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Biomass burning pollution products C2H6, C2H2, HCOOH, and PAN in the Southern hemisphere UTLS region observed by the GLORIA instrument during the SouthTRAC HALO aircraft campaign Sep-Nov 2019

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The Gimballed Limb Observer for Radiance Imaging of the Atmosphere (GLORIA) is an imaging Fourier transform spectrometer (iFTS) using a 2-dimensional detector array to record emission spectra in the mid-infrared region with high spatial resolution. GLORIA has been operated on the High Altitude and Long Range Research Aircraft (HALO) during the SouthTRAC campaign in September-November 2019. The campaign with base in Rio Grande (Tierra del Fuego) consisted of two observational periods, mainly in September and November 2019. Apart from many local flights, between the two phases HALO returned to Germany which allowed us to acquire long-range hemispheric cross-sections.

Two dimensional distributions of pollution species like C_2H_6, C_2H_2, HCOOH, and PAN, which are produced as primary and secondary products from biomass burning sources have been derived from the GLORIA observations. We will show that during the hemispheric cross sections as well as during some of the local flights, GLORIA observed pollution plumes with extensions of many kilometres in altitude and hundreds of kilometres horizontally with strongly enhanced concentrations of these species.

Trajectory analysis as well as comparisons to Microwave Limb Sounder (MLS) satellite observations show that the origin of plumes are mainly fires in South America and Africa, but also first signs of the Australian bush fires have been detected in the UTLS as early as November 2019.