



Diurnal variations of halocarbons in and above the tropical Atlantic

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Short lived halogenated substances that occur naturally in the oceans contribute largely to the overall budget of reactive halogen species in the atmosphere and thus influence the ozone depletion in both the troposphere and the stratosphere. Coastal areas, as well as upwelling regions in the tropics, have been identified to be of high significance to the budget of brominated very short lived substances (VSLS) with bromoform (CHBr_3) and dibromomethane (CH_2Br_2) generally representing the largest organic contributors to atmospheric reactive bromine. Previous observations of elevated atmospheric mixing ratios of brominated halocarbons above the Mauretanian upwelling have led to the hypothesis that, apart from enhanced biological production in the upwelling, additional coastal sources contribute significantly to the atmospheric budget. We present a study of diurnal and regional variability of halogen emissions in the tropical Atlantic to further investigate this theory, based on the campaign DRIVE onboard the RV Poseidon that took place from May 31st to June 17th 2010.

Starting at the TENATSO station at Cape Verde, the RV Poseidon followed a cruise track to the coast of Mauretania where coastal upwelling could be observed. Parallel sampling of the atmosphere and sea surface water on the ship, as well as land-based sampling of air at the Cape Verde Atmospheric Observatory (CVAO) made it possible to observe a regional gradient of halocarbon concentrations towards the continental coast. In the course of the cruise, six 24-hour stations with nearly hourly sampling gave the unique opportunity to investigate diurnal variations of halocarbons in sea surface water and in the atmosphere, in order to calculate the regional and diurnal variability of sea-to-air fluxes of these compounds. Air mass back trajectories, as well as the comparison to biological parameters such as chlorophyll-a will help to further identify the sources of the high sea surface concentrations and the elevated mixing ratios of brominated halocarbons observed in and above the Mauretanian upwelling itself.