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Peroxy Radical Measurements via Laser Induced Fluorescence

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We present a newly built Laser Induced Fluorescence (LIF) system to measure the sum of all peroxy radicals (RO_2) utilizing chemical conversion to OH. This instrument operates in two different modes: the ROx mode (sum of OH, HO_2, and RO_2) and the HO_x mode (sum of OH and HO_2). The HO_x mode is used to derive the RO_2 data from the ROx measurements.
A model approach was used during instrumental development to identify the key parameters needed for the conversion process in front of the detection area and to optimize sensitivity. The instrument was then carefully characterized in various lab experiments, where it could be shown that the wall losses for HO_2 are negligible and that nearly all HO_2 is converted to OH in front of the detection zone. The pressure and temperature dependencies were also analyzed and assured that the instrument does not show any photolytical interference. As the instrument is calibrated with only one kind of peroxy radicals it was very important that the differences in sensitivity for different peroxy radicals are acceptable.
Lab experiments as well as first results from the HOPE 2012 intensive field campaign, which took place in summer 2012 at the Global Atmosphere Watch (GAW) station of the German Weather Service, will be discussed.