Geophysical Research Abstracts
Vol. 21, EGU2019-5726, 2019
EGU General Assembly 2019

Bromine activation in the high Arctic: four-year time series of BrO profiles from Eureka, Canada

Kristof Bognar (1), Xiaoyi Zhao (2), Kimberly Strong (1), Xin Yang (3), Patrick L. Hayes (4), Samantha Tremblay (4), Rachel Y-W. Chang (5), Sara Morris (6), and Audra McClure-Begley (6)

(1) University of Toronto, Department of Physics, Toronto, Canada (kbognar@physics.utoronto.ca), (2) Air Quality Research Division, Environment and Climate Change Canada, Toronto, Canada, (3) British Antarctic Survey, Natural Environment Research Council, Cambridge, UK, (4) Department of Chemistry, University of Montreal, Montreal, Canada, (5) Department of Physics and Atmospheric Science, Dalhousie University, Halifax, Canada, (6) Earth System Research Laboratory, National Oceanic and Atmospheric Administration, Boulder, USA

Bromine explosions and corresponding ozone depletion events are common in the Arctic spring. The sources of reactive bromine are the snowpack and aerosols, but the exact conditions and mechanisms required for bromine release are not well understood. While direct observations of bromine chemistry are challenging, long time series of bromine monoxide (BrO) provide useful insight into the underlying processes of bromine activation. Here we present a four-year time series (2015-2018) of springtime BrO profiles retrieved from Multi-AXis Differential Optical Absorption Spectroscopy (MAX-DOAS) measurements from Eureka, Nunavut, Canada (80.1° N, 86.4° W). BrO profiles are compared to wind observations and surface ozone concentrations to investigate the role of local meteorology. Comparisons to in-situ aerosol measurements indicate that high BrO concentrations correlate with high supermicron aerosol load (likely locally produced sea salt aerosol). BrO profiles are also compared to modeled BrO and aerosol concentrations from the UM-UKCA global chemistry-climate model, to further investigate the role of aerosols in bromine activation.