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Understanding HO_x in the African Tropical Troposphere

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The hydroxyl radical (OH) is the primary oxidant in the troposphere, dominating the processing of both biogenic and anthropogenic trace gases. The interconversion of OH and HO_2 is fast and the ratio of OH/HO_2 provides information on the recycling between the species.

The first observations of OH and HO_2 in West Africa were made aboard the UK FAAM BAe-146 aircraft using an airborne FAGE instrument during the AMMA project in 2006. Saharan, forest, anthropogenic and oceanic-influenced airmasses were sampled over a large range of altitudes and a strong latitudinal gradient was observed in biogenically emitted species. The spatial and temporal variation of HO_x in these different airmasses is discussed and the primary production pathways of HO_x are examined.

Tropospheric photochemistry is investigated using an observationally constrained box-model run to diurnal steady state. The chemical schemes used are described in the Master Chemical Mechanism (MCM, v3.1) and the model has the potential to run chemistry schemes from global models ($e.g.$ TOMCAT, GEOS-CHEM, etc.).

Modelled HO_x is compared with the aircraft observations to investigate the mechanisms controlling radical chemistry and test our understanding of tropical chemistry in a variety of environments.