



Cloud-modifications by ship emissions derived from remote sensing data

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Seagoing ships emit gases and particles into the marine boundary layer. This leads to a modification of the chemical composition of the atmosphere and climate. The Junior Research Group SeaKLIM aims at a quantitative description of the influence of gaseous and particulate emissions from global shipping. One important aspect is how the emitted aerosols change the radiative balance of the earth system and how the conditions for cloud formation change by altering cloud properties and lifetimes, thus affecting the global water cycle. Under certain meteorological conditions aerosol emissions from ships modify existing marine stratocumulus clouds by an increase of cloud condensation nuclei and a decrease in droplet size. These so-called ship tracks can be detected with the help of remote sensing techniques and are defined as line-shaped bright features in a near-infrared imagery that are spatially coincident with the effluent plume of a ship. SACURA, a semi-analytical approach for the retrieval of cloud optical properties is used, to examine changes of micro- and macrophysical cloud parameters in maritime stratiform clouds due to ship emissions. First results are presented, indicating a change in optical thickness and effective radius of the droplets, leading to an albedo-change of maritime clouds.