



The Polar Stratosphere in a Changing Climate (POLSTRACC)

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The POLSTRACC mission aims at providing new scientific knowledge on the Arctic lowermost stratosphere (LMS) and upper troposphere under the present load of halogens and state of climate variables. POLSTRACC is the only HALO (High Altitude and LOng Range Research Aircraft, German Research Community) mission dedicated to study the UTLS at high latitudes several years after the last intensive Arctic campaigns. The scientific scope of POLSTRACC will be broadened by its combination with the SALSA (Seasonality of Air mass transport and origin in the Lowermost Stratosphere using the HALO Aircraft) and GW-LCYCLE (Gravity Wave Life Cycle Experiment, a BMBF/ROMIC project) missions, which address complementary scientific goals sharing the same HALO payload. POLSTRACC, SALSA and GW-LCYCLE will offer the unique opportunity to study the bottom of the polar vortex and the high-latitude UTLS along with their impact on lower latitudes throughout an entire winter/spring cycle.

The POLSTRACC consortium includes national (KIT, Forschungszentrum Jülich, DLR, Max Planck Institute for Chemistry, Universities of Frankfurt, Heidelberg, Mainz and Wuppertal) and international partners (e.g. NASA). The payload for the combined POLSTRACC, SALSA and GW-LCYCLE campaigns comprises an innovative combination of remote sensing techniques providing 2- and 3-D distributions of temperature and a large number of substances, and precise in-situ instruments measuring T, O₃, H₂O, tracers of different lifetimes and chemically active species at the aircraft level with high time-resolution. Drop sondes will add information about temperature, humidity and wind in the atmosphere underneath the aircraft.

The field campaign will be divided into three phases for addressing (i) the early polar vortex and its wide-scale vicinity in December 2015 (from Oberpfaffenhofen, Germany), (ii) the mid-winter vortex from January to March 2016 (from Kiruna, Sweden), and (iii) the late dissipating vortex and its wide-scale vicinity in March 2016 (from Kiruna and Oberpfaffenhofen). The activities from Kiruna will be split into two intensive phases, with a focus on gravity wave observations in January 2016. Actual mission planning will be supported by flight planning and model tools and will be tested already in the preceding winter in a dry-run activity. The airborne field observations will be complemented by ground-based activities (e.g. lidars, radars and radio soundings) and satellite observations (e.g. CALIPSO, MLS and ACE-FTS).

The Poster is intended to present an overview of the scientific objectives, the payload, and the mission rationale, and to attract international scientific groups to join the POLSTRACC framework and extend its scientific scope.