

ENA AOS and Supplementary Site: Data and Plans

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G-1 over ENA during IOP1



ENA C1



ACE-ENA Breakout

Tysons, VA

March 19, 2018

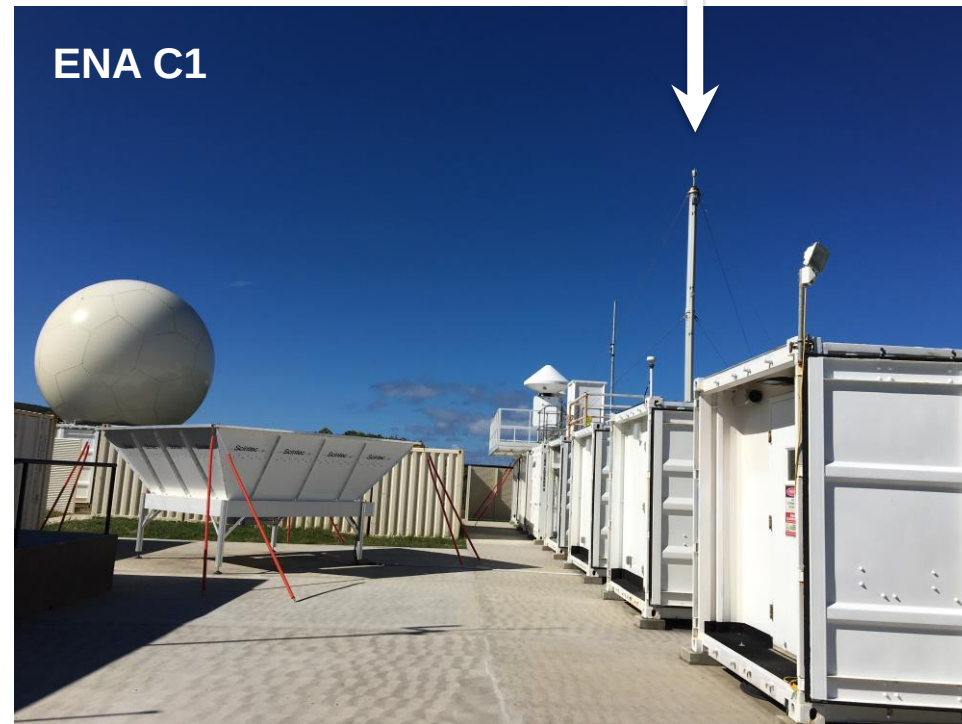


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ENA Aerosol Observing System (AOS)

- **Aerosols and Trace Gases**

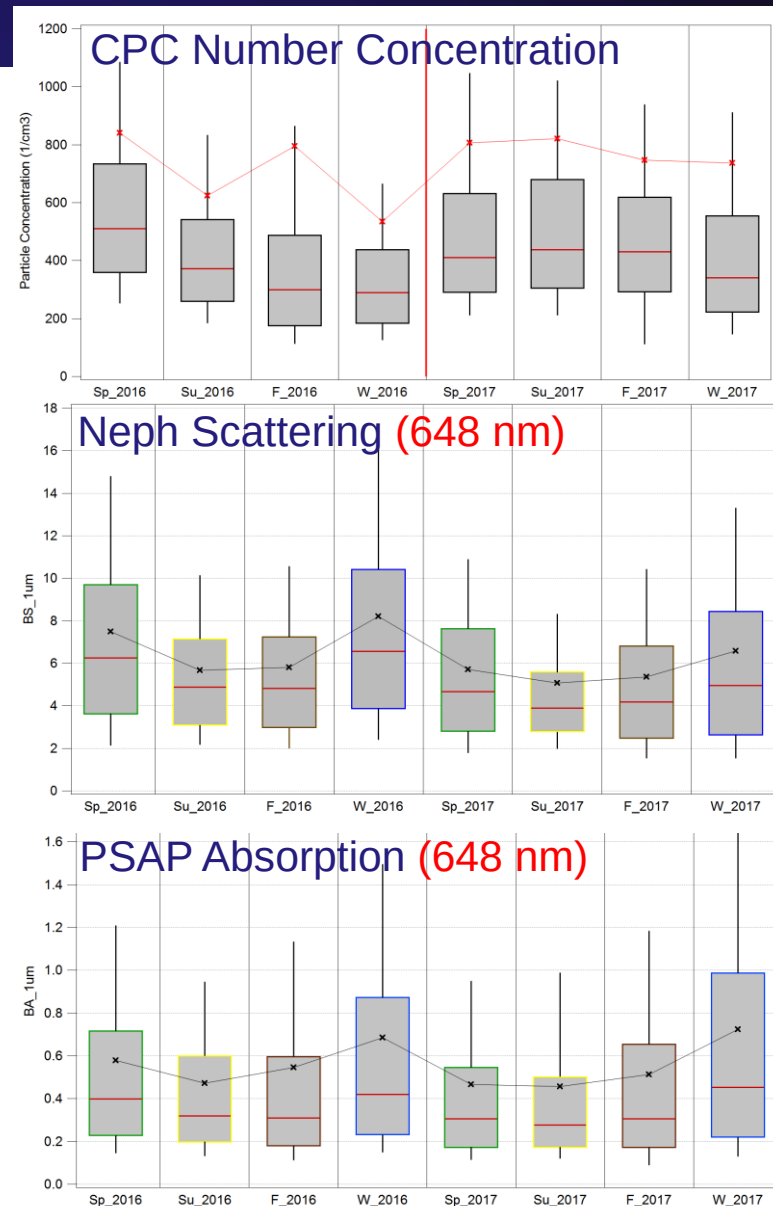
- Main C1 Ground site (10 meters a.g.l.)
- Physical Properties
 - CPC: Particle number
 - UHSAS: size distributions
 - CAPS, Neph, PSAP: optical properties (absorption, scattering, extinction)
- Chemical Properties
 - ACSM: non-refractory chemical composition of Ammonium, Chloride, Nitrate, Organics, Sulfate
- Water uptake
 - CCN: cloud condensation nuclei
 - HTDMA: hygroscopicity
- Trace Gas: CO, N₂O, Ozone
- Green house gases: CH₄, CO₂, H₂O
- Met Sensor
 - Wind direction and speed
 - Temperature
 - RH and rainfall



ENA Central Facility (C1) Aerosol Observing System (AOS)

PM₁ Data from 2016 - 2017

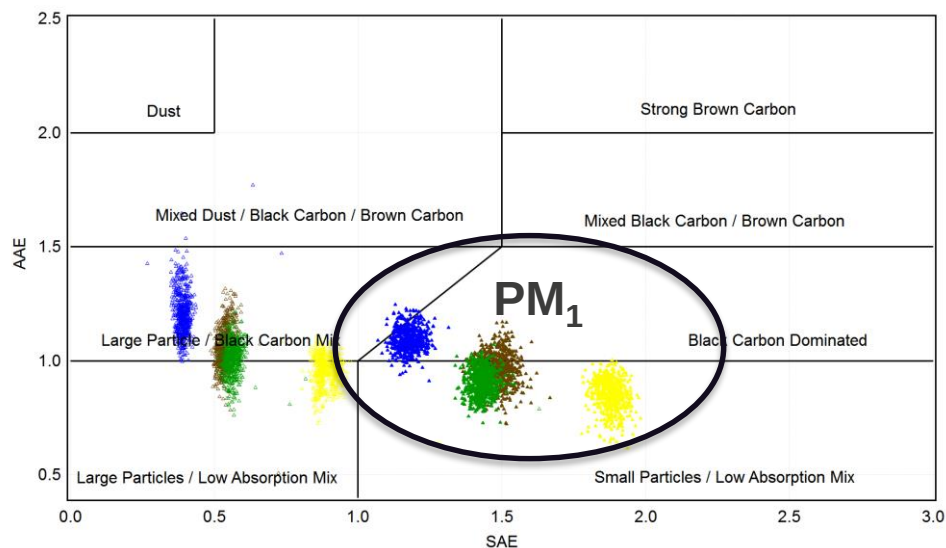
- **See Gallo et al. Poster 186**
 - A1: Tuesday 3:30pm
 - 2 years of consecutive monthly data
- **Particle Number Concentration**
 - Monthly median concentrations from 200 – 500 cc⁻¹ (average from 300 – 800 cc⁻¹)
 - Relatively clean background with local sources mostly during the day (airport/traffic)
- **Aerosol Optical Properties**
 - Neph PM₁ Scattering (648 nm)
 - PSAP PM₁ Absorption (648 nm)
 - Virkkula corrections (AOP Archive Product)
 - Low signal (< 1Mm⁻¹ at 648 nm) with observable seasonal trends
 - Both have seasonal trends with highest signals in the spring and winter (highest AAE)



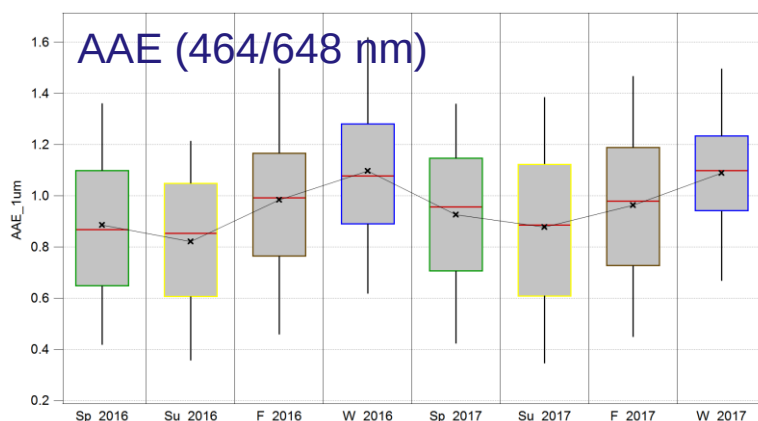
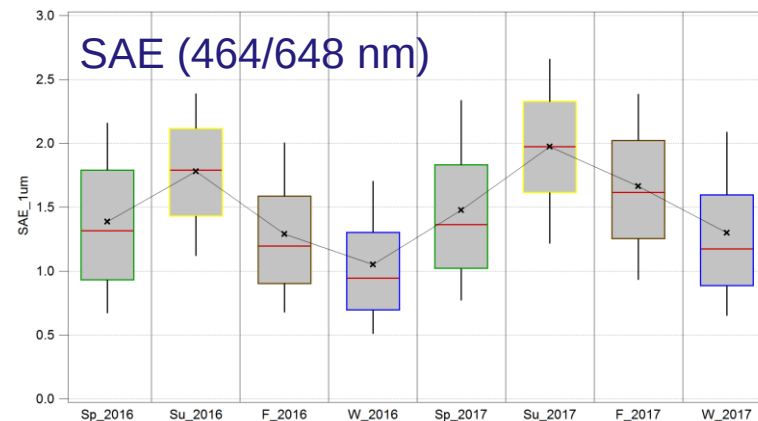
ENA AOS Data Analysis 2016 – 2017: Optical Properties

• Angstrom Exponents

- Absorption AE (AAE) highest in the winter
- Scattering AE (SAE) highest in the summer
 - Supported by UHSAS size distribution data (Guangjia Zheng, BNL)
- Winter: higher absorption at shorter wavelengths in the winter and larger particles
- Summer: smaller particles, absorption dominated by combustion particles



Plot based on Cappa et al., ACP 2016, CARES Dataset



Supplementary Site during ACE-ENA

★ 2009-2010 AMF1 CAP-MBL

★ 2013 – present ENA C1

★ 2017-2018 S1

- Data available on ARM Data Discovery Archive
- UHSAS (particle size distributions) and Met (wind speed and direction, temperature, precipitation, RH) from August 2017 – Feb 2018 (full coverage of ACE-ENA IOP2 flights)
- CPC data July/August 2017
- Will be analyzing for regional versus local contamination at the main and S1 sites (ARM Service Now)

