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**Identifying precursors and aqueous organic aerosol formation pathways during the SOAS campaign**

Aqueous multiphase chemistry in the atmosphere can lead to rapid transformation of organic compounds, forming highly oxidized low volatility organic aerosol and, in some cases, light absorbing (brown) carbon. Because liquid water is globally abundant, this chemistry could substantially impact climate, air quality, health, and the environment. Gas-phase precursors released from biogenic and anthropogenic sources are oxidized and fragmented forming water-soluble gases that can undergo reactions in the aqueous phase (in clouds, fogs, and wet aerosols) leading to the formation of secondary organic aerosol (SOAAQ). Recent studies have highlighted the role of certain precursors in the formation of SOAAQ. The goal of this work is to identify other precursors that are atmospherically important. In this study, ambient mixtures of water-soluble gases were scrubbed from the atmosphere at Brent, Alabama during the Southern Oxidant and Aerosol Study (SOAS). Aqueous OH radical oxidation experiments were conducted with these mixtures. Results showed precursors to be primarily odd ions and found in the positive mode by electrospray ionization mass spectrometry (ESI-MS), indicative of the presence of alcohols, aldehydes, organic peroxides, and epoxides. The results from this study will be used to better understand the precursors and cloud chemistry of these atmospherically relevant mixtures.