



## **Transport of biomass burning emissions into the Arctic in April 2008: GEM-AQ simulation and comparison with aircraft observations from the ARCTAS and ARCPAC campaigns**

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In 2008 Northern Asia experienced an early fire season that resulted in large amounts of pyrogenic species being transported into the Arctic atmosphere. Biomass burning plumes were encountered during NASA ARCTAS (Arctic Research of the Composition of the Troposphere from Aircraft and Satellites) and NOAA ARCPAC (Aerosol, Radiation, and Cloud Processes affecting Arctic Climate) mission flights out of Fairbanks, Alaska. To simulate these events, we used the GEM-AQ (Global Environmental Multiscale with Air Quality) model, a global, tropospheric chemistry, general circulation model based on the global multiscale model developed by the Meteorological Service of Canada for operational weather forecasting. GEM-AQ includes a size-resolved multi-component aerosol module. Fire emissions with daily temporal resolution were generated from MODIS active fire products. The model was run on a global variable grid with 0.5-degree horizontal resolution in the uniform core covering the Arctic region, and 54 hybrid sigma-pressure vertical levels between the surface and 0.5 hPa. Objective analysis data from the Canadian Meteorological Centre were used to update the meteorological fields every 24 h. The model output is compared with aerosol mass concentrations and trace gas volume mixing ratios measured during ARCPAC and the spring deployment of ARCTAS.