

ATS/CIRA Colloquium

Barbara Ervens

**Visiting ATS from Chemical Sciences Division, Earth System
Research Laboratory, NOAA and CIRES, University of Colorado**

**Secondary organic aerosol formation:
The role of chemical processes in the aqueous phase of
clouds and aerosol particles**

Hosted by Jeff Pierce

Friday, February 6, 2015

**ATS room 101; Discussion will begin at 11:15am
Refreshments will be served at 10:45am in the weather lab**

Aerosol particles in the atmosphere adversely affect climate, air quality and health. They interact with incoming radiation by absorbing/scattering light and by acting as condensation nuclei for cloud droplets. Organic material comprises a significant fraction of such atmospheric particulate matter. A large portion of this material is produced by physical and chemical processes in the atmosphere and is referred to as 'secondary organic aerosol' (SOA). In order to estimate the effects of aerosol particles on clouds and vice versa, aerosol loadings and properties have to be explicitly predicted by models. Current models often significantly underestimate SOA mass and cannot properly predict physicochemical SOA properties.

Most current models describe SOA formation by condensation of low-volatility and semivolatile organic trace gases onto preexisting particles. However, many recent laboratory, field and model studies suggest that chemical processes in the aqueous phase of cloud droplets and aerosol particles might also contribute to SOA mass and could (partially) explain model discrepancies in total predicted mass and properties. I will discuss how chemical mechanisms based on laboratory data are developed and used in small-scale process models. Some examples will be shown of comparisons of process model predictions to atmospheric observations demonstrating our current understanding of ambient SOA formation in clouds and aerosol particles. Finally, I will share some ideas on the key properties of clouds that need to be taken into account for simplified (parameterized) expressions of SOA formation in the atmospheric aqueous phase to be used in large-scale models.

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