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Bromine and iodine chemistry in the tropical Atlantic Ocean: a model study

Roberto Sommariva and Roland von Glasow
University of East Anglia, School of Environmental Sciences, Norwich, United Kingdom (r.sommariva@uea.ac.uk)

Bromine and iodine species have a significant influence upon chemical processes in the marine boundary layer (MBL). Although their role is still subject to many uncertainties, previous studies have highlighted their impacts on the ozone and dimethyl sulphide (DMS) budgets. Recent measurements taken at the Cape Verde Atmospheric Observatory, located on Sao Vicente island (16°51'N, 24°52'W) have shown substantial loss of ozone associated with significant concentrations of bromine and iodine monoxides in the tropical MBL.

In this work, a one-dimensional Lagrangian model (MISTRA v7.4.1) - which includes a detailed description of meteorological and microphysical processes and up-to-date gas and aqueous phase chemical mechanisms - was used to simulate the observations of BrO and IO at Cape Verde in different scenarios. Sea-air fluxes derived from recent measurements of organic iodine compounds in the Eastern Atlantic Ocean were included in the model.

The model results were used to analyze the relative importance of the different sources and sinks of inorganic bromine and iodine species and to study how these species affect the concentrations of ozone and DMS in the tropical MBL under the conditions prevalent in the Cape Verde region.