Geophysical Research Abstracts
Vol. 14, EGU2012-8138-2, 2012
EGU General Assembly 2012

Multi-phase halogen chemistry in the tropical Atlantic Ocean

R. Sommariva (1,2) and R. von Glasow (1)

(1) University of East Anglia, School of Environmental Sciences, Norwich, United Kingdom (r.von-glasow@uea.ac.uk, +44-(0)1603-591327), (2) Institut für Umweltphysik, Universität Heidelberg, Heidelberg, Germany

We used a one-dimensional model to simulate the chemical evolution of air masses in the eastern tropical Atlantic Ocean (Cape Verde region), with a focus on halogen chemistry. The model results were compared to the observations of inorganic halogen (particularly chlorine and bromine) species made in this region. The model could reproduce the measurements of chlorine species, especially under unpolluted conditions, but it overestimated sea-salt chloride and bromine species. Agrement with the measurements could be improved by taking into account the reactivity with aldehydes and the effects of DMS and Saharan dust on aerosol pH; an hypothetical HOX -> X^- aqueous-phase reaction could also improve the agreement with measured Cl_2 and HOCl, particularly under semi-polluted conditions. The results showed that halogen levels and speciation are very sensitive to cloud processing, although the model could not reproduce the observations under cloudy conditions. The model results were used to calculate the impact of the observed levels of halogens: Cl accounted for $5.4 - 11.6\%$ of total methane sinks and halogens (mostly bromine and iodine) accounted for $35 - 40\%$ of total ozone destruction.