Geophysical Research Abstracts
Vol. 12, EGU2010-11619, 2010
EGU General Assembly 2010

Column Densities of Bromine Monoxide as Measured from Space Compared to Ground-Based Measurements During the OASIS Barrow Campaign in Spring 2009

Holger Sihler (1,2), Udo Frieß (1), Thomas Wagner (2), and Ulrich Platt (1)

(1) Institute for Environmental Physics, University of Heidelberg, Heidelberg, Germany, (2) Max Planck Institute for Chemistry, Mainz, Germany

Bromine monoxide (BrO) radicals are known to play an important role in the chemistry of the springtime polar troposphere. Their release by halogen activation processes leads to the almost complete destruction of near-surface ozone during ozone depletion events (ODEs) which may cover areas of up to several thousand square kilometers.

The autocatalytic mechanisms leading to halogen activation from saline surfaces, such as frost flowers and brine, are not well understood yet and may occur on much smaller spatial scales than covered by satellite measurements. In order to improve our understanding of the halogen activation processes in three dimensions, we combine active and passive ground-based and satellite-borne measurements of BrO radicals. While satellites can not resolve the vertical distribution and have rather coarse horizontal resolution (GOME-2: 80x40 km), they may provide information on the large-scale horizontal distribution. Information on the spatial variability within a satellite pixel may be derived from our combined ground-based instrumentation.

Simultaneous passive multi-axis differential optical absorption spectroscopy (MAX-DOAS) and active long-path DOAS (LP-DOAS) measurements were conducted during the jointly organised OASIS campaign in Barrow, Alaska during Spring 2009 within the scope of the International Polar Year (IPY). The active LP-DOAS measurements (3 km one-way) clearly reveal averaged BrO concentrations of up to 40 ppt varying strongly at times. The vertical profiles retrieved from the MAX-DOAS indicate that BrO is located within the boundary layer. These ground-based measurements are compared to BrO column densities measured by GOME-2 in order to find a conclusive picture of the spatial pattern of bromine activation.