

Karlsruhe Institute of Technology



## Biomass Burning Pollution in the South Atlantic Upper Troposphere: GLORIA Trace Gas Observations and Evaluation of the CAMS Model

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## **GLORIA** limb imaging

- The Gimballed Limb Observer for Radiance Imaging of the Atmosphere
- Fourier-Transform Spectrometer in combination with an imaging detector allows for simultaneous measurements of multiple limb geometries
- Aircraft and balloon versions of GLORIA available



- SouthTRAC aircraft campaign with German HALO research aircraft from September to November 2019 with base in Rio Grande, Argentina
- Biomass burning trace gases have an influence on ozone and thus the UTLS climate; long-range transport and uncertain emissions are difficult to simulate
   Measurements are important



## GLORIA observations and comparisons to CAMS (Copernicus Atmosphere Monitoring Service)

- GLORIA is able to measure 2D distributions of PAN, HCOOH, CH<sub>3</sub>OH, C<sub>2</sub>H<sub>6</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>2</sub>, HCN, NH<sub>3</sub>, HNO<sub>3</sub>, O<sub>3</sub>, ... in high vertical resolution
- Direct comparison by interpolation of CAMS reanalysis data on GLORIA measurement locations
- Strong biomass burning trace gas enhancements measured during transfer flights above the South Atlantic
- Trajectory analysis indicates central South America as origin of these polluted air masses



- CAMS simulation of PAN agrees with GLORIA, but underestimates  $C_2H_6$  and HCOOH, and overestimates  $CH_3OH$  and  $C_2H_4$
- The comparisons indicate that atmospheric transport processes are well captured by CAMS, but emission strengths and atmospheric gain and loss processes could be improved<sup>#</sup>
- Systematic global observations of UTLS pollution under increased biomass burning due to climate change is
  HCOOH τ ≈ weeks
  - → CAIRT EE11 proposal





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 \* Upper tropospheric lifetimes

