Chemical Characterization of Organic Aerosols in the SE US by High Resolution Aerosol Mass Spectrometry

N. L. NG[1], L. XU[1], R. WEBER, H. GUO[1], L. KING[1], K. CERULLY[1], A. BOUGIATIOTI[1], A. NENES[1], A. G. CARLTON[2] AND K. NGUYEN[2]

[1]Georgia Institute of Technology, Atlanta, GA
[2]Rutgers University, New Brunswick, NJ

The extent to which human activities affect secondary organic aerosol (SOA) formation and evolution is highly uncertain and poorly understood. The SE US is characterized by high emissions of both biogenic and anthropogenic sources, ambient measurements in such areas can provide invaluable insights into the interaction of biogenic and anthropogenic emissions and aerosol formation. In this work, a High Resolution Time-of-Flight Aerosol Mass Spectrometer was deployed at multiple sites in the greater Atlanata area and Centerville Alabama for SCAPE (Southeastern Center for Air Pollution and Epidimiology) and SOAS (Southerm Oxidant and Aerosol Study), respectively. For SCAPE, we deployed the HR-ToF-AMS at at four different sites in the Atlanta area from 2012-2013, including: Jefferson Street (urban), Yorkville (rural), a roadside site (near Highway 75/85), and a near roadside site (Georgia Tech campus). During SOAS (June-July 2013), the HR-ToF-AMS was coupled to a Particle-Into-Liquid-Sampler and Cloud Condensation Nuclei Spectrometer to investigate the chemical composition of water soluble organic aerosols. We performed factor analysis of all the AMS datasets to understand the sources of organic aerosols in the SE and their processing in the atmosphere. The OA source apportionment at each site will be reported. In general, the OA in the SE is dominated by oygenated organic aerosols (OOA). The prevalent factors are LV-OOA, SV-OOA, and isoprene-OA. Comparison of datasets at different seasons in the year indicates that while LV-OOA and SV-OOA are prevalent throughout the year, isoprene-OA is only observed in warmer seasons. Our results show that all of the dominate OA factors are correlated with an anthropogenic component, higlightening the significant influence of anthropogenic pollution on SOA formation in the SE US.