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Reactive Halogen Species in the Marine Boundary Layer: A Comparision of the Mauretanian and the Peruvian upwelling regions

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Reactive halogen species (RHS) such as bromine oxide (BrO) or iodine oxide (IO) play a major role in the chemistry of ozone in both, the troposphere, and the stratosphere and possibly influence the ozone budget on a global scale. In order to estimate the amount of RHS release from marine sources DOAS measurements in three different upwelling regions (Mauritanian, African equatorial and Peruvian) as well as long-term-observations at the Cape Verde Atmospheric Observatory (CVAO) were performed within the SOPRAN Project (BMBF Förderkennzeichen 03F0611F).
In 2010 the HaloCaVe campaign with a set of DOAS instruments on the CVAO and RV Poseidon allowed for an intercomparision of Long-Path-DOAS (LP), Multi-Axis-DOAS (MAX) and Cavity-Enhanced-DOAS (CE) measurements on shore as well as for extending these observations to a larger area with the simultaneous ship-borne MAX-DOAS measurements during the DRIVE campaign from Gran Canaria to Cape Verde and back along the mauretanian coast. A re-evaluation of the entire data set is presented. LP- and MAX-DOAS observations show significant BrO concentrations of several ppt with strong variations from day to day and a diurnal cycle with a maximum at sunrise and sunset and a minimum during noon. In opposite to previous measurements, IO was below the detection limit of 0.5 ppt for the LP-DOAS and CE-DOAS instrument. From the ship (DRIVE campaign) locally restricted BrO hotspots with mixing ratios of up to 10ppt were observed in the Mauritanian costal upwelling. These findings allow new conclusions on the relevance of halogens on this marine environment which will be presented.
Within the SOPRAN cruise M91 on RV Meteor the upwelling region along the coast of Peru has been investigated in December 2012. First results from MAX-DOAS and CE-DOAS measurements will be presented and compared to those from the Atlantic. Both instruments measured NO_2, IO and glyoxal mixing ratios, the MAX-DOAS additionally BrO and formaldehyde. We observed significant differences for IO and BrO. Observed glyoxal slant column densities were significantly smaller than previously reported for this area. These recent findings raise several questions about the halogen mechanisms.
Comparing both regions might give hints to the relevant release mechanisms and thus furthermore improve estimations of the global influence of reactive halogen species on tropospheric chemistry and the local relevance. First conclusions will be presented.