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Modelling marine halogen chemistry within the chemistry-climate model ECHAM5/MESSy

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Due to its complexity, most studies of halogen chemistry have been performed within box or one-dimensional models. This restricts the validity of such model simulations to the specific conditions that were arbitrarily selected. To get an insight on the global importance of halogen chemistry, it is inevitable to perform global simulations.

We have implemented a marine halogen chemistry scheme into MECCA (Model Efficiently Calculating the Chemistry of the Atmosphere). MECCA is a comprehensive mechanism of gas-phase as well as aerosol chemistry. The MESSy interface (Modular Earth Submodel System) developed by P. Jöckel is used to couple the MECCA chemistry to the general circulation model ECHAM5. Since sea-salt aerosol particles provide the main tropospheric halogen source, we needed prognostically calculated aerosol fields. They are provided by the modal aerosol submodel M7.

Recent global halogen chemistry studies have used simple aerosol parameterisations and concentrated on specific issues. For example, one study addressed the influence of BrO on ozone, performed with simplified halogen chemistry, and reveals a strong interaction between them.

We will show results of MECCA (including the marine boundary layer halogen chemistry) and compare them to previous results, showing the importance of a prognostic aerosol representation for calculation of halogen chemistry, as well as the advantage of using detailed halogen chemistry.