



Long-range transport of emissions from the July 2002 Québec forest fires

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The long-range transport of smoke aerosol and carbon monoxide from the Québec forest fires of July 2002 is investigated using the Global Environmental Multi-scale Air Quality model (GEM-AQ). The model is based on the 3-D global variable-resolution multi-scale model developed by the Meteorological Service of Canada for operational weather prediction, and it includes an online chemical module and a size-resolved multi-component aerosol module (Canadian Aerosol Module, CAM). The smoke aerosol and CO emissions, generated from GOES Wildfire Automated Biomass Burning Algorithm products, are uniformly injected into grid columns between altitudes of 1 and 5 km, and updated every half an hour. The smoke particles are assumed to contain 6% black carbon and 94% organic carbon, and are distributed into 12 size bins spaced logarithmically in radius between 0.01 and 1 μm . Their initial size distribution is unimodal and lognormal. The particles grow by coagulation and hygroscopically. CO is transported as a passive tracer. The model output is compared with CO measurements from the PICO-NARE mountaintop station in the Azores Islands, MOPITT CO mixing ratios, TOMS aerosol index data, and AERONET/AEROCAN aerosol optical depth measurements.