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Field studies of BrO and IO at salt ponds (Namibia and Botswana) and related smog chamber experiments on environmental salt and soil samples

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Previous studies have shown that salt lakes provide a significant source for gaseous reactive halogen compounds. Reactive halogen species (RHS) influence the ozone chemistry. Iodine chemistry is known to initiate particle formation, where the relevant nucleation mechanism is not fully understood. The RHS IO and BrO were investigated by Multi- Axis- Differential- Optical- Absorption- Spectroscopy (MAX-DOAS) of scattered sunlight at two different salt ponds. At a coastal salt evaporation pond for production of sodium chloride in Namibia (Walfish Bay) as well as at a natural salt pond in Botswana (Sua Pan) a tropospheric IO signal was observed. In Namibia the slant column density (SCD) rose up to $(4.5\pm0.7)\cdot10^{13}$ molec/cm^2 (elevation angle: 5°). Assuming a typical layer thickness of 500 m, this would correspond to a concentration of (3.3 ± 0.5) ppt. The mean SCD of IO was $(2.2\pm0.5)\cdot10^{13}$ molec/cm^{2}at Sua Pan for 5° elevation angle. At both measurement sites tropospheric BrO remained below the detection limit of $1.8\cdot10^{13}$molec/cm^{2}or 1.3ppt, respectively. Many aspects of the underlying mechanisms for the release of reactive halogen compounds, their sources and sinks are not well understood yet. In order to investigate the release of RHS soil and salt samples from both measurement sites are exposed to simulated sunlight in a teflon smog-chamber experiment at Bayreuth. RHS are observed by DOAS with a multireflection system. An ozone analyzer, a gas chromátograph (with flame ionisation detector) and a scanning electrostatical classifier with condensation nuclei counter are employed for monitoring hydrocarbons and aerosol, respectively.