



MAX-DOAS measurements of BrO and IO over the Eastern Tropical North Atlantic

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BrO and IO potentially play an important role in the photochemistry of the ocean. In the troposphere, these halogen radicals destroy ozone catalytically, can cause the formation of new aerosol particles and serve as oxidizers for dimethyl sulfide. Reactive halogen species are formed in the boundary layer by different processes, for example through the release from sea salt aerosols or certain algae. In particular, IO is produced inshore by macroalgae. However, the situation in the marine boundary layer over the open ocean is not well understood.

Measurements of BrO and IO were carried out during a campaign on the German research vessel Poseidon in June 2010 in the Eastern North Atlantic from Las Palmas, Gran Canaria via the Cape Verde Islands and back along the West African Coast to Vigo, Spain. The campaign is part of the second phase of the BMBF joint project SOPRAN (Surface Ocean Processes in the Anthropocene) and its main aim is to investigate the role of coastal regions for the formation and emissions of halocarbons and reactive inorganic halogen compounds. The coast of West Africa represents an area with high biological activity which is caused by the strong upwelling in this region and the dust impact from the Sahara Desert.

The Multi-Axis Differential Optical Absorption Spectroscopy (MAX-DOAS) technique was applied, which analyses scattered sunlight spectra at different elevation angles. With this method, information about the vertical distribution and the concentration of trace gases can be derived.

Tropospheric BrO could be detected close to the Mauritanian Coast at a maximum mixing ratio of approximately 10 ppt at an assumed layer height of 1 km, whereas IO was present only in very small amounts close to the detection limit during the whole cruise.

These values match with simultaneous measurements of BrO and IO performed with the LP-and MAX-DOAS technique on the Cape Verde Islands, located in the Eastern Tropical North Atlantic. The results are also in good agreement with MAX-DOAS measurements performed in February 2007 during another cruise in the same area.