

SEMINAR

Aerosol trends in the United States: Fires in the West and Sulfate in the East

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Aerosol scattering and absorption are still among the largest uncertainties in Earth's radiative budget. In the United States, two large trends are affecting aerosol emissions and optical properties.

One major aerosol trend is increased forest fires in the western U.S. The NOAA Chemical Sciences Division is in the middle of the five year Fire Influence and Regional and Global Environments Experiment for Air Quality (FIREX-AQ) study. Biomass burning is a major source of light-absorbing carbonaceous aerosol. These aerosol are generally classified into two categories: black carbon (graphitic-like aerosol) and brown carbon (organic aerosol that absorbs strongly in the ultraviolet and near-visible spectral regions). I will discuss the sources and magnitude of brown carbon absorption, and present results from the southeastern US and Fire Sciences Laboratory examining its lifetime and volatility.

The second major aerosol trend is the rapid decrease in SO₂ emissions in the eastern U.S. Between 1995 and 2013, SO₂ emissions in the U.S. declined by over 70%, leading to reduced sulfate aerosol mass loading. This has caused a decrease in both sulfate aerosol mass and aerosol hygroscopicity, with large improvements in aerosol mass loading and visibility in the eastern U.S. This rapid change has many consequences. Plant photosynthesis is more efficient using scattered light than direct light because more leaf surfaces are illuminated, and anthropogenic aerosol trends have had a small impact on carbon uptake in temperate forests due to reduced scattered light.

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Refreshments 3:15 p.m

NCAR Foothills Laboratory

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FL2-1022, large seminar room

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