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2-d chemical sampling of a tropopause fold over the Mediterranean: Observations by the IR limb-imager GLORIA and calculations by chemistry-transport models

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We will present results from measurements obtained by the GLORIA (Gimballed Limb Observer for Radiance Imaging of the Atmosphere) instrument that has been operated on the Geophysica research aircraft during a field campaign within the European StratoClim project in the Mediterranean area with basis in Kalamata, Greece, in September 2016. The flight at an altitude of 18 km (400 K) reached the eastern Mediterranean south of Cyprus, where air influence by the Asian Monsoon was sampled.
We will show retrievals of two-dimensional trace-gas distributions derived from GLORIA observations performed with high spectral resolution. Targeted gases are, amongst others, O_3 and HNO_3 as stratospheric tracers and PAN and C_2H_6 as pollution indicators. We will present an analysis of retrieval performance including diagnostics of spatial resolution and an estimated error budget.
For a first scientific analysis, comparisons to atmospheric model simulations from two atmospheric chemistry-transport models, ICON-ART (ICOsahedral Nonhydrostatic model - Aerosols and Reactive Trace gases) and CLaMS (Chemical Lagrangian Model of the Stratosphere) will be discussed. Focus will be on comparisons of the distribution of the trace gases measured by GLORIA to the model tracers indicating the chemical composition as well as well as the air mass origin.
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