Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05923, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05923
EGU General Assembly 2008

MAX-DOAS measurements of bromine explosion events in McMurdo Sound, Antarctica

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Ozone depletion events in the Arctic and Antarctic marine boundary layer have been reported since the mid-1980s. These events occur over periods of hours and days with ozone concentrations as low as 0.05 ppb compared to non-depleted values of about 25-40 ppb. The involvement of bromine compounds in ozone depletion was confirmed by observations of BrO (Bromine monoxide) in the Arctic as well as in the Antarctic boundary layer. Though it is now widely accepted that the mechanism for these sudden and rapid depletion events involves autocatalytic release of halogens by heterogeneous reactions on sea-salt surfaces (referred to as 'bromine explosions'), many aspects of the chemistry involved in this process are not fully understood. Satellite measurements by GOME (Global Ozone Monitoring Experiment) and SCIAMACHY (Scanning Imaging Absorption Spectrometer for Atmospheric Chartography**)** show that extensive areas of BrO enriched air masses, which are clearly associated with certain sea ice zones, repeatedly form during the austral spring. The presence of young sea ice and a capping inversion layer are known to be important, but further research is required to more accurately describe the sources and conditions required to trigger bromine explosion events.

Measurements of BrO and ozone have been made at coastal sites, including Arrival Heights and Neumayer Station, for several years, but until recently there were no

measurements from the sea ice zones themselves. To this end, we made ground-based MAX-DOAS (Multi-Axis Differential Optical Absorption Spectroscopy) BrO and surface ozone observations using remote instruments on the sea ice in McMurdo Sound. Several small to medium-sized ozone depletion events associated with elevated boundary layer BrO were measured during two field campaigns from August to November of 2006 and 2007. These first results are discussed along with the development of a retrieval analysis code to obtain BrO altitude distributions for the lower troposphere.