

2.053 Secondary Formation and Transformations of Organic Aerosols in Atmospheric Waters.

Presenting Author:

Chandra Mouli Pavuluri, Institute of Surface-Earth System Science, Tianjin University, Tianjin 300072, China, cmpavuluri@tju.edu.cn

Co-Authors:

Subba Rao Devineni, Institute of Surface-Earth System Science, Tianjin University, Tianjin 300072, China

Yan-Lin Zhang, Yale-NUIST Center on Atmospheric Environment, Nanjing University of Information Science and Technology, Nanjing 10044, China

Pingqing Fu, Institute of Surface-Earth System Science, Tianjin University, Tianjin 300072, China

Cong-Qiang Liu, Institute of Surface-Earth System Science, Tianjin University, Tianjin 300072, China

Abstract:

Organic aerosols (OA) have serious impacts on the Earth's climate system directly by absorbing solar radiation and indirectly by acting as cloud condensation nuclei. They can also play an important role in atmospheric chemistry and cause adverse effects on human health. The secondary OA (SOA), formed in the atmosphere, accounts for a large and often a dominant fraction of total OA mass. In recent times, much progress has been made in our understanding of SOA formation chemistry. However, most of the laboratory studies conducted so far represent idealized systems, which do not reflect the complex mixture of organic and inorganic aerosol constituents. The current atmospheric models underestimate the SOA mass and do not always capture the variability of the measured SOA loadings and distributions. In order to better understand the secondary formation and transformations of organics in the atmosphere, we conduct aqueous-phase experiments on atmospheric aerosol samples collected from Tianjin and Nanjing, China and at point sources as well under atmospherically relevant conditions for variant time periods. Both non-irradiated and irradiated samples are analyzed for the measurements of concentrations and stable carbon isotopic compositions of diacids, oxoacids, dicarbonyls and other compounds. Based on the results, we propose the secondary formation and transformations pathways of organics in atmospheric waters.