



Maiden flight of the infrared sounder GLORIA

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The Gimballed Limb Radiance Imager of the Atmosphere (GLORIA) instrument is an imaging Fourier transform spectrometer that is capable to operate on various high altitude research aircraft and on stratospheric balloons. The instrument is a joint development of the Helmholtz Centers Forschungszentrum Jülich and Karlsruhe Institute of Technology. GLORIA was flown on board the Russian research aircraft Geophysica M55 for the first time in December 2011.

Atmospheric measurements with GLORIA are possible in limb and nadir geometry. The scientific focus in limb sounding mode is on dynamics, tropopause region, TTL and polar UTLS. The nadir mode is tailored to processes in the troposphere such as biomass burning events and high precision methane measurements. The combination of limb and nadir will combine good spatial resolution in both the troposphere and lower stratosphere. In addition, GLORIA serves as a proof of concept instrument for the candidate ESA Earth explorer mission PREMIER. The GLORIA spectrometer consists of a classical Michelson interferometer combined with an infrared camera. The spectral range of the first instrument version extends from 780 cm⁻¹ to 1400 cm⁻¹ with a spectral resolution of up to 0.075 cm⁻¹. The high speed HgCdTe focal plane array with 256x256 elements allows for an extremely high spatial sampling of up to 100 m in the vertical domain in the limb mode. The spectrometer is mounted in a gimballed frame that permits agility in elevational and azimuthal direction, as well as image rotation. Scene acquisition and scene stabilisation are accomplished by a control system based on an inertial measurement unit. Limb scenes can be chosen within 45° and 132° with respect to the flight direction of the aircraft allowing tomographic analysis of sampled air volumes.

The presentation will focus on a description of the instrument and its implementation in the aircraft, on in flight instrument characterisation results and on first exemplary scientific results.