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Aircraft FAGE measurements of OH and HO_2 radicals over West Africa during the AMMA campaign, July/August 2006

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The hydroxyl (OH) radical is the primary oxidant in the troposphere, controlling the processing of anthropogenic and biogenic pollution. Methane is the most abundant trace gas in the atmosphere, with $\sim$80% of global methane being removed in tropical regions by reaction with OH. Nevertheless, measurements of OH and HO_2 in the tropical boundary layer and free troposphere are sparse.

An airborne Fluorescence Assay by Gas Expansion (FAGE) instrument has been developed, and concentrations of OH and HO_2 radicals were measured during the AMMA Special Observation Period 2 (SOP-2) based in Niamey, Niger, during July and August 2006. For a signal-to-noise ratio of 1, the average limit of detection for OH was 7.2×10^5 molecule cm^{-3} at 1100 m for a 30 s integration period, whereas for HO_2 the limit of detection was 3.1×10^6 molecule cm^{-3} at 1100 m for a 1 s integration period.

FAGE was one of a number of chemical and meteorological instruments deployed aboard the FAAM (Facility for Airborne Atmospheric Measurement) operated BAe-146 research aircraft. OH was measured on 7 flights over 6 days and HO_2 on 13 flights over 11 days. Measurements will be presented from transects flown over a variety of vegetation from desert to forest, over the Gulf of Guinea and whilst sampling the pollution plume from Lagos. Rapid reductions in HO_2 concentrations were observed when sampling in cloud, which were correlated with an increase in the liquid water content.