

A major regional air pollution event in the northeastern United States caused by extensive forest fires in Quebec, Canada

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During early July 2002, wildfires burned $\approx 1 \times 10^6$ ha of forest in Quebec, Canada. The resultant smoke plume was seen in satellite images blanketing the U.S. east coast. Concurrently, extremely high CO mixing ratios were observed at the Atmospheric Investigation, Regional Modeling, Analysis and Prediction (AIRMAP) network sites in New Hampshire and at the Harvard Forest Environmental Measurement Site (HFEMS) in Massachusetts. The CO enhancements were on the order of 525–1025 ppbv above low mixing ratio conditions on surrounding days. A biomass burning source for the event was confirmed by concomitant enhancements in aerosol K^+ , NH_4^+ , NO_3^- , and $C_2O_4^{2-}$ mixing ratios at the AIRMAP sites. Additional data for aerosol K, organic carbon, and elemental carbon from the Interagency Monitoring of Protected Visual Environments network and CO data from Environmental Protection Agency sites indicated that the smoke plume impacted much of the U.S. east coast, from Maine to Virginia. CO mixing ratios and K concentrations at stations with 10-year or longer records suggested that this was the largest biomass burning plume to impact the U.S. east coast in over a decade. Furthermore, CO mixing ratios and aerosol particles with diameters $< 2.5 \mu m$ ($PM_{2.5}$) mass and scattering coefficients from the AIRMAP network and HFEMS indicated that this event was comparable to the large anthropogenic combustion and haze events which intermittently impact rural New England. The degree of enhancement of O_3 , NO_y , NO_3^- , NH_4^+ , and SO_4^{2-} in the biomass plume showed significant variation with elevation and latitude that is attributed to variations in transport and surface depositional processes.