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## **Two-dimensional water vapour and temperature measurements from the airborne infra-red limb sounder GLORIA compared to atmospheric simulations**

We will present measurements of water vapour, temperature and cloud tops obtained by the GLORIA (Gimballed Limb Observer for Radiance Imaging of the Atmosphere) instrument that has been operated on the HALO (High Altitude and Long range) research aircraft during the PGS (POLSTRACC / GW-LCYCLE II / GWEX / SALSA) campaign in the Arctic during winter 2015/16.

We will show retrievals of two-dimensional water vapour and temperature distributions derived from GLORIA observations performed with high spectral resolution. In total, 16 HALO research flights with each up to 10 hour duration (10,000 km distance) have been performed during this aircraft campaign. The focus of these measurements is the UTLS (Upper Troposphere Lower Stratosphere) region. Within these flights, complex tropopause patterns, such as tropopause folds and gravity wave induced trace gas modulations, have been observed. These detailed cross sections allow for comparisons with ECMWF forecasts and reanalysis products. In our contribution, we discuss agreements and differences between GLORIA observations and model data at the geolocations of the measurement, and we help to identify regions of the UTLS, which need to be improved in atmospheric models.

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