

<https://www.arm.gov/research/campaigns/amf2023epcape>

EPCAPE

Aerosol Processes WG: 10 August 2023

Shel Browning
Scripps Memorial Pier

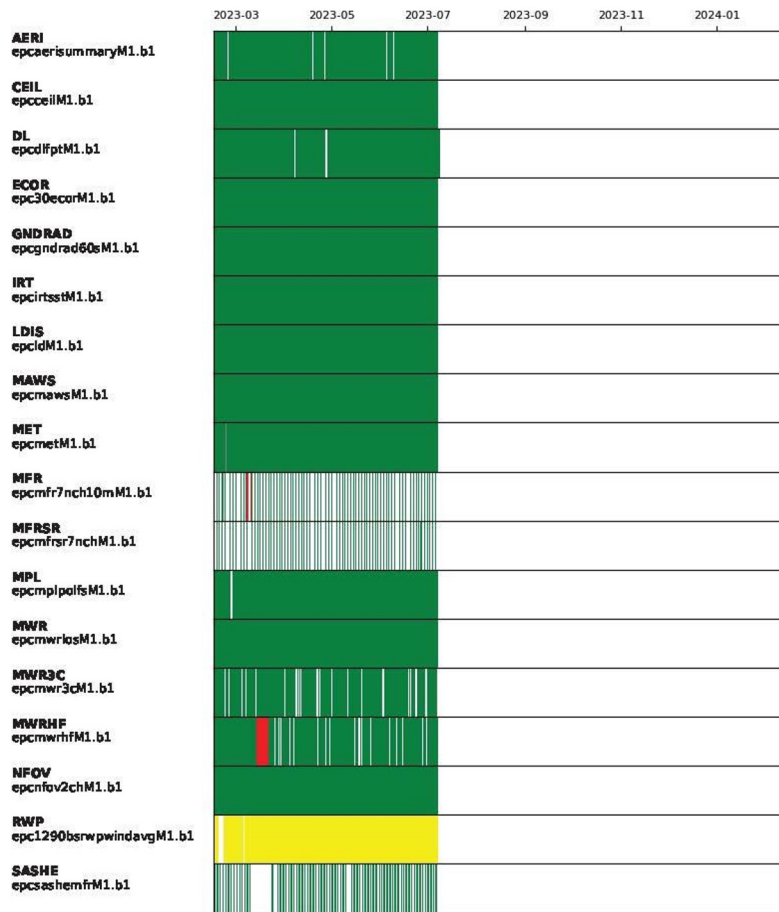


Eastern Pacific Cloud Aerosol Precipitation Experiment
DOE ARM AMF1 Deployment: February 2023 - February 2024
La Jolla, California: Scripps Pier and Mt. Soledad
Lead Scientist: Lynn Russell lmrussell@ucsd.edu
Proposal Team: Dan Lubin, Israel Silber, Ed Eloranta,
Johannes Muelmenstaedt, Susannah Burrows, Allison
Aiken, Die Wang, Markus Petters, Mark Miller, Andy
Ackerman, Ann Fridlind, Mikael Witte, Matt Lebsock, David
Painemal, Rachel Chang, John Liggio, Michael Wheeler

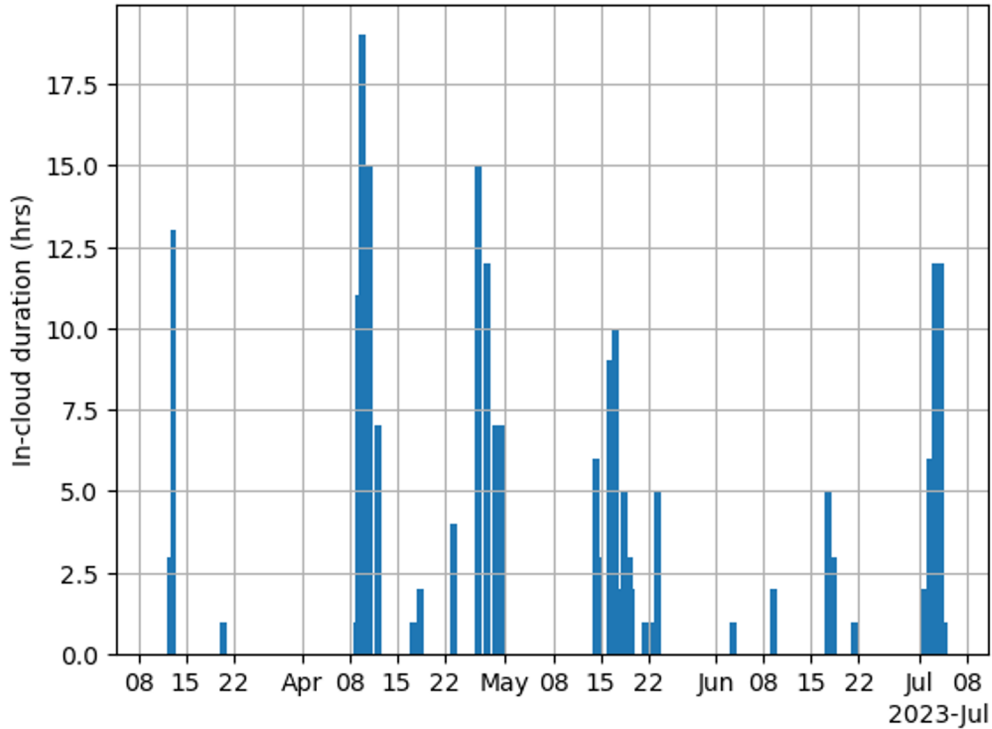
La Jolla, CA; AMF1 (main site for EPCAPE on Scripps Pier)
Atmospheric Radiation Measurement User Facility



La Jolla, CA; AMF1 (main site for EPCAPE on Scripps Pier)
Atmospheric Radiation Measurement User Facility



Amazing and Continuing In-Cloud Events at Mt. Soledad



March 1-31

● 28 hrs

April 1-30

● 131 hrs

May 1-31

● 71 hrs

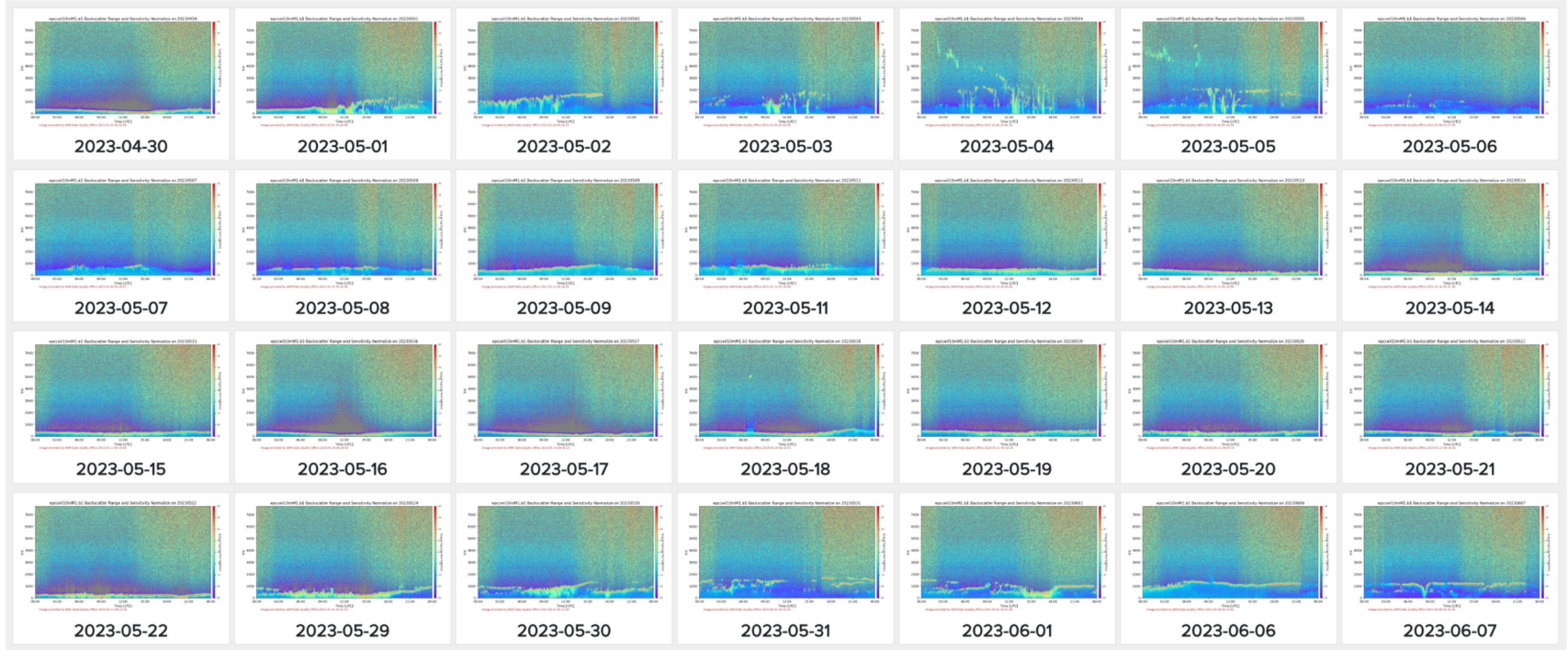
June 1-30

● 32 hrs

July 1-7

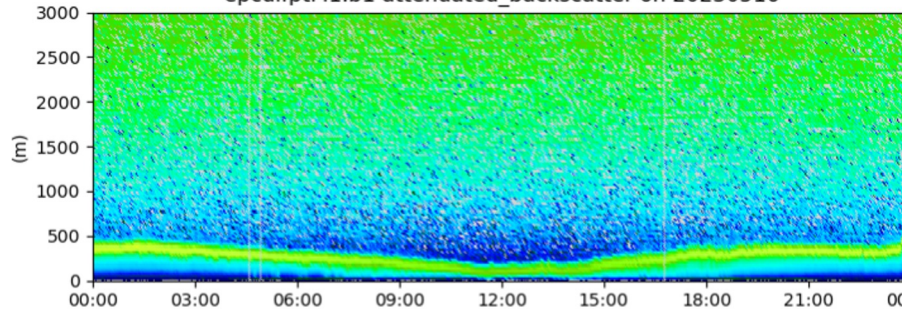
● 48 hrs

Clouds during May

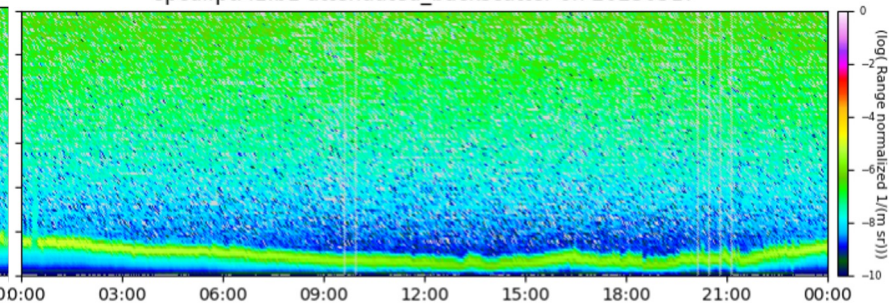


May 16-17

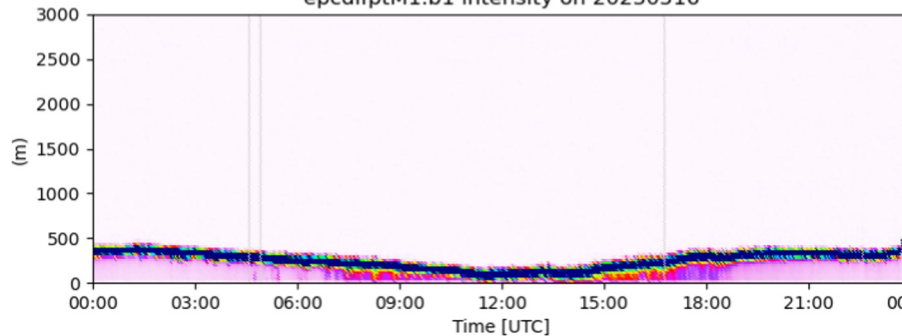
epcdfptM1.b1 attenuated_backscatter on 20230516



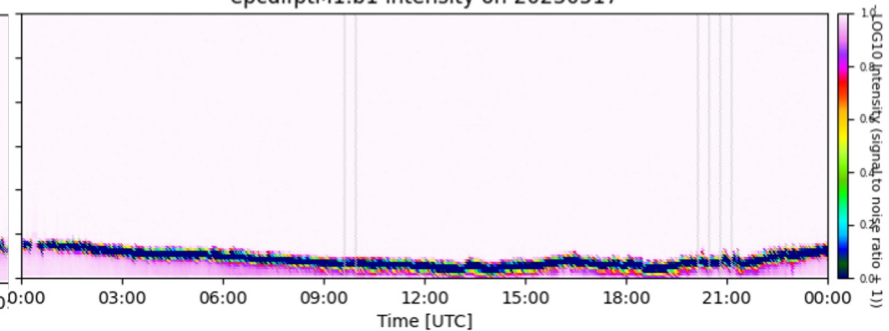
epcdfptM1.b1 attenuated_backscatter on 20230517



epcdfptM1.b1 intensity on 20230516



epcdfptM1.b1 intensity on 20230517



Domain: ARM EPCAPE Small Domain

Imagery

Satellite: GOES-W

20:00 UTC

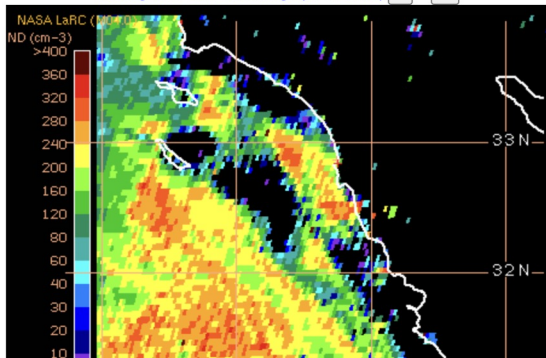
Date: 2023 05 16

20:00 UTC

Image: Cloud Nd

Animate: Frames ---

Viewing 2000 UTC CND image (05-16-2023)



May 16-17

Domain: ARM EPCAPE Small Domain

Imagery

Satellite: GOES-W

20:00 UTC

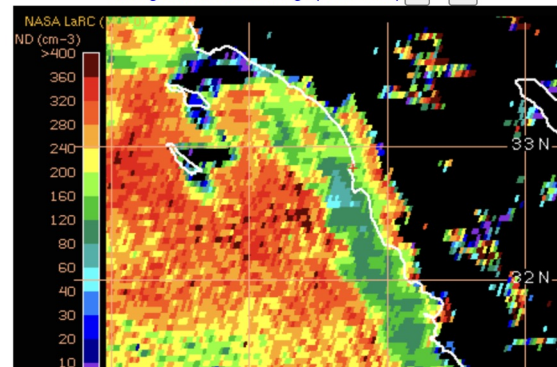
Date: 2023 05 17

20:00 UTC

Image: Cloud Nd

Animate: Frames ---

Viewing 2000 UTC CND image (05-17-2023)



Domain: ARM EPCAPE Small Domain

Imagery

Satellite: GOES-W

20:00 UTC

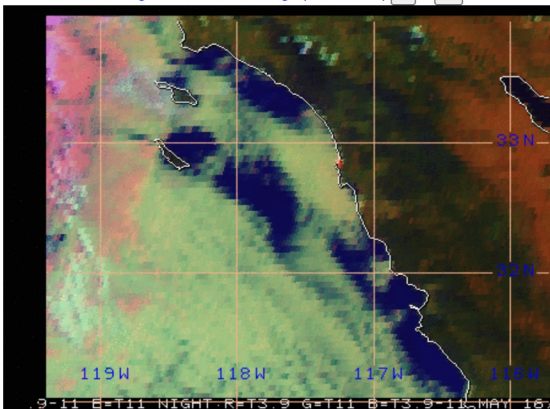
Date: 2023 05 16

20:00 UTC

Image: Multi-Channel RGB

Animate: Frames ---

Viewing 2000 UTC RGB image (05-16-2023)



2000 UTC

Domain: ARM EPCAPE Small Domain

Imagery

Satellite: GOES-W

20:00 UTC

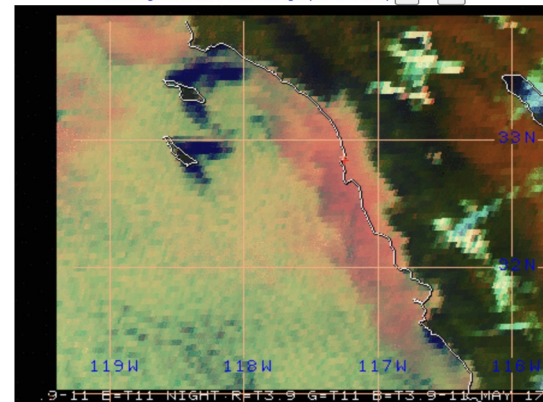
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20:00 UTC

Image: Multi-Channel RGB

Animate: Frames ---

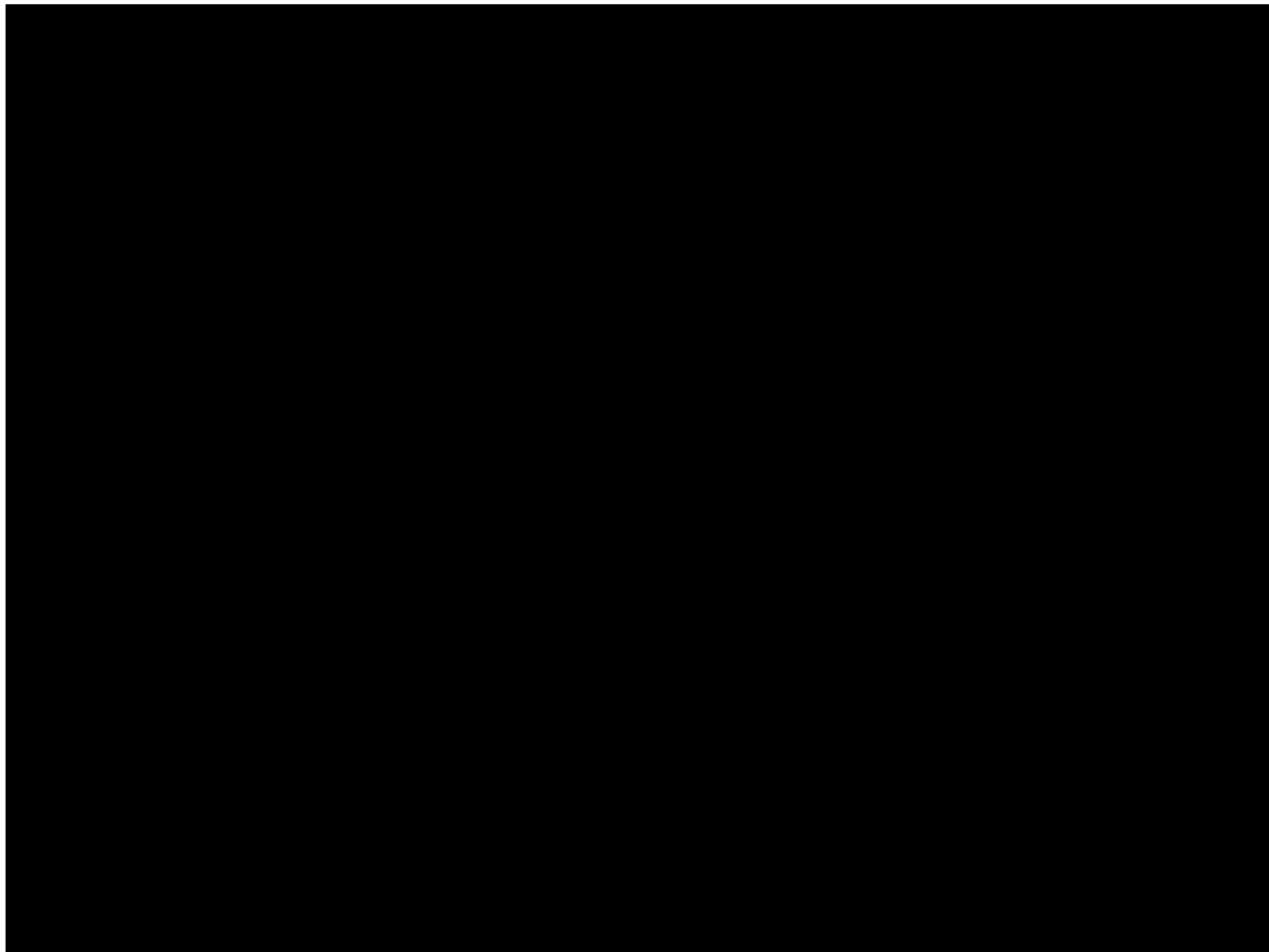
Viewing 2000 UTC RGB image (05-17-2023)



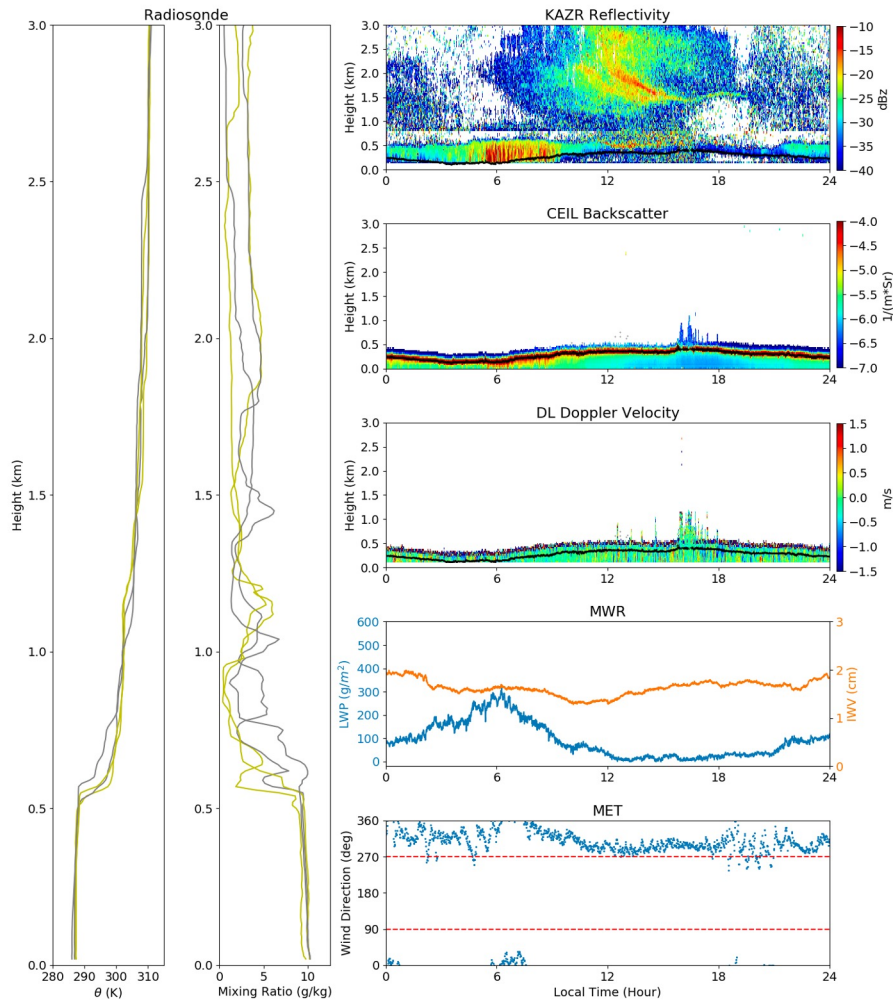
EPCAPE

Case:

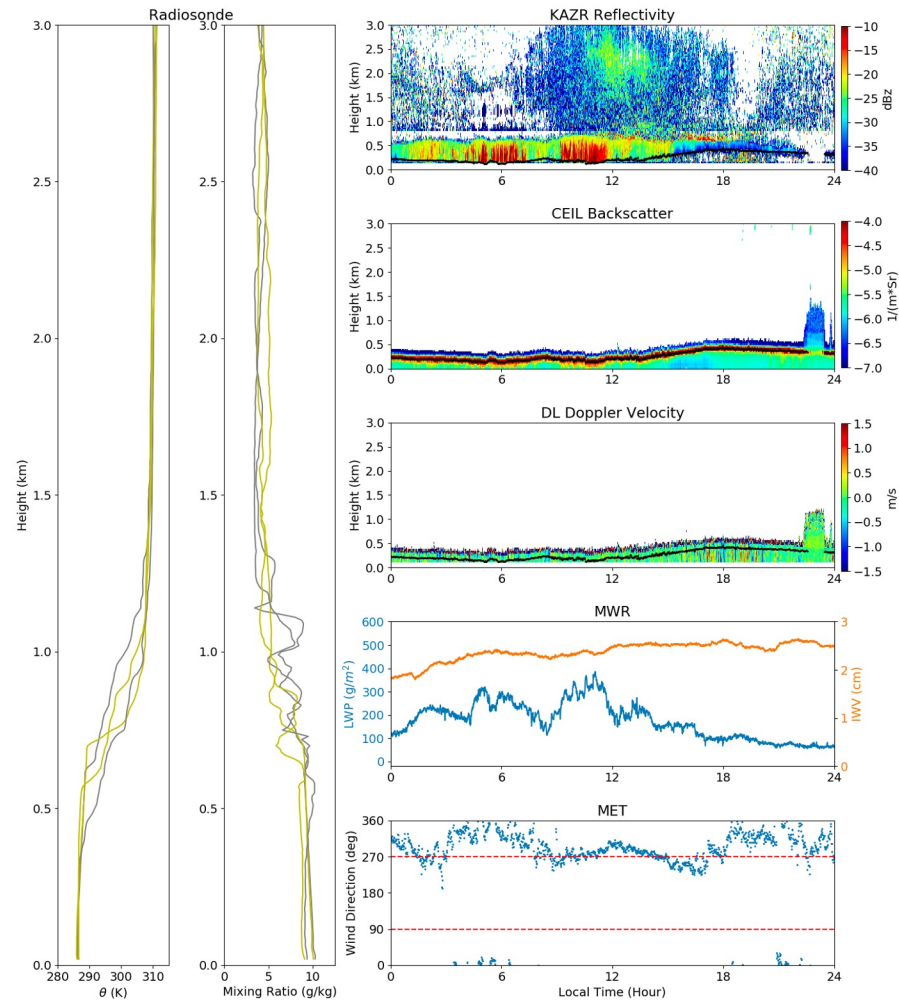
May 16-17



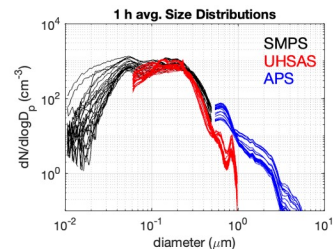
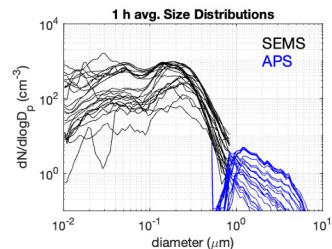
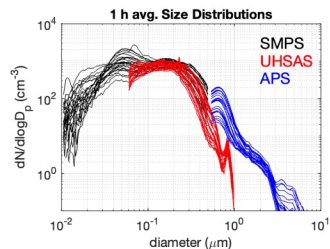
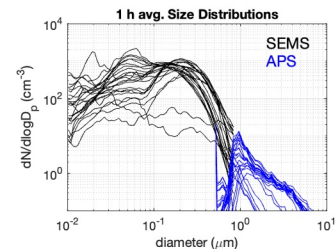
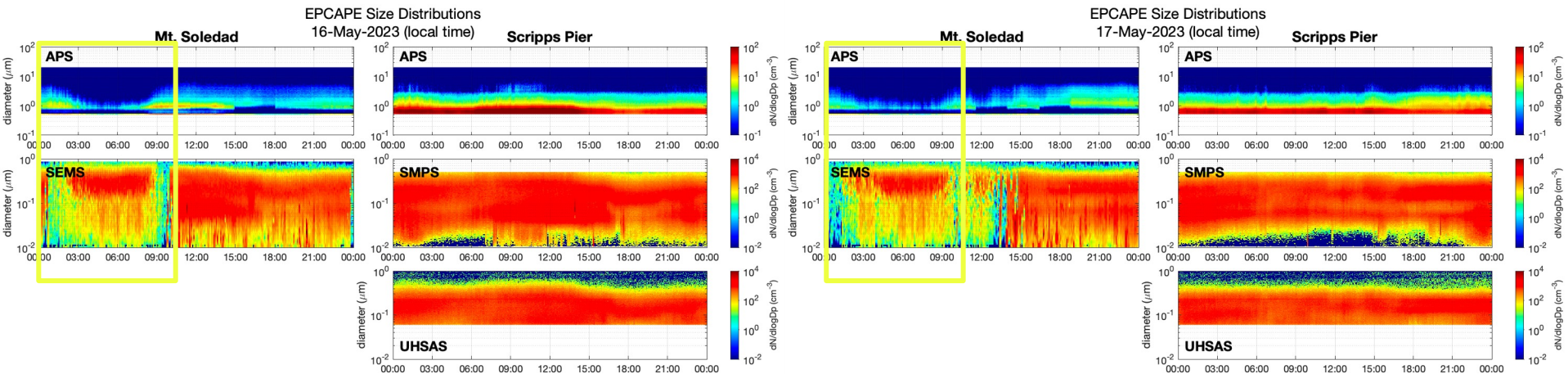
2023-05-16



2023-05-17



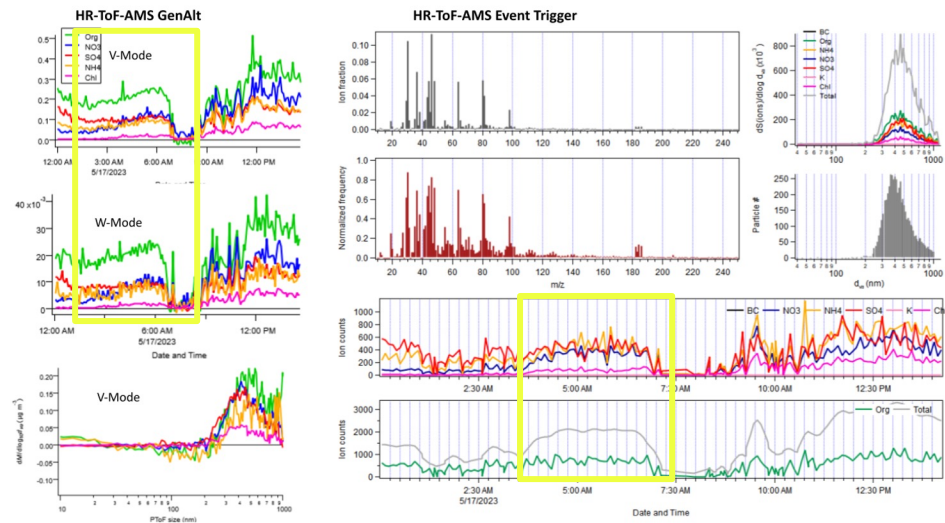
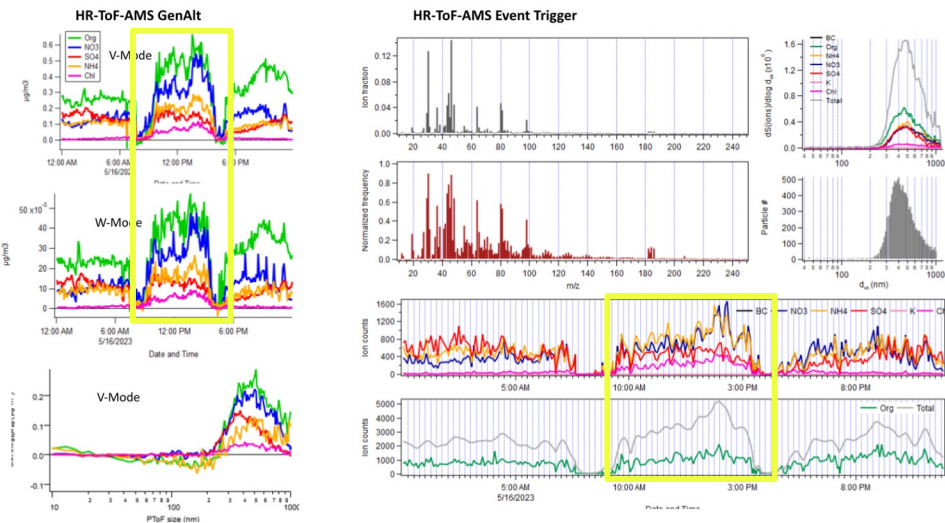
May 16-17 Aerosol Particle Size Distributions



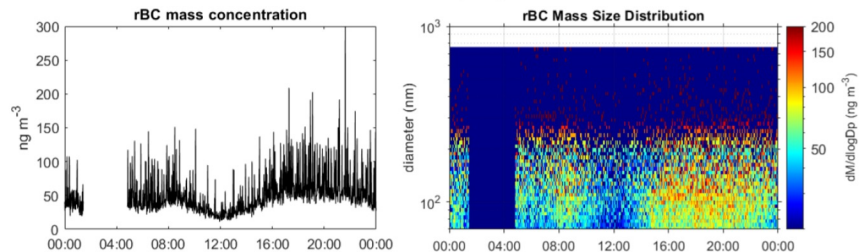
May 16-17 Aerosol Submicron Composition

2023-05-16

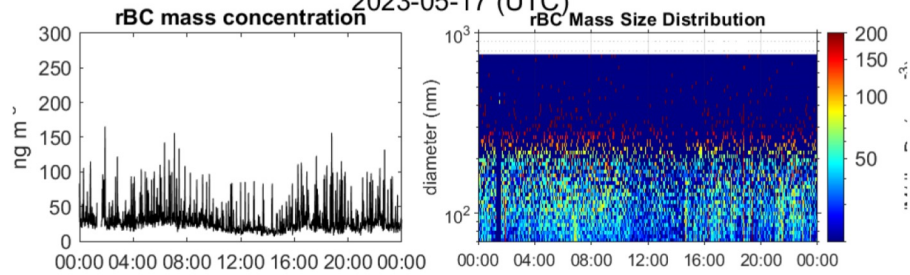
2023-05-17



Mt. Soledad SP2
2023-05-16 (UTC)

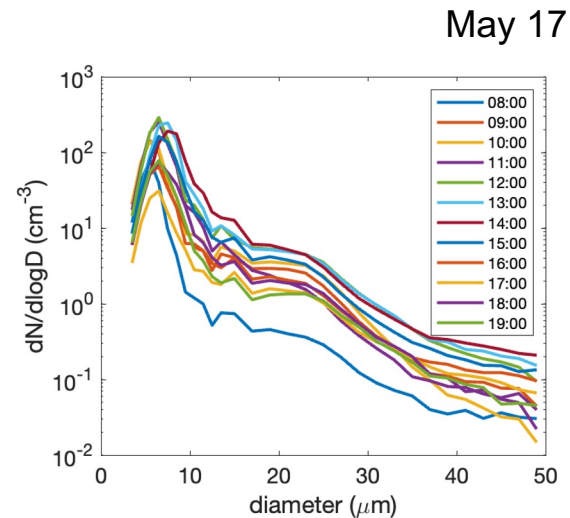
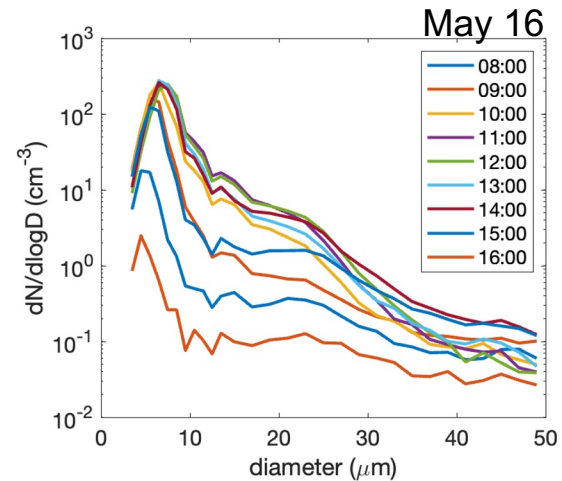
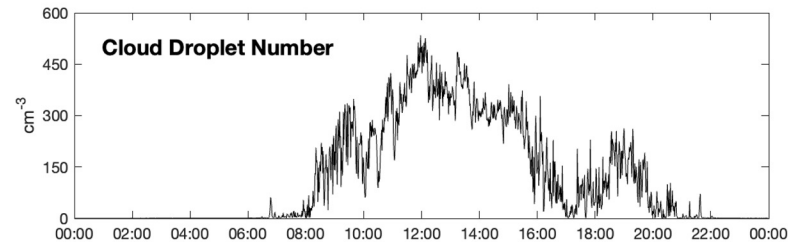
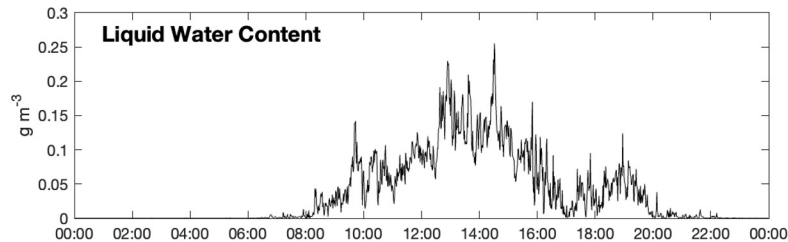
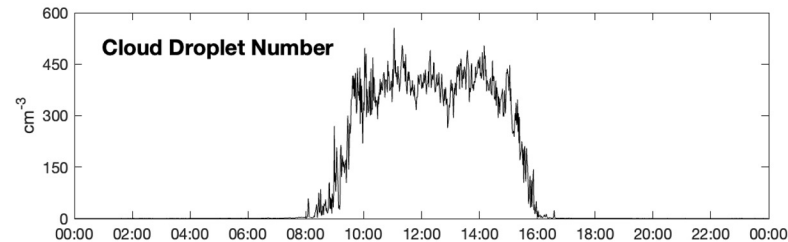
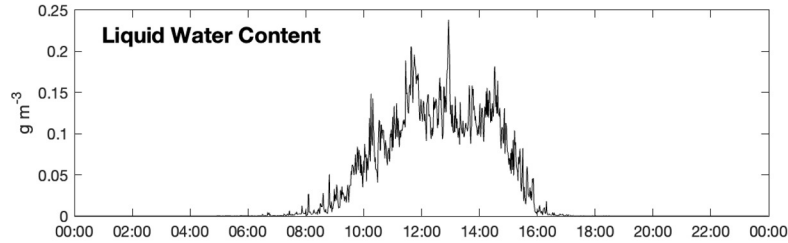


Mt. Soledad SP2
2023-05-17 (UTC)



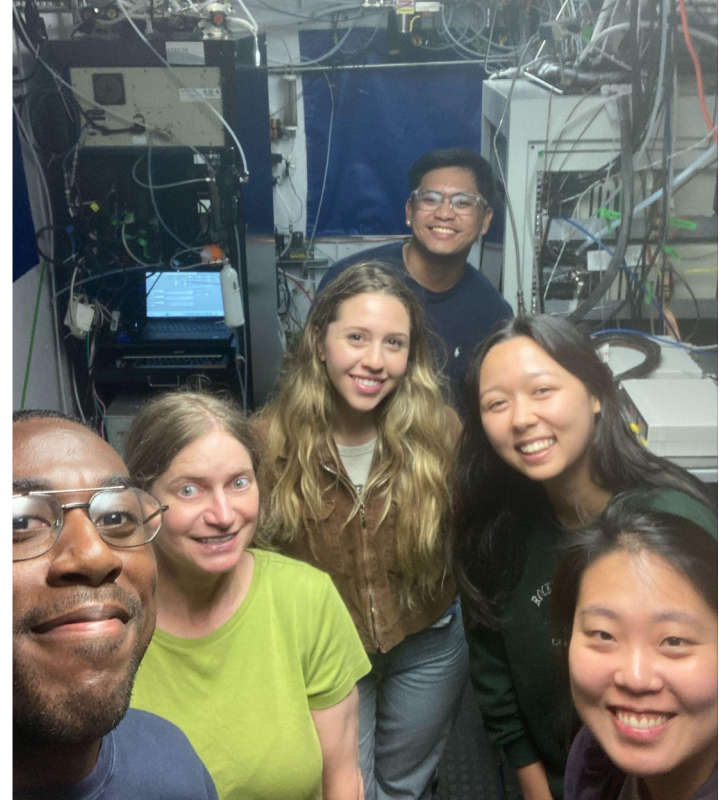
Fog Monitor Drop Distribution

Rachel Chang and
Lauren Robinson,
Dalhousie University



Thank you!

Acknowledgements:
ARM&ASR Support,
ARM Techs&Mentors;
EPCAPE Science Team.



EPCAPE

Case:

May 16-17

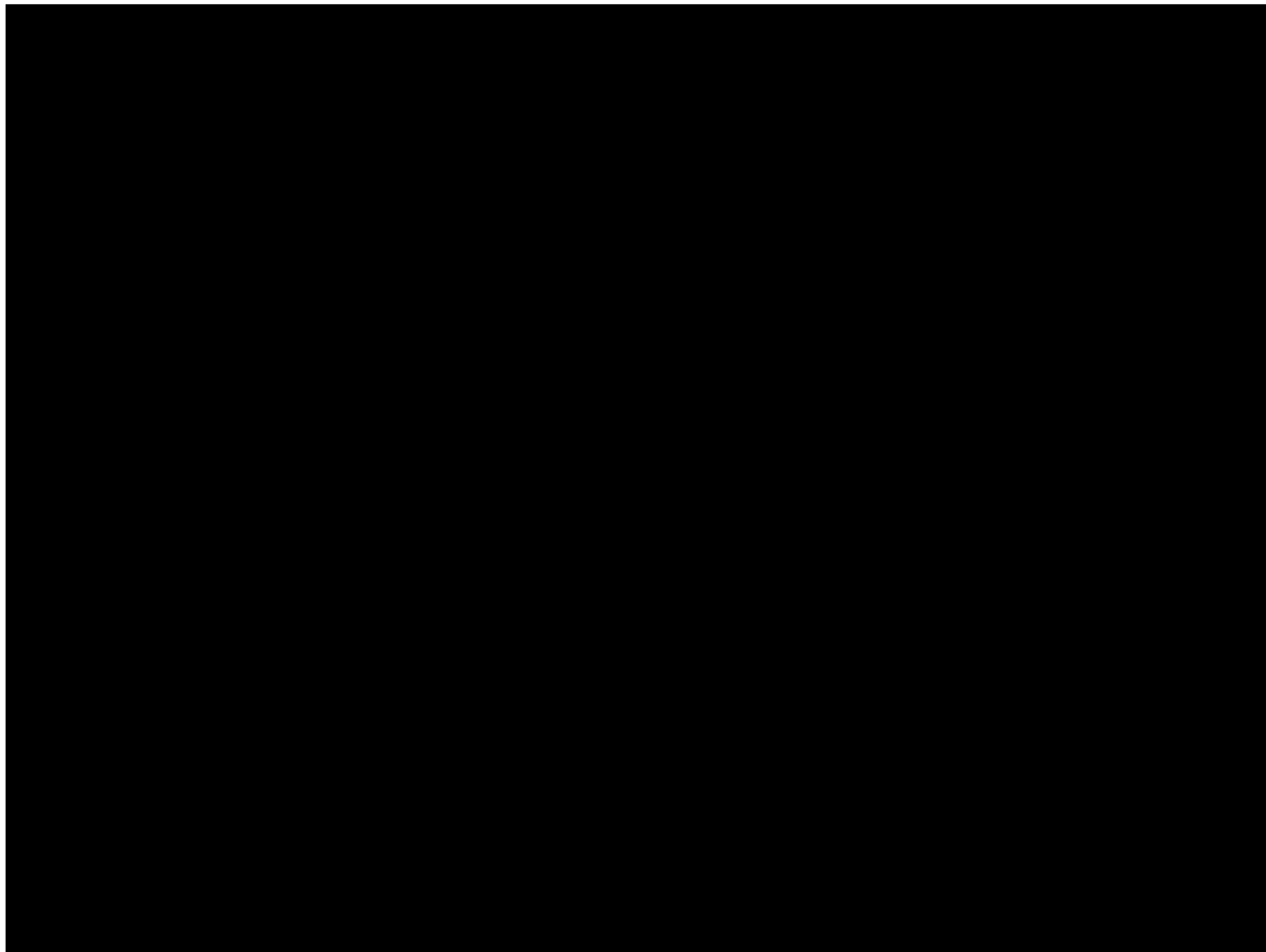
QUICKLOOKS:

<https://wordpress.cels.anl.gov/clouds/epcape/>

SOLEDAD DATASET:

Russell, Lynn M.; Han, Sanghee; Williams, Abigail S.; Dedrick, Jeremy L.; Pelayo, Christian; Maneenoi, Nattamon; Petters, Markus; Ravichandran, Elavarasi; Chang, Rachel; Wheeler, Michael; Wentzell, Jeremy; Liggio, John (2023). Aerosol Microphysics and Chemical Measurements at Mt. Soledad and Scripps Pier during the Eastern Pacific Cloud Aerosol Precipitation Experiment (EPCAPE) from February 2023 to February 2024. UC San Diego Library Digital Collections.

<https://doi.org/10.6075/J0NG4QT4>



Extra Slides

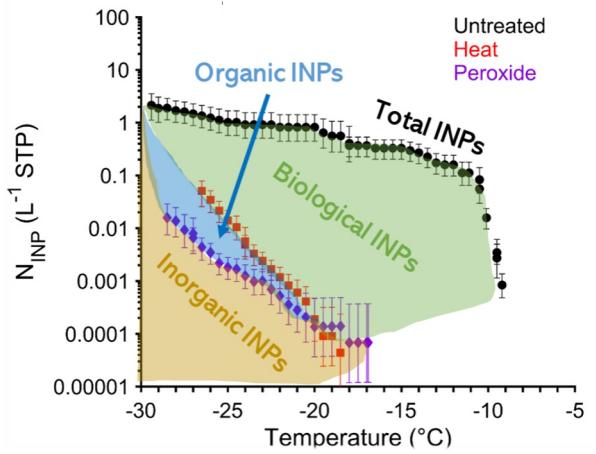
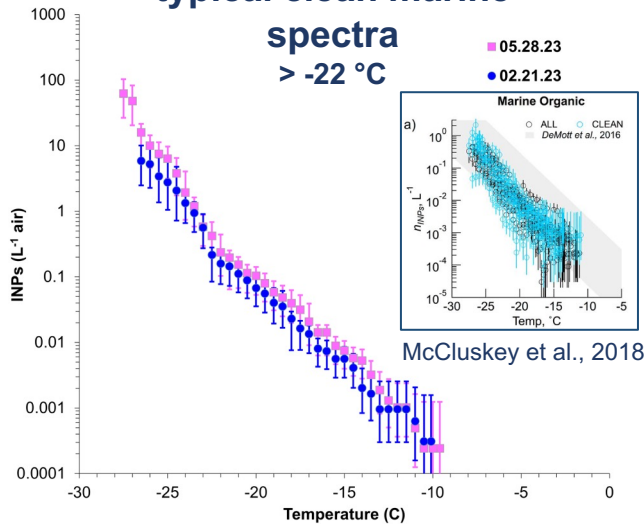
EPCAPE ice nucleating particles (INPs)



Jessie Creamean, Tom Hill, Carson Hume, Tim Devadoss

- INPs catalyze the formation of ice in clouds and influence precipitation, latent heat release, cloud electrification, cloud albedo and cloud lifetime
- 0.2 μm pore filters run for 24 h every 3-4 days on Scripps Pier

Preliminary data: typical clean marine spectra > -22 °C



Select samples will be retested after heating (95°C) and H₂O₂ digestions to estimate abundance of biological, heat stable organic, and inorganic INPs.



Scan for link to our Ice Nucleation Spectrometer (INS) ARM instrument page

EPCAPE-Partitioning Thrust-LANL

Fall deployment to Mt. Soledad

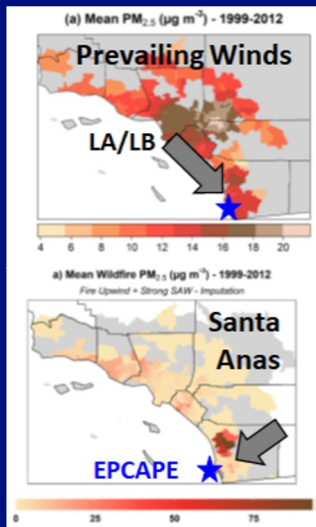
Kyle Gorkowski, Allison C. Aiken, Katherine Benedict,
James Lee, Manvendra Dubey, Abu Sayeed Md Shawon

Science Questions: What is the role of carbonaceous aerosols from different sources in a complex marine environment including

- Urban emissions that have aged over the ocean during prevailing winds
- Continental sources from Santa Ana winds?
- What are the dominant aerosol processes and how do they impact cloud formation?

Research Objectives: Determine which aerosols dominate the CCN-activated fraction when continental aerosols impact marine boundary layer cloud formation in the fall.

- EPCAPE-PT-LANL will perform new observations
 - Vapor partitioning between aerosols and cloud droplets
 - Effects of cloud processing on aerosol optical properties
 - Participation of black carbon in aerosol-cloud interactions

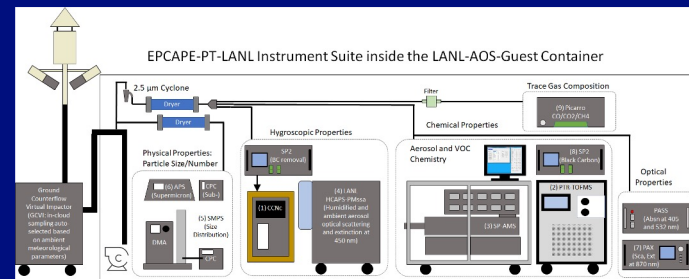


Aguilera et al., Nat. Commun., 2021.



LANL Science Team on the LANL-Guest-AOS

9 key measurements of aerosol physical, optical, hygroscopic and chemical properties and trace gas measurements inside the LANL-AOS-Guest for deployment on Mt. Soledad in October 2023



EPCAPE “Coastal Stratocumulus” Case Studies

