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Observations of iodine monoxide in the Arctic troposphere

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A unique feature of the polar troposphere is the strong impact of halogen photochemistry, in which reactive halogen species are responsible for ozone depletion as well as the oxidation of elemental mercury and dimethyl sulfide. The sources, however, as well as release and recycling mechanisms of these halogen species are far from being completely understood, especially the role of chlorine and iodine compounds. For iodine, which is thought to be produced either by organic precursors or inorganic processes, one curious issue is the difference of its role in the two polar regions, the Arctic and the Antarctic. Satellite observations show significant quantities of IO in large areas of Antarctica and the surrounding ocean and comparatively no IO in the Arctic. This is in concordance with some ground-based remote sensing observations in Antarctica, whereas publications of IO mixing ratios or upper limits from the Arctic are seldom. This strong hemispheric dichotomy may however not be the whole picture.
Here we present data from ground-based MAX-DOAS observations in the Arctic. Long-term measurements from Alert, Canada (82N) spanning the period from 2007 until 2013 indicate elevated and significant quantities of IO in the troposphere in late spring and early summer comparable to ground-based observations in Antarctica. This is backed up by ship-borne MAX-DOAS measurements in Baffin Bay during summer 2010, which also show elevated and significant amounts of IO. Furthermore the interaction of IO and BrO will be shown, as well as the influence of meteorological parameters and the data will be compared to other measurements.