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Measurements of OH reactivity in a South-East Asian tropical rainforest

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The Oxidant and Particle Photochemical Processes (OP3) project took place within and above a South-East Asian tropical rainforest on the island of Borneo. Measurements of OH reactivity were made using a sliding injector flow-tube reactor with OH detection by LIF. Mean OH reactivities of 15.5 s-1 were observed with a mean daily maximum of 24.7 $\pm$ 11.1 s-1 shortly after local solar noon, coinciding with a peak in isoprene concentrations; minimum values of 7.2 $\pm$ 2.2 s-1 were observed just before sun rise. These data are used with the simultaneous direct measurements of OH in a constrained box model to investigate the complex oxidation processes within the forest canopy. We find that the sinks of OH that were measured are unable to account for the high measured OH reactivity, so that a range of unmeasured sinks must be invoked to simulate the observations. Thus, our simultaneous measurements of OH reactivity and OH concentration enabled the separation of OH sources and sinks, allowing a more comprehensive test of our understanding of the radical chemistry occurring in this chemically complex environment.