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Global tropospheric BrO derived from GOME and 3D chemical transport models over the period 1996-2002

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In the last two decades, reactive halogens have been identified as important reactants in both the stratosphere and the troposphere. Bromine monoxide (BrO) is an efficient catalyst of the ozone destruction, and is responsible for 50% of the Arctic seasonal ozone loss. In the troposphere, massive amounts of BrO have been found in the boundary layer during polar ozone depletion events. It has also been identified over salt lakes, in the marine boundary layer and in volcanic plumes. Furthermore satellite observations have found strong indications for the widespread presence of BrO in the free troposphere with vertical columns of about 1-3 x10^{13} molec/cm^2. Recent modeling results have shown that this may represent a very strong sink for O_3 that has been so far ignored in most tropospheric chemistry studies.

In the present study, tropospheric BrO columns are derived globally by combining GOME total column measurements and stratospheric BrO column estimates obtained using two different 3D chemical transport models: SLIMCAT (Univ. Leeds) and BASCOE (BIRA-IASB, see presentation by S. Chabrillat et al.). The retrieval algorithm properly accounts for the different air mass factors at stratospheric and tropospheric altitudes. Clouds and surface albedo are taken into account using FRESCO and GOME-derived MLER climatogical data sets. The stability of the retrieved tropospheric BrO columns is investigated, in particular as regards the impact of applying a stratospheric correction based either on SLIMCAT or on BASCOE calculations. GOME retrievals are also compared with tropospheric BrO columns independently retrieved (see companion poster by M. van Roozendael et al.) from ground-based DOAS measurements performed at Harestua (Southern Norway) and Reunion Island (Indian Ocean). Finally results are discussed in light of recently published global tropospheric chemistry

transport model results.