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Modeling Organic Films on Atmospheric Aerosol Particles and their Influence on Chemistry

L. Smoydzin, R. von Glasow

Institute of Environmental Physics, University of Heidelberg, Germany
(linda.smoydzin@iup.uni-heidelberg.de)

It is well known that organic material from the ocean's surface can be incorporated into sea salt aerosol particles often producing a surface film on the aerosol. Although recent measurements have confirmed that assumption it is still not possible to determine exactly which species are the major organic compounds in marine aerosols and it is an open question how strong the influence of organic matter on gas phase and sea salt chemistry in the marine atmosphere is. It is assumed that the most important influence of the organics is the reduced mass transfer between the gas and liquid phase due to a surface film. For studying the effect of organic surfactants on atmospheric chemistry we use a one-dimensional numerical model which contains a microphysics scheme and a detailed description of chemistry in the gas phase, in aerosol particles and in cloud droplets. We use a simple approach to simulate organic surface films on aerosol particles by using oleic acid as a proxy for organic compounds being present in the aerosol. If the concentration of oleic acid is large enough to form a monolayer on the particle the mass transfer between the gas and liquid phase is reduced. Lab measurements have shown that oleic acid can react with ozone which leads to a destruction of the organic film. That process is also taken into account in our model. By using this approach we want to find out in which way a reduced mass transfer between the gas and liquid phase might influence chemical processes in the marine atmosphere.