



Bromine oxide in the polar boundary layer: Analysis of long-range transport processes

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On many days in polar springtime, a nearly complete removal of ozone from the polar boundary layer can be observed in widespread parts of Arctic and Antarctic.

Responsible for these so called Ozone Depletion Events (ODEs) is the catalytic destruction of ozone by halogens. These can be released from sea salt to the gas phase by heterogeneous reactions on newly formed sea ice, snow or aerosols. Here, bromine has been identified as the key halogen in the destruction cycle. It reacts together with ozone to bromine oxide (BrO), which strengthens the bromine release and ozone destruction by autocatalytic processes. BrO can be detected In-Situ or by absorption spectroscopy from the ground or from satellites and also has a large impact on the deposition of gaseous mercury in the sensitive polar ecosystem. The exact mechanism, which leads to an initial bromine release and the influence of transport and chemical processes on BrO is still not clearly understood.

In this study, BrO measurements of the satellite instrument GOME-2 together with model calculations of the dispersion model FLEXPART and the chemistry model MECCA are used to interpret selected BrO events, which could be observed over many days and large areas to get new information about source regions of BrO and the influence of transport and chemistry on the evolution of these events.