

Interactive comment on “Chemical sensing of plant stress at the ecosystem scale” by T. Karl et al.

T. Karl et al.

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We are thankful for a very valuable review, which will improve our manuscript if accepted. Our point by point response (incl. suggested changes) are as following:

For the HAPSITE Smart instrument, as it is not commonly used yet, it is desirable to state the instrument's time resolution, whether the ionisation occurs at the conventional 70 eV and what the total measurement uncertainty and detection limit is for MeSA and a monoterpene.

Response: The LOD for MeSA and MT was 10 pptv. The GC-MS operates at 70eV. Each GC run required 30 minutes. More information will be added in the Methods section.

A quantitative in situ intercomparison between GCMS and PTRMS including their total

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measurement uncertainty would support the flux estimates.

Response: We will include a comparison between GC-MS and PTR-MS for ambient concentrations. The GC-MS was used for ambient sampling at 3 m above ground on 2 days (JD139-140). Daytime MeSA mixing ratios peaked at 19+/-5 pptv based on GC-MS analysis and 24+/-6 pptv based on PTR-MS on JD139. No GC measurements in ambient air are available early on, when MeSA concentrations peaked, but a concentration comparison in a branch enclosure yielded 400+/-60 pptv MeSA based on GC-MS and 350+/-40 pptv based on PTR-MS.

An equation or a reference to the calculation of the internal MeSA mixing ratio in leaves would be nice.

Response: The internal MeSA mixing ratio was calculated using the stomatal resistance relationship to calculate the internal concentration C_i . We will include an equation, e.g. $C_i \sim (F/g_s - C_a) \cdot HLC$, where F is the measured flux, g_s is the measured stomatal conductance, C_a is the measured ambient concentration and HLC is the Henry's Law Constant.

Would it be possible to include in the discussion what kind of correlation there was between the MeSA flux and the hexenal isomer flux?

Response: We will include the correlation between leaf wound compounds and MeSA midday fluxes in the discussion. (0.82)

Which are the primary oxidation products formed on the OH- and O₃-oxidation of MeSA? Can the author spend special interest in the potential formation of smaller OVOCs like methanol,... during the oxidation?

Response: To our knowledge there has not been any study investigating gasphase products from the initial oxidation of Methylsalicylate. We can therefore not include a discussion on this topic.

One may include '(accumulated dose over a threshold of 40ppbv)' on the first time

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’AOT40’ is mentioned.

Response: We will include the suggested addition.

Interactive comment on Biogeosciences Discuss., 5, 2381, 2008.

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