

Please note special date and time

Special Seminar

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Molecular corridors and global maps of phase state in atmospheric secondary organic aerosols

Hosted by Jeff Collett and Shantanu Jathar from Mechanical Engineering

Monday, September 19, 2016

**ATS room 101; Discussion will begin at 1:15pm
Refreshments will be served at 1:00pm in the weather lab**

Secondary organic aerosols (SOA) account for a large fraction of submicron particles in the atmosphere and play a key role in aerosol effects on climate, air quality and public health. The formation and aging of SOA proceed through multiple steps of chemical reaction and mass transport in the gas and particle phases, which is challenging for the interpretation of field measurements and laboratory experiments as well as accurate representation of SOA evolution in atmospheric aerosol models. SOA particles can adopt liquid, semi-solid and amorphous solid (glassy) phase states depending on chemical composition, relative humidity and temperature. The particle phase state is crucial for various atmospheric gas-particle interactions, including SOA formation, heterogeneous and multiphase reactions and ice nucleation. We found that organic compounds with a wide variety of functional groups fall into molecular corridors, characterized by a tight inverse correlation between molar mass and volatility. Based on the concept of molecular corridors, we develop a method to estimate glass transition temperatures based on the molar mass and molecular O:C ratio of SOA components, which is a key property for determination of particle phase state. Utilizing the global chemistry climate model EMAC with the organic aerosol module ORACLE, a global prediction of SOA phase state is presented.

Link to colloquium videos and announcement page: <http://www.atmos.colostate.edu/dept/colloquia.php>