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Atmospheric Chemistry and Physics Discussions

Interactive comment on "In situ measurements of isoprene and monoterpenes within a South-East Asian tropical rainforest" *by* C. E. Jones et al.

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The authors thank both reviewers for their constructive comments. We address the specific comments from anonymous referee #1 below. Please note that all page and line numbers refer to the amended manuscript.

P1191, line 1-5. please cite Guenther et al. 2008. Biogenic VOC emissions from African, American, and Asian tropical forests. American Geophysical Union, Fall Meeting 2008, abstract A14C-04, http://adsabs.harvard.edu/abs/2008AGUFM.A14C..04G. Biogenic Volatile Organic Compound (BVOC) emission models (e.g., Guenther et al. 1995) estimate that the tropics, which contain about 40 NON- METHANE VOC EMISSIONS. From vegetation 600 Tg C yr-1 Isoprene, terpenes, oxygenates. . .

We are not sure exactly what we are being asked to add here, and we can only access the abstract for this paper (and did not attend the meeting where this work was presented). However, we do note that we should make it clear that we are referring to non-methane VOCs in this study, and so the sentence on Page 2 L44 has been amended to: “Biogenic VOCs (BVOCs) such as isoprene, monoterpenes and sesquiterpenes are thought to provide the largest fraction (> 90 %) of the total global non-methane VOC source term”.

P1197, line 23-25. Literature need to be referred. Line 25-26. The isoprene mixing ratio peaked just after midday, slightly later than the maximum PAR. Isoprene emission is developmentally delayed relative to photosynthe-sis (Grinspoon et al. 1991).

We have amended this section (Page 13 L278-297) to address the above comments as follows: “Previous studies have established light-dependent emission pathways for isoprene (e.g. Fuentes et al., 2000), and the slightly weaker relationship with PAR apparent in our ambient air observations may be a consequence of light-dependent isoprene destruction (via reaction with photochemically produced OH, Atkinson, 1997; Calvert et al., 2000) competing with light-dependent emission. The isoprene mixing ratio peaked just after midday, slightly later than the maximum PAR; concurrent OH observations at Bukit Atur (Whalley et al., 2011) show that OH peaked at local noon, suggesting that although maximum isoprene emission may have occurred around midday in line with maximum PAR, rapid removal of isoprene by OH suppressed ambient concentrations during this time. In addition, Grinspoon et al. (1991) suggest that isoprene emission from velvet pine (Mucuna sp.) is dependent upon the product(s) of the light-dependent reactions of photosynthesis, rather than being directly linked to photosynthesis itself, and as such maximum daily isoprene emissions might be delayed slightly following peak photosynthesis. Both scenarios are consistent with the relatively lower levels of ambient isoprene observed in the late morning - midday period compared to equivalent light conditions during the afternoon, which reduces the strength of the correlation between isoprene levels and PAR for this period. In contrast, measure-

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ments made between midday and midnight demonstrate a much stronger correlation between isoprene and PAR, comparable to the correlation between isoprene with temperature (Table 2)."

P1198, line 10-12. Since ozone concentrations: : : It is not supported by evidence.

We have now included a reference to Hewitt et al 2010, where ozone levels from this study are reported (Page 14 L303).

P1201, line 10 and 20. How did figure out OH reactivity?

We state on page 18 L401 that "The reactivity of each VOC with respect to OH was calculated from each instantaneous measured mixing ratio and the relevant published rate constant (Atkinson et al., 1986; Atkinson, 1997; Atkinson and Arey, 2003)." For clarity we have modified this sentence as follows: "The reactivity of each VOC with respect to OH was calculated for each instantaneous measured mixing ratio as the product of the VOC concentration (converted from ppt to molec cm-3) and the relevant published rate constant, kOH (cm3 molec-1 s-1) (Atkinson et al., 1986; Atkinson, 1997; Atkinson and Arey, 2003)."

In Abstract, the results don't been mentioned from 3.3 VOC carbon budget and OH reactivity within the natural rainforestïij ËŹ Z3.4 Regional differences in VOC composition and OH reactivity.

We have added the following sentence to the abstract, detailing that the carbon budget and reactivities are also reported in the manuscript: "The contributions of isoprene, monoterpenes and other classes of VOC to the volatile carbon budget and OH reactivity have been summarised for this rainforest location". We also state that there is good agreement between ground based and aircraft-based VOC measurements, however we cannot directly compare VOC composition and OH reactivities for the aircraft measurements, since monoterpenes could not be measured on the GC-FID deployed to the aircraft campaign.

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