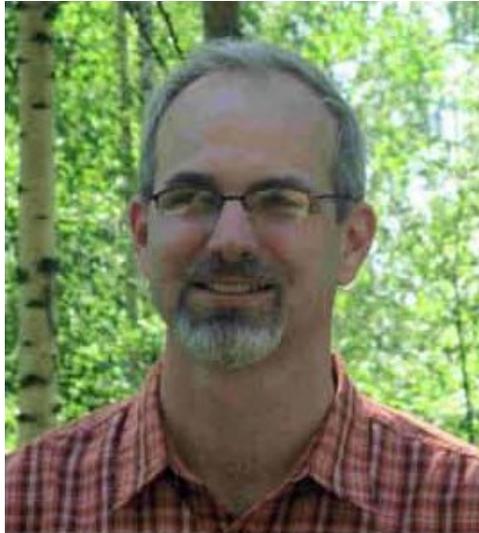




Distinguished Speaker Series



Jim Smith

Atmospheric Chemistry Division
National Center for Atmospheric
Research

Please join us Monday

April 1

ETRL 101

4:10 PM

The Roles of Nitrogen in Atmospheric Aerosol Formation and Growth

New particle formation is the spontaneous creation of new nanometer-sized particles in the atmosphere. Observations spanning from megacities to isolated forests show that these events can occur frequently and extend for hundreds of square kilometers. While the impacts of these events are not well understood, they are often the dominant source of particles in the remote regions and could play a crucial role in the Earth's climate by regulating the number and activity of cloud condensation nuclei (CCN). In this presentation, I will describe observations from the Thermal Desorption Chemical Ionization Mass Spectrometer (TDCIMS), an instrument capable of measuring the molecular composition of nanoparticles as small as 6 nm in diameter at time resolutions of ~30 minutes. Evidence from laboratory and field studies show that nitrogen-containing organic bases, amines, participate in neutralization reactions with acidic species in ambient nanoparticles. These reactions lead to low-volatility organic salts that may be particularly important in the earliest stages of new particle formation and growth. Recently, we have seen evidence that another class of nitrogen-containing compounds, organic nitrates, may also play an important role in the growth of newly formed particles. Particles formed from these nitrogen-containing compounds are often quite hygroscopic, and thus may have a far greater effect on cloud formation than previously thought.