


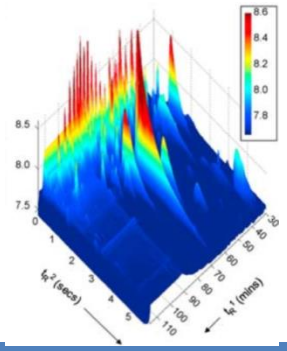

Session 2.1: New Aerosol Measurement Techniques

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What's this session all about?

Through presentations and discussion, we hoped to identify capabilities, opportunities, and roadblocks for the development of new measurement and analysis techniques.

Presentations covered the following:

- Unmanned Aerial Systems
- Shipborne Measurements
- Spatially Distributed Measurements
- SBIR Activities/Community
- Frontiers in offline aerosol analytics
- Machine Learning

Some highlights

- There is a lot of excitement about the capabilities of our UAVs, like the ArcticShark. Cool science is being done and new capabilities are considered such as VOCs, fluxes, and clouds
- Opportunities have opened via a program Science Research on Commercial Ships (Science RoCS), which aims to put instruments onboard commercial ships that require minimal user intervention. Tech developed in the program can have trickle-down effects through the development of robust instruments (e.g., an SMPS that can run autonomously in the Amazon Rainforest)
- ARM is investing in the development of aerosol “nodes” (mini- and micro-AOS), initially for the BNF site but potentially for other AMF deployments. Initially targeting aerosol size distribution and number concentration, but may be expanded to include optical properties, CCN, INP, trace gases, and potentially more. This effort should and the RoCS program are complementary.

Some highlights

- The Small Business Innovation Research (SBIR) program has led to exciting new instruments, but there are challenges. Are all instruments that benefit ARM science fit the SBIR model for commercial viability? Do the timelines work well?
- Lab analysis capabilities for particle samples are amazing, from ultrahigh resolution mass specs, to chemically-resolved imaging, to measurements of IN and CCN activity. We should be thinking about “bringing the field into the lab” as much as we are thinking about “lab to field.”
- Recent success in applying a machine learning model to rapidly identify aerosol source profiles from ACSM measurements highlight the need to expand this work into other areas, such as spectral absorption and size distribution.