

# ARM Aerosol Measurement Plans

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# ARM Aerosol Measurement Strategy



- This is an attempt to address the issues raised by the AMSG
- For the most part – it does not fundamentally change the direction of the measurement strategy to date (with a few exceptions)

# Task Categories

1. Documentation and Communication
2. Deployment Strategies
3. System Configuration and Operation
4. General data product issues/harmonization
5. Number Density
6. Size Distribution
7. Hygroscopicity and Cloud Droplet Activation
8. Optical Properties
9. Aerosol Composition and Gas-Phase Chemistry
10. Vertical Profiles

# Top Tier Aerosol Measurement Actions

- (System) Implement an inlet drying system, initially at SGP
- (Location) Undertake analysis of the satellite site analysis collected at ENA
- (Instrument) Determine PSAP/TAP migration and replacement filter path
- (Instrument) Complete the instrument set at SGP by adding ozone
- (Data Product) Implement comparable size distribution representation across the size spectrum (and across the three size distribution instruments)
- (Data Product) Implement Improved quality controls in ACSM data products

Workshop Report is Now Available at:

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

# Documentation and Communication



- There are approximately 60 aerosol instruments and 500 datastreams
  - ▶ Need to facilitate access to aerosol datastreams
  - ▶ There is an umbrella activity to review needed improvements to Data Discovery

The recommendation is to measure the full size distribution everywhere

- Currently have instruments to support the full distribution at 2 sites
  - ▶ 1 set is at SGP
  - ▶ Plan to consolidate the other set with the AMF1 for CACTI
  - ▶ Long term recommendations?
- Working toward consolidated size distribution product

# Hygroscopic Activity

Currently we have three instruments related to this area, the CCN, HTDMA and nephelometers attached to the humidgraph. There are issues with each of these and no overarching strategy

- CCN generally going well – strategy for 2-channel?
- HTDMA – low usage, data product need? Goals for this instrument?
- F(RH) – how do the new and old styles compare?

How should these three fit together? What information is really needed?

# Aerosol Composition

- ACSM seems to be going well and has broad application
  - ▶ Working this year to improve characterization and a1/b1 products
- The MAOS-C – in it's current form is not sustainable but there are individual considerations
  - ▶ Do not plan to operate the PILS.
  - ▶ SP2 – still expensive – but doing this for limited term.
  - ▶ PTR-MS? Need to review options.
  - ▶ Should ARM provide an empty MAOS-like facility to support guest instruments?
- Filters
  - ▶ Continue to support guest measurements?
  - ▶ Develop internal capabilities/standards?
  - ▶ Implement one or more IMPROVE stations?



Seems to be very important in some camps – esp. for aerosol-cloud-interactions

- Lidar
  - ▶  $3\lambda$  provides profiles of size and number – requires upgrade of High Spectral Resolution Lidar;
  - ▶ Passive radiometry could also add a constraint
- Aircraft (Piloted and UAS provide episodic measurements)
- Tower (Currently the tallest tower is the 60m tower at the SGP)

What is the need here? Where should we invest? Lidar seems most tractable for continuous measurements – but would it be used?

# ARM Aerosol Measurement Strategy



- Feedback?
- Are there more significant changes needed?
  
- Provide feedback to me, the AMSG or the WG chairs
- Plan to have a check-in meeting sometime between now and the next ARM/ASR meeting