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MeSMarT - Measurements of Shipping Emissions in the Marine Troposphere

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A new project called MeSMarT (Measurements of shipping emissions in the marine troposphere) to estimate the influence of ship emissions on the chemistry of the atmospheric boundary layer over the North Sea has been established in cooperation with the German Bundesamt für Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency). Over the last years discussions about ship emissions have increased and grown in importance due to the increase of commercial shipping as well as studies about their dangerous health effects. While industrial and traffic air pollution from ashore is decreasing because of technological improvements and stronger political regulations the impact of ship emissions becomes more relevant, especially in coastal areas and harbor cities. The establishment of a Sulfur Emission Controlled Area (SECA) for the North Sea and the Baltic Sea has been a first step to control and reduce ship emissions by consecutively regulating the sulfur content of fuels.
The project MeSMarT aims to monitor background concentration as well as elevated signals of gases and particles related to ship emissions with various physical and chemical methods to cover a wide range of relevant pollutants and their spatial and seasonal distribution. SO_2, NO_2, NO, CO_2 and O_3 are measured with in situ techniques, SO_2 and NO_2 as well by remote sensing applying the MAXDOAS-technique. The data will also be compared with satellite measurements and passive sampling in order to find a method to observe the long-term effect of regulations like SECA. High volume filter samples will be taken and analyzed especially for sulfate, nitrate, organics and elemental composition to investigate possible sources, sinks and conversion of ship emission derived compounds. Measurements and sampling take place during ship campaigns primarily in the North Sea and will be complemented with stationary measurements located on a coastal site close to the main shipping routes through the German Bight. Modeling of pollutants transport and chemical transformation taking into account the measured data will also be included in the MeSMarT project to improve the understanding of the relevance of ship emissions in coastal environments.
Here we present a project outlook and first results of a campaign in late 2012 using both in situ and remote sensing techniques.