

### **3.021 First Emission Estimates From Oil and Gas Exploration and Production Activities in the Norwegian Sea.**

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Abstract:

The Arctic warms twice as fast as the rest of the world, and the Arctic Ocean is projected to become nearly ice-free in summer within this century. This opens the possibilities for hydrocarbon extraction, which will result in an increase of local emissions of short-lived climate forcers and greenhouse gases in a very sensitive region. Type and quantity of emissions of off-shore oil/gas exploration are not well known and very few independent measurements exist. During the ACCESS (Arctic Climate Change, Economy and Society aircraft) campaign in 2012 and one follow-on mission in 2016, the DLR Falcon conducted measurements in the Norwegian Sea area. The objective of these missions were to study chemical composition of emissions and to quantify source strengths of climate forcers and precursors ( $\text{NO}_x$ ,  $\text{SO}_2$ ,  $\text{CO}_2$ ,  $\text{CH}_4$  and non-vol. particles) released by oil/gas production. The measurements, carried out in cooperation with the Statoil company, focused on the largest platforms in that area, including oil and gas production facilities, drilling rigs and storage tankers. Elevated levels of most trace gas and aerosol concentrations were observed downstream of each facility. Using high resolution particle dispersion modelling, the measurements are used to constrain atmospheric emissions of off-shore oil/gas production in the Norwegian Sea.