



## The Influence of $\text{NO}_x$ and Iron on Halogen Activation

Sergej Bleicher (1), Franz D. Oeste (4), Julian Wittmer (1), Joelle Buxmann (2), Rolf Sander (3), Ulrich Platt (2), and Cornelius Zetzsch (1)

(1) Atmospheric Chemistry Research Laboratory, University of Bayreuth, Germany (sergej.bleicher@uni-bayreuth.de), (4) gM-Ingenieurbüro, Tannenweg 2, 35274 Kirchhain, Germany, (2) Institute of Environmental Physics, University of Heidelberg, Germany, (3) Air Chemistry Department, Max-Planck Institute for Chemistry, Mainz, Germany

Reactive Halogen Species (RHS) have a high impact on tropospheric trace gases, such as ozone and methane. Their activation from halides in sea spray aerosol and salt pans is a topic of intensive research. Here we present smog chamber measurements on both: aerosol and salt pans, using  $\text{NO}_x$  and iron(III) as activation species. The experiments were performed in a Teflon (FEP) chamber, equipped with Differential Optical Absorption Spectroscopy (DOAS) in a White setup. Using DOAS we were able to observe  $\text{BrO}$ ,  $\text{OCIO}$  and  $\text{ClO}$  directly. Moreover, we could observe the concentration of chlorine atoms with the radical clock technique. In addition, we calculated the ionic composition and pH of the aerosol using an adapted CAABA/MECCA model.

In contrast to salt pans the activation of both: bromide and chloride is strongly dependent on the initial  $\text{NO}_x$  concentration in the aerosol. Experiments with salt pans show almost no influence of  $\text{NO}_x$  on activation of chloride. Moreover, although the total surface of salt pans compared to aerosol was a factor of 102 to 103 larger, no rapid consumption of  $\text{NO}_x$  was observed over wet salt pans (RH>50%). While in the aerosol case  $\text{NO}_x$  had a lifetime of approx. 15 min, its observed consumption over salt pans was a factor of 10 slower.

Additionally, experiments on the salt pan with added iron(III) will be shown. The related photo-Fenton cycle is supposed to release chlorine to the gas phase, which could be considered to remove tropospheric methane in future, potential climate-engineering applications.