QOS2016-95, 2016
Quadrennial Ozone Symposium of the International Ozone Commission

GLORIA chemistry-mode observations during the Arctic winter 2015/16 POLSTRACC campaign

S. Johansson (1), F. Friedl-Vallon (1), M. Höpfner (1), P. Preusse (2), J. Ungermann (2), and the GLORIA Team

(1) Institute of Meteorology and Climate research, Karlsruhe Institute of Technology, Karlsruhe, Germany, (2) Institut für Energie und Klimaforschung, Stratosphäre, IEK-7, Forschungszentrum Jülich, Jülich, Germany, (3) Institute for Data Processing and Electronics, Karlsruhe Institute of Technology, Karlsruhe, Germany, (4) Zentralinstitut für Engineering, Elektronik und Analytik, Systeme der Elektronik (ZEA-2), Forschungszentrum Jülich, Jülich, Germany, (5) Institute for Atmospheric and Environmental Research, University of Wuppertal, Wuppertal, Germany

We will present results from measurements obtained by the GLORIA (Gimballed Limb Observer for Radiance Imaging of the Atmosphere) that has been operated on the HALO (High Altitude and Long Distance) research aircraft during the POLSTRACC campaign (Polar Stratosphere in a Changing Climate) in the Arctic winter 2015/16. This winter was characterized by record-breaking low stratospheric temperatures and a stable polar stratospheric vortex. The POLSTRACC aircraft mission was performed in three campaign parts from Oberpfaffenhofen (December 2015) and Kiruna (January and late February-mid-March) with the aim to investigate chemical and dynamical processes in the transition region at the bottom part of the stratospheric vortex. During the scientific flights, polar stratospheric clouds and processed air-masses were observed down to and below flight altitude. We will show retrievals of 2-dimensional trace-gas distributions derived from the so-called chemistry mode, i.e. GLORIA observations performed with high spectral resolution. Targeted gases are, amongst others, O_3, HNO_3, $ClONO_2$, H_2O, and various CFCs. We will present a detailed analysis of retrieval performance including diagnostics of spatial resolution and an estimated error budget. For validation, GLORIA data obtained during POLSRTRACC will be compared to datasets from other sensors on HALO as well as external sources. Furthermore, comparisons to meteorological analyses and atmospheric model simulations will be presented.