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Measurements and modelling of OH and HO_2 radicals over a South-East Asian tropical rainforest during the OP3 field campaign

Daniel Stone (1,2), Mathew Evans (2), Peter Edwards (1), Roisin Commane (1), Trevor Ingham (1,3), Dwayne Heard (1,3), and the OP3 Team

(1) School of Chemistry, University of Leeds, United Kingdom (d.stone@leeds.ac.uk), (2) School of Earth and Environment, University of Leeds, UK, (3) National Centre for Atmospheric Science, University of Leeds, UK

Forests are the dominant source of volatile organic compounds (VOCs) into the atmosphere, with isoprene being the most significant species. The oxidation chemistry of these compounds is a significant driver of local, regional and global atmospheric composition. Recent evidence suggests a significant failing in our understanding of VOC oxidation chemistry under low NO_x conditions, with important consequences for modelling of OH and the climate gases methane and ozone.

During the Oxidant and Particle Photochemical Processes (OP3) project over Borneo in July 2008 aircraft observations of OH and HO_2 were made using FAGE (Fluorescence Assay by Gas Expansion) . We investigate these observations with a constrained box model using the Master Chemical Mechanism (MCM). In line with previous work we significantly underestimate the observed OH and HO_2 concentrations, with mean observed to modelled ratios of OH and HO_2 in airmasses impacted with isoprene of (5.32 $\pm$ 8.74) and (1.18 $\pm$ 0.31) respectively. A variety of mechanistic changes are made to the model, and their impact on the model success will be described. None of the suggested mechanistic changes allow for a good simulation of both OH and HO_2 concentrations in the model.