Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-53-AC1, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Methanol and Isoprene Emissions from the Fast Growing Tropical Pioneer Species *Vismia guianensis* (Aubl.) Pers. (Hypericaceae) in the central Amazon Forest" *by* K. J. Jardine et al.

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Received and published: 22 April 2016

We greatly thank anonymous referee #1 for the time to review our manuscript and for the recognition that "The experiment is well done, the manuscript is well structured and written, the reference list is conclusive and plots are clear." The responses to the two minor comments are listed below.

Comment 1: As there is only a single-noon measurements of ambient isoprene concentration, why do authors believe the measurements supports "the potential for widespread occurrence of Is emissions from secondary forest tree species" in the Ama-

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zon? Were the measurements representative? What were the situation on the day of sampling (was it too hot, or any other stimulating factor existing)?

Response 2: The observations of ambient isoprene concentrations above the secondary forest are limited to mid-day on a single day (23 April 2015 between 11:38-13:18). However, six samples were sequentially collected during this period where full sun conditions persisted until 13:00 when clouds could be detected.

From Line 247: "Daytime ambient Is concentrations above secondary forest canopy at ZF3 where high (>10 ppb) and increased from 10.0 ppb at 11:38 to 10.9 ppb by 12:30. This was followed by a decreased to 10.5 ppb by 13:03, possibly due to the reduction of light and temperature from afternoon cloud formation."

Comment 2: In line 322-323, "Both Is emissions and Pn increased together with leaf temperature: : :". But Fig.3 clearly shows a decrease of Pn. Could you please check.

Response 2: Fig. 3 shows the average +/- 1 standard deviation of Pn for 5 leaves, one leaf per tree. We now clarify this point by rewriting this section;

Line 321: "A strong uncoupling of Is emissions and Pn was observed as a function of leaf temperature in each of the V. guianensis leaves studied from 5 individuals (Fig. 3). For 3 of the 5 leaves, Pn increased together with temperature and showed a clear optimum temperature of 30-32.5 °C and decreased at higher temperatures. The other two leaves showed decreases in Pn as temperatures increased above 25 °C. Thus, a relatively high standard deviation occurred at the lowest leaf temperature (25 °C) and a clear optimum in Pn between 30-32.5 °C was generally not observable from the average. Nonetheless, above 30-32.5°C, all 5 leaves showed a strong decrease in Pn.

In contrast, Is emissions from all 5 leaves increased with leaf temperatures above 25 °C; Is emissions continued to increase even while Pn was strongly suppressed up to the highest leaf temperatures studied (40 °C). Therefore, distinct temperature optima for Pn (30.0-32.5 °C) and Is (>40 °C) exists for V. guianensis leaves. This classic un-

coupling has been shown to be influenced by the use of 'alternate' Is carbon sources including potential extrachloroplastic substrates (Rosenstiel et al., 2004;Loreto et al., 2004;Karl et al., 2002) as well as the integration of photorespiratory substrates into the Calvin Cycle and the re-assimilation of internally produced CO2 (e.g. respiration, photorespiration) (Jardine et al., 2014;Jardine et al., 2010). At the highest leaf temperature studied (40 °C), 7% of the Pn on average was emitted from V. guianensis leaves in the form of Is."

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-53, 2016.

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