



## **Quantifying emerging local anthropogenic emissions in the Arctic region: the ACCESS aircraft campaign experiment**

Anke Roiger (1), Jennie L. Thomas (2), Hans Schlager (1), Kathy Law (2), Jin Kim (1), Anja Reiter (1), Andreas Schäfler (1), Bernadett Weinzierl (1), Maximilian Rose (1), Jean-Christophe Raut (2), and Louis Marelle (2)

(1) Deutsches Zentrum für Luft- und Raumfahrt (DLR), Institut für Physik der Atmosphäre, Oberpfaffenhofen, (2) UPMC Univ. Paris 06; Univ. Versailles St-Quentin; CNRS/INSU, UMR 8190, LATMOS-IPSL, Paris, France

Arctic change has opened the region to new industrial activities, most notably transit shipping and resource extraction. The impacts that Arctic industrialization will have on pollutants and Arctic climate are not well understood. In order to understand how shipping and offshore oil/gas extraction impact on Arctic tropospheric chemistry and composition, we conducted the ACCESS (Arctic Climate Change, Economy, and Society, a European Union Seventh Framework Programme project) aircraft campaign. The campaign was conducted in July 2012 using the DLR Falcon research aircraft, based in Andenes, Norway. The Falcon was equipped with a suite of trace gas and aerosol instruments (black carbon, ozone, as well as other trace species) to characterize these emissions and their atmospheric chemistry. The Falcon performed nine scientific flights to study emissions from different ships (e.g. cargo, passenger, and fishing vessels) and a variety of offshore extraction facilities (e.g. drilling rigs, production and storage platforms) off the Norwegian Coast. Distinct differences in chemical and aerosol composition were found in emissions from these increasing pollution sources. We also studied the composition of biomass burning plumes imported from Siberian wildfires to put the emerging local pollution within a broader context. In addition to our measurements, we used a regional chemical transport model to study the influence of emerging pollution sources on gas and aerosol concentrations in the region. We will present an overview on the measured trace gas and aerosol properties of the different emission sources and discuss the impact of future local anthropogenic activities on the Arctic air composition by combining measurements with model simulations.