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Title: *Studies of ship emissions and particles in the Svalbard fjords with use of the passive remote sensing*

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Ship emissions in the Arctic are expected to increase strongly due to increased oil and gas extraction on the continental shelf in the Arctic and the retreat of the sea-ice making ships traffic via an ice-free Polar Ocean possible. Monitoring these emissions and estimating their effect is a prerequisite for implementation of best available techniques for the reduction of the impact associated with them. The most important aerosol component resulting from ship emissions is sulphate, which is formed by the oxidation of SO₂. Norwegian coastal ship traffic, for instance, is responsible for more than 1/3 and 1/6 of the Norwegian emissions of NO_x and SO₂, respectively, and contributes substantially to coastal pollution. Emissions of black carbon (BC) per ship are probably higher than elsewhere because of the variable engine loads required by the Arctic conditions.

The main objective of this work is to measure aerosol emissions from ship-traffic, to estimate the impact to the local environment and the instantaneous solar aerosol radiative forcing in the Arctic.

The goal can be reached by extending a multi-spectral imaging camera system for SO₂ emissions to comprise information on the aerosol content. Observations will be made during a dedicated field campaigns using s/y Oceania in Svalbard coastal waters. Utilizing this dataset and co-located measurements, we can give an estimate of the impact of ship emissions to the local environment and further assess the local, instantaneous solar aerosol radiative forcing.