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Understanding the signature and chemistry of atmospheric organic aerosols

Xuan Zhang
Center for Aerosol and Cloud Chemistry
Aerodyne Research Inc.

Abstract:

Atmospheric organic aerosol has important impacts on climate and air quality, yet large-scale transport models continue to have difficulty in accurately simulating organic aerosol budgets in the atmosphere. Although possible explanations for this mismatch have been advanced, none has addressed the laboratory chamber data themselves. This presentation will provide experimental and modeling results to understand the interactions of semi/low-volatile organic vapors with the chamber wall and the impact of wall-induced vapor losses on the derived secondary organic aerosol yield, a parameter that has been widely used in global and regional models. Accounting for such losses has been demonstrated to bring model predictions and observations of organic aerosol levels into much closer agreement. While the quantity yield is essentially a mathematical representation of the secondary organic aerosol forming potential of any given precursor, the organic aerosol formation and evolution mechanisms are further explored based on the advanced spectrometric techniques that could provide the temporal profiles of molecular constituents in complex aerosol mixtures. Recent development on the speciation of labile molecules such as multi-functional organic nitrates and peroxides in the condensed phase using Ion Mobility Mass Spectrometry are highlighted.

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For more information please contact Bonnie Slagel, bonnie@ucar.edu, phone 303-497-8318.