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Interactive comment on “A new plant chamber facility PLUS coupled to the atmospheric simulation chamber SAPHIR” by T. Hohaus et al.

Anonymous Referee #2

Received and published: 13 January 2016

Comments to the manuscript “A new plant chamber facility PLUS coupled to the atmospheric simulation chamber SAPHIR” submitted for publication in Atmospheric Measurement Techniques (AMTD 8, 11779-11816).

General:

The manuscript describes the construction and set up of a plant exposure chamber for use as source of biogenic emissions from plants in atmospheric chemistry experiments within the SAPHIR reactor. Following a very detailed description of materials, chamber design and analytical instrumentation, the authors gave a comprehensive overview of gas exchange characteristics demonstrating the versatility of use for generating plant emissions as source for latter use in air chemistry experiments. Furthermore a detailed analysis of the transfer of BVOCs from PLUS to SAPHIR is given showing the time

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constants of BVOC injections into the big chamber and demonstrating the tightness of the system. Using a monoterpane-emitting tree species the authors demonstrate in a small proof-of-principle experiment the suitability of PLUS for SAPHIR experiments.

Overall the manuscript is very well written describing in an excellent way the technical features of this new plant exposure chamber and how it can be linked to air chemistry experiments in the SAPHIR reactor.

I only have marginal comments mostly related to spelling errors of insufficient description of the figures in the legends.

Specific comments:

Generally: *Quercus ilex* should be changed to *Quercus ilex*. *De novo* should be in italic

p. 11785 l. 29also flushed with 1 m3 h-1..... p. 11786 l. 20the plants with CO₂. p. 11787 l. 19pump the relative humidity... p. 11789 l. 15 I'm wondering why the monoterpenes were identified by Kovacs indices when a GC/MS system was used. I agree that it might be convenient for routine use FID detections is appropriate. However, initially I recommend characterizing the plant emission pattern using the GC/MS device. Please give additional information. In addition, GC/MS will allow seeking for sesquiterpenes in the emission spectrum of the plants. As mentioned in the manuscript undetected sesquiterpenes can be responsible for the weak deviation in the acetone yield from monoterpane oxidation. p. 11797 l. 19 it must be ... curve of the monoterpenes... as you have no analysis of individual compounds by PTR-MS.

Legends Generally: you are not consistent whether you write the xy legends of the figs in initial capital letters or not. Please correct.

Figure 3: a legend should be self-explaining. Please give flow rates, gas exchange volume. Symbols for CO₂ calc. nopinone calc. are not easy to read. Please make it clearer.

Figure 4: what do the error bars mean? Standard deviation, standard error?, how many



n?

Figure 5: the blue lines shows calculated monoterpene concentrations in SAPHIR. Please explain in the legend.

Figure 6: what do the % values indicate? Mol fraction, or C, or μg ? What's the deviation between measurements? Even highly constant, the emission rates can vary over time. Have you checked the emission pattern at different time points a day and at the different light and temperatures? I'm sure the patterns will somehow change under dynamic conditions. You use this split between the different compounds for your calculations, so this should be checked.

Figure 7: Here you show the light dependences at 3 different temperatures (which temperatures? Leaf or air temperature?). I recommend showing not normalized data. In this case it will be very obvious for the reader realized the temperature effect.

Figure 8: explain error bars, SD or SE, how many n, give fit parameters for the Guenther 1993 algorithm (Why haven't you used the newer version of this parameterization published in 1995?).

Interactive comment on *Atmos. Meas. Tech. Discuss.*, 8, 11779, 2015.

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