

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Analysis of levoglucosan, potassium and water soluble organic carbon in activated filter samples

Discipline: Natural

Type of Project: Research

Funding Agency: National Park Service

Other Partners/Cooperators: Colorado State University

Effective Dates: 1/2/2008- 12/31/2008

Funding Amount: \$55,382

Investigators and Agency Representative:

NPS Contact: Bill Malm, Air Resources Division, National Park Service, CIRA Foothills Campus, Colorado State University, 1375 Campus Delivery, Fort Collins, CO 80523, (970) 491-8598;
malm@cira.colostate.edu

Investigator: Jeffrey Collett, Jr., Atmospheric Science Department, Colorado State University, Fort Collins, CO 80523; Tel: (970)-491-8697; Fax: (970)-491-8449; e-mail: Collett@lamar.colostate.edu

Project Abstract: This research will apply a new, robust and inexpensive technique to measure concentrations of levoglucosan and other carbohydrates in collected aerosol samples: ion chromatography coupled with pulsed amperometric detection (IC-PAD). Colorado State University proposes to apply this technique to analysis of archived Teflon filter samples originally collected in routine aerosol monitoring conducted by USEPA. Five hundred (500) samples will be selected, in collaboration with EPA and other scientists, for extraction and analysis at the Colorado State University laboratory. Samples will be chosen to look at spatial and temporal trends in smoke marker concentrations. Samples from locations and periods known to have been strongly influenced by wildfires will be included as will samples from locations where residential wood combustion is suspected to be a prime contributor to fine particle concentrations. Results of the sample analyses will be used to examine spatial and temporal variability in concentrations of the measured parameters, primarily focusing on spatial and temporal trends in the influence of biomass combustion emissions on fine particle concentrations. Correlations between levoglucosan and K⁺ will be examined to assess whether these two smoke markers indicate similar patterns of smoke influence. Comparisons between levoglucosan and water soluble organic carbon (WSOC) concentrations will be examined to determine whether changes in WSOC levels track changes in fire influence and to determine the range of fractions of WSOC contributed by levoglucosan. Project results will be presented at the 2008 annual meeting of the American Association for Aerosol Research.

Outcomes with Completion Dates: Final reports, including measure concentrations of key species from archives filter samples, due December 31, 2008.

Keywords: Colorado State University, NPS-Air Resources Division, air quality, filter samples, aerosols, smoke markers