAiC POC

Scott Collis
Convective POC
CACTI POC

Scott Giangrande
Warm Clouds POC
COMBLE POC

Krista Gaustad
Software
Development

Ken Kehoe
Data Quality

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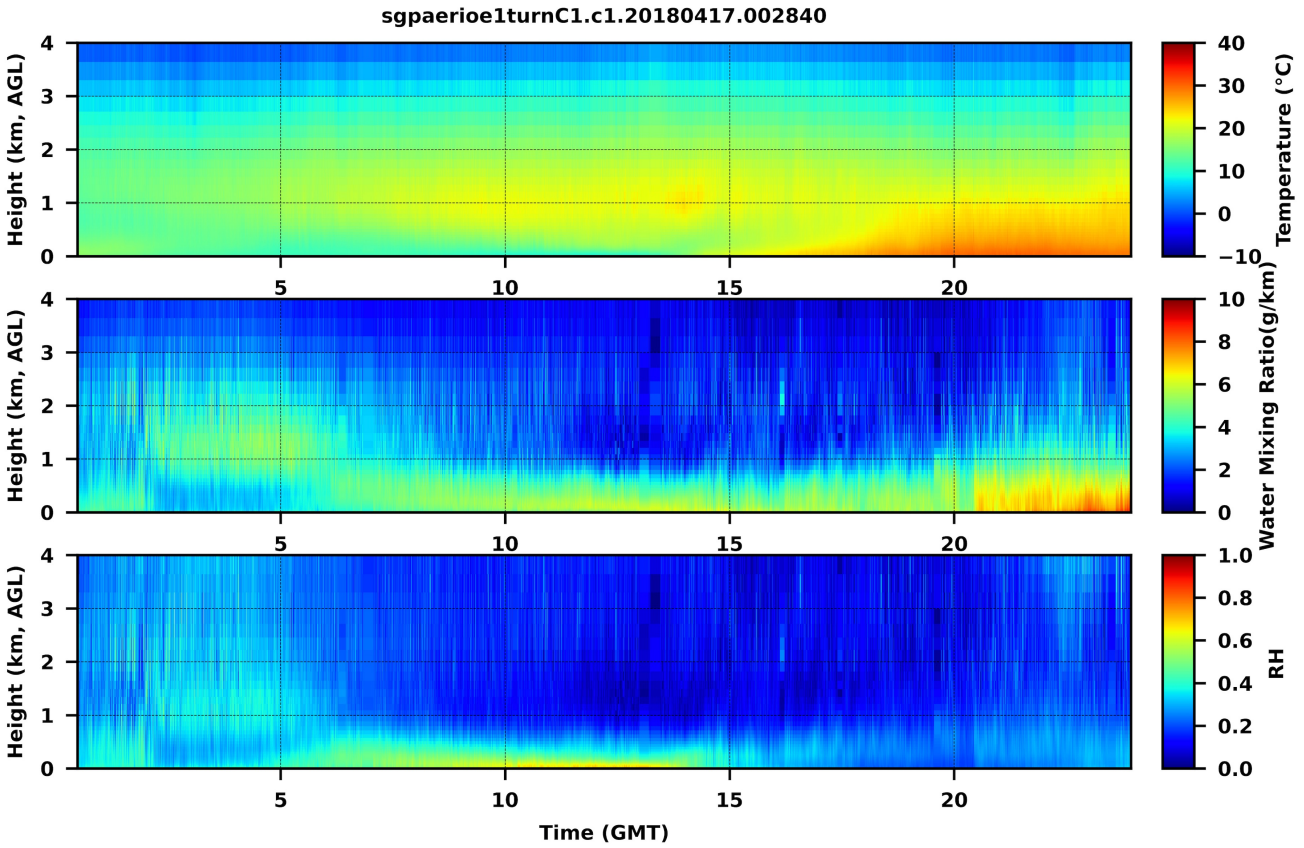
ARM VAPs: https://www.arm.gov/capabilities/vaps

Data Product Highlight: AERIoe

Physical retrieval of temperature and water vapor mixing ratio profiles and cloud properties

- Computationally intensive
- SGP C1, E32, E37, and E39 (2016 - 2021), COR, and ACE-ENA
- Resolution: 30 sec and ~10 m at near surface



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Data Product Highlight: PBLHT from Lidar Measurements

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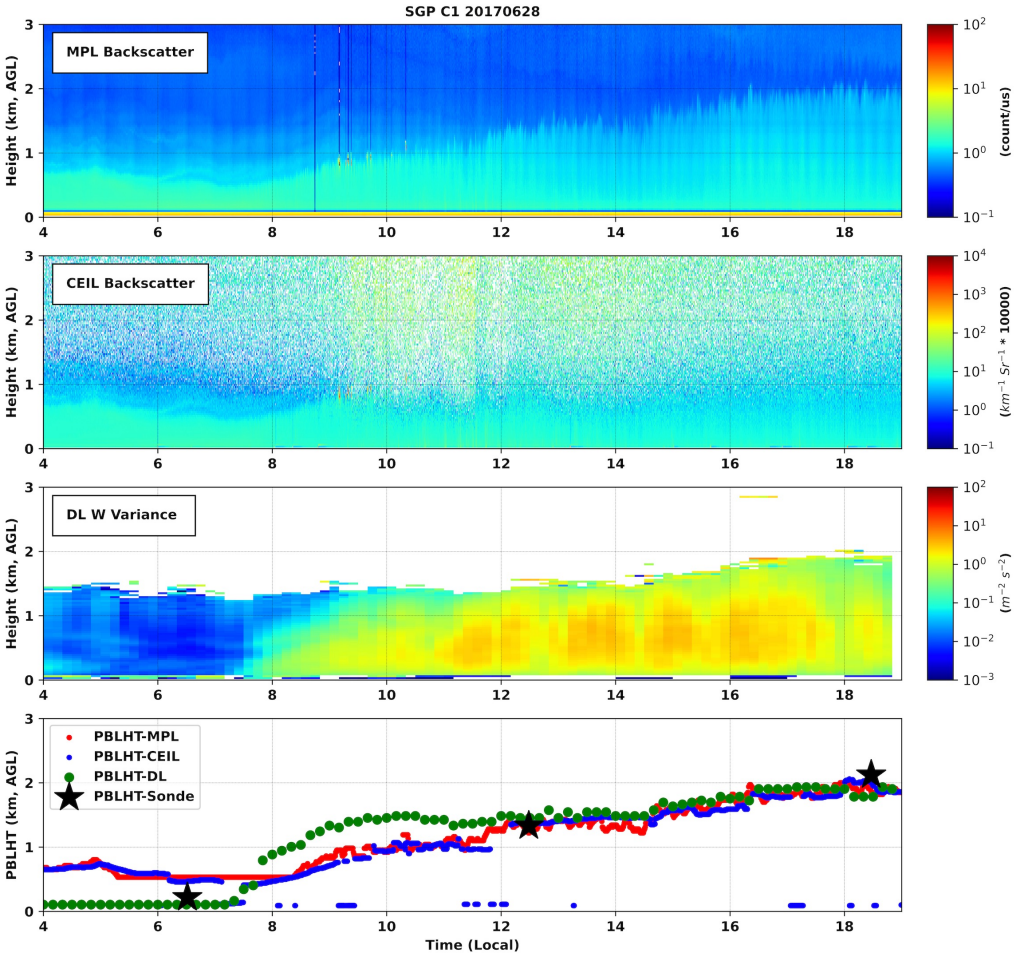
VAPs	ARM sites
PBLHT-Sonde	SGP(2001-2021), ENA(2013-2021), NSA(2002-2021), AMF field campaigns
PBLHT-MPL	SGP (2014-2021), CACTI
PBLHT-CEIL	SGP (2012-2021), ENA (2013-2021), NSA (2013-2021), AMF field campaigns
PBLHT-DL	SGP (2010-2021)
PBLHT-RL	Under development



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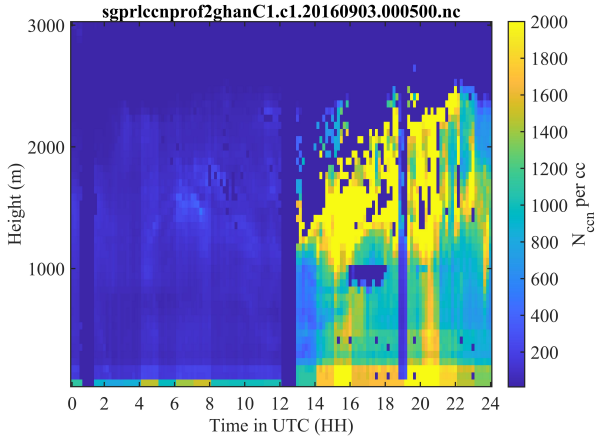
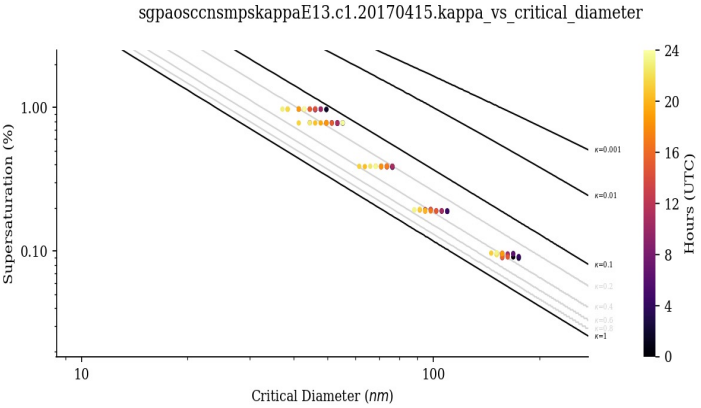
Data Product Highlight: Aerosol VAPs



Vertical CCN profiles at 0.4% supersaturation

CCNPROF: estimates the vertical distribution of CCN as a function of supersaturation.

- Currently working on 2016 SGP data and comparing to in-situ G-1 measurements from HI-SCALE.
- Starting to derive f(RH) for ENA.



Kappa constant lines are drawn from analytical expression number 10 from Petters and Kreidenweis (2007).

CCN kappa VAP: uses CCNC and SMPS measurements to parameterize hygroscopicity with the kappa parameter.

- Kappa data for April 2017 – February 2021 at SGP are newly available.
- Will extend to other sites/deployments (ANX, ASI, COR, MOS) in coming FY.

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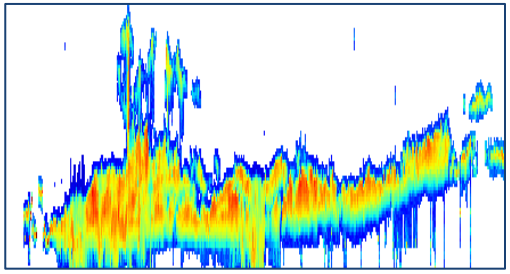
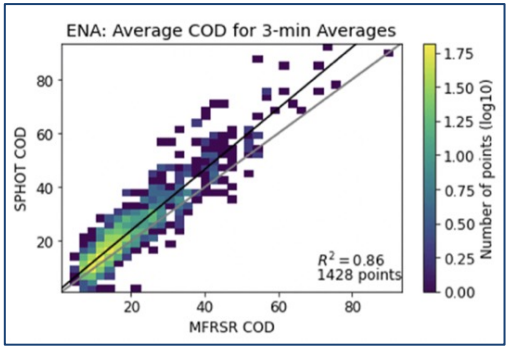
Ongoing ARM Cloud Microphysical Retrieval Developments



Improved, Reprocessed MICROBASE → MICROBASEPLUS:

- Reinstalling MICROBASE for baseline Liquid Water Content (LWC), Ice Water Content (IWC), and Effective Size (De) retrievals.
- Uncertainty quantification and ARM campaign/site evaluation.

See Poster by M. Wang: "Rebuilding ARM's MICROBASE VAP – MICROBASEPLUS using the OGRE-CLOUDS framework", Wed 6/23, 3-4 pm.



Microphysical Cloud Properties from ARM Cimel Sunphotometer:

- New Cloud Optical Depth (COD), Cloud droplet effective radius (EFF), and Liquid Water Path (LWP) retrievals.
- Uncertainty quantification, and long-term ARM evaluation.

See Poster by T. Fairless: "Automated Microphysical Cloud Properties from ARM Cimel Sunphotometer Cloud Mode Datasets", Tues. 6/22, 3-4 pm.

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Data Product Highlight: VARANAL and ARMBE for AMFs

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CAMPAIGNS NAME (Featured)	Start	Duration	VARANAL	ARMBE
Tracking Aerosol Convection Interactions Experiment (TRACER)	10/01/21	12 months	Planned	Planned
Surface Atmosphere Integrated Field Laboratory (SAIL)	09/01/21	1.8 years	Planned	Planned
Cold-Air Outbreaks in the Marine Boundary Layer Experiment (COMBLE)	12/01/19	6 months	Planned	Ongoing
Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAiC)	10/11/19	1.1 years		Planned
Cloud, Aerosol, and Complex Terrain Interactions (CACTI)	10/01/18	7 months	Ongoing	Completed
Profiling at Oliktok Point to Enhance YOPP Experiments (OLI)	06/01/18	3 months		Planned
Aerosol and Cloud Experiments in the Eastern North Atlantic (ACE-ENA)	06/01/17	8.9 months	Completed	Completed
Macquarie Island Cloud and Radiation Experiment (MICRE)	03/01/16	2.1 years	Planned	
ARM West Antarctic Radiation Experiment (AWARE)	11/23/15	1.1 years	Completed	Completed
ARM Support for the Plains Elevated Convection at Night Experiment (PECAN)	06/01/15	1.5 months	Completed	
Observations and Modeling of the Green Ocean Amazon (GOAMAZON)	01/01/14	1.9 years	Completed	Completed
Midlatitude Continental Convective Clouds Experiment (MC3E)	04/22/11	1.5 months	Completed	
RAdiative Divergence using AMF, GERB, and AMMA STations (RADAGAST) (NIM)	01/01/06	1 years		Completed

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