

***LONG-TERM MEASUREMENTS OF ORGANIC AEROSOL AND ITS COMPONENTS
AT THE DOE ATMOSPHERIC RADIATION MEASUREMENT SITES***

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ABSTRACT

Secondary organic aerosols (SOA) comprise a large fraction of the aerosol mass in the atmosphere at many locations; however, the formation of SOA is poorly understood and represented by atmospheric models. This deficiency represents a large source of uncertainty in quantification of aerosol effects on radiation and clouds, and consequently the prediction of future climate. Evaluation and development of aerosol process modules require data products generated from field observations. Aerosol Mass Spectrometers (AMS) have been frequently used in field campaigns for characterizing aerosol composition and elucidating aerosol sources and processes. Three Aerosol Chemical Speciation Monitors (ACSM) were recently added to two long-term measurement sites (Tropical Western Pacific and Southern Great Plains) and a mobile facility supported by the Department of Energy Atmospheric Radiation Measurement (ARM) program. The ACSM is a “mini” version of the AMS developed for continuous, low maintenance operation. The typical time resolution of AMS measurements is 2-5 min at fixed-sites and 30 s or less on mobile-platforms (e.g., aircraft), while the time resolution of ACSM is generally 30 min. We are currently developing code that takes measurements of total organic matter and mass spectral information from the ACSM and derives the primary and secondary fractions of organic matter. The code will be run operationally within the Data Management Facility of ARM, and the new data product will soon be available on the ARM archive. This presentation will describe how the organic aerosol components are derived, the quality assurance (QA) procedures, and comparisons of side-by-side measurements from AMS and ACSM instruments. Data from over a year-long period from the ARM Southern Great Plains will be presented, along with an analysis that explains the seasonal and multi-day variations in inorganic and organic aerosol components.