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Airborne Infrared limb-imaging for atmospheric measurements: the GLORIA instrument and beyond

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Hyperspectral sounding of the radiance emitted by the earth's atmosphere in the mid-infrared range allows to derive information on atmospheric parameters like temperature, trace-gas concentrations, as well as information on aerosol and cloud. The GLORIA instrument is the first and only limb-viewing imaging Fourier transform spectrometer operated on board of high-flying aircraft to derive 2- and 3-D distribution of atmospheric parameters. GLORIA has been developed and is operated jointly by the Karlsruhe Institute of Technology and the Research Centre Jülich. In this contribution, we will present results of comparisons between GLORIA and in-situ instruments from simultaneous observations. Further, an overview on the scientific results obtained during various field campaigns where GLORIA has been flown on board the German HALO as well as on the Russian Geophysica high-altitude research aircraft will be provided. We will further discuss future deployments of GLORIA as well as perspectives for developments regarding advanced infrared limb imaging spectrometers.