

***SOURCE CHARACTERISTICS AND MIXING STATE OF BLACK CARBON
DURING CARES 2010***

R. Subramanian, *Droplet Measurement Technologies*
Greg Kok, *Droplet Measurement Technologies*
Arthur Sedlacek, *Brookhaven National Laboratory*
Darrel Baumgardner, *Droplet Measurement Technologies*
Rahul Zaveri, *Pacific Northwest National Laboratory*

For presentation at
The Second Science Team Meeting of the
Atmospheric System Research (ASR) Program,
San Antonio, TX
March 28-April 1, 2011

**Environmental Sciences Department/Atmospheric Sciences Division
Brookhaven National Laboratory**

**U.S. Department of Energy
Office of Science**

ABSTRACT

During the recent Carbonaceous Aerosols and Radiative Effects Study (2010) in California, two single- particle soot photometers (SP2s) were run in parallel at the T0 and T1 sites in Sacramento and Cool, respectively. The SP2 uses laser-induced incandescence (LII) to detect black carbon mass, while scattering is used to determine the mixing state of individual BC-containing particles. At the T0 site near downtown Sacramento, BC concentrations higher than 1 $\mu\text{g}/\text{m}^3$ were measured at times, and BC particles tended to be thinly coated. This suggests that the T0 site was impacted by fresh emissions, as expected for an urban area. Two high-BC-mass events were recorded in the early morning hours of June 13 and June 17, but the BC mass-size distributions were different for these two events. The first appears to be biomass smoke, while the second is more indicative of fresh vehicular exhaust. On June 15, the urban plume was forecast to be transported to T1. A closer look at the SP2 results show that though both sites were dominated by thinly coated BC cores, T1 appears to show more thickly coated, sub-100 nm MED BC cores. The mass-mean BC MED at was 143 nm at T0, and 175 nm at T1.

NOTICE: This manuscript has been authored by employees of Brookhaven Science Associates, LLC under Contract No. DE-AC02-98CH10886 with the U.S. Department of Energy. The publisher by accepting the manuscript for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this manuscript, or allow others to do so, for United States Government purposes.