



## **Chemical and microphysical properties of particles in aged forest fire plumes from Alaska and western Canada observed in the summer 2004 over the Northeastern U.S.**

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During the Intercontinental Transport and Chemical Transformation-New England Air Quality Study (ITCT-NEAQS 2004) in July and August 2004, several forest fires plumes were observed over the northeastern U.S. and southeastern Canada. Satellite data and trajectory analyses indicate that the plumes originated from forest fires burning in Alaska and western Canada. In-situ measurements of the aged forest fire smoke were made on board the NOAA WP-3D research aircraft during several flights over a period of 3 weeks. Concentrations of volatile organic compounds (VOCs) and the chemical composition of single aerosol particles in air masses containing forest fire smoke show significant differences compared to background air or to pollution from urban and industrial sources and unambiguously identify the smoke plumes. Removal of particles and water soluble trace gases indicates cloud processing in certain plumes.

Quantitative compositional measurements were made of the volatile fraction of submicron particles, as well as of submicron inorganic ionic compounds and water soluble organic mass, within the forest fire plumes. Particle size distributions from 0.004 to 8  $\mu\text{m}$  were measured with one second resolution in the aged forest fire smoke. The smoke was characterized by mass-weighted diameters between 0.6 and 1  $\mu\text{m}$ —much larger than secondary particles typical of urban and industrial sources. Most of the

detectable submicron mass was in the form of water-soluble organic material. Particle volume concentrations were among the highest seen within the ITCT-NEAQS 2004 project, and regional visibility and air quality were significantly affected by the transported smoke.