



Spatial structures in UTLS trace gases imaged by the GLORIA instrument during the TACTS/ESMVal campaign in 2012

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The combined TACTS/ESMVal measurement campaign was conducted during August and September 2012. Its objective was to improve our understanding of the UTLS region using a combination of airborne in situ and remote sensing devices.

While the focus of TACTS was on exchange processes across the tropopause, ESMVal's objective was to obtain a wide latitude coverage from northern to southern polar regions. The campaign was based in Oberpfaffenhofen (D), with support bases in Sal (CV), Malé (MV), and Cape Town (ZA).

A total of 13 scientific flights, ranging in latitude from 65°S to 80°N, were performed aboard the High Altitude and Long Range (HALO) research aircraft, operated by the German Aerospace Agency (DLR). One of the core instruments was GLORIA, the Gimballed Limb Observer for Radiance Imaging of the Atmosphere.

GLORIA is a joint development of Forschungszentrum Jülich and Karlsruher Institut für Technologie. It is an imaging Fourier transform spectrometer in the thermal infrared range, designed to optimize either spatial or spectral resolution, so as to yield data for dynamical as well as chemical analysis. In dynamics mode, the instrument also pans between measurements, making it possible to observe the same target volume from multiple directions. Combined with the right flight pattern, a 3D tomographic analysis becomes possible.

In this presentation, we will show our first results for temperature and trace gas mixing ratios from a selection of the TACTS/ESMVal flights, concentrating on dynamics mode measurements in the polar regions. We will show the resolution of filaments in the UTLS region in two-dimensional cross-sections along the flight path, as well as preliminary results from true 3D retrievals.