ATS/CIRA Colloquium

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The formation and growth of ultrafine atmospheric aerosols

Hosted by Eric Maloney

Thursday, March 8, 2012

ATS room 101; Discussion will begin at 3:30pm
Refreshments will be served at 3:00pm in the coffee lounge

Atmospheric aerosols have important influences on climate through their interaction with clouds and radiation. The extent of aerosols' climate impact depends greatly on the aerosol concentration, size and composition. A major source of aerosol particles in the atmosphere is nucleation, where low-volatility vapors combine to form ~1 nm diameter particles. These particles must grow to diameters around 100 nm in order to significantly affect clouds and radiation, yet many newly formed particles will not survive long enough to grow to these climate-relevant sizes. Understanding this formation and growth of particles to climate-relevant sizes on the global scale is thus necessary for predicting the influence of aerosols on climate.

In recent years, several groups have implemented aerosol microphysics (the processes that shape aerosol concentration, size and composition) into 3D climate and chemical transport models. There are many challenges in accurately representing aerosol microphysical processes in models, including size-resolved emissions/deposition, sub-grid variability, nucleation rates and gas-aerosol partitioning. Research in my group focuses on improving the understanding and representation of the uncertain processes. In this talk, I will present an overview of global predictions of aerosol microphysics (including the many challenges in these predictions) and then focus on two specific areas where my group is combining measurements and theory to improve the representation of aerosol processes in models: (1) Aerosol nucleation and growth in sulfur-rich emissions plumes (e.g. coal-fired power plants), and (2) Growth of ultrafine aerosols by condensation of Secondary Organic Aerosol (SOA).

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