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Hydroxyl radicals in the Amazon tropical troposphere measured during the CAFE-Brazil field campaign with HORUS

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The campaign Chemistry of the Atmosphere Field Experiment (CAFE) Brazil was conducted in the Amazon rainforest in December 2022 and January 2023 to study new particle formation in the outflow of convective systems over the Amazon rainforest. In the framework of this campaign, photochemical and aerosol processes in the tropical troposphere were investigated at different altitudes from the boundary layer up to 14 km using the High Altitude and Long Range Research Aircraft (HALO).

The HydrOxyl Radical measurement Unit based on fluorescence Spectroscopy (HORUS) measures the OH and HO_2 abundances as a highly relevant tracer for photochemical and aerosol processes in the tropical troposphere and new particle formation. The Hydroxyl radical (OH) oxidizes trace gases transported by convective systems from the boundary layer into the upper troposphere, leading to the formation of condensable matter. Contrasting conditions were measured, from pristine rainforest to polluted biomass burning and pollution conditions, and the occurrence of HO_x during the day and nighttime in the outflow of electrified and non-electrified convective systems.
The first results of these measurements will be presented, providing unique insights into the air chemistry and lifecycle of aerosols and clouds in the Amazon rainforest.