

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

Anonymous Referee #1

Received and published: 4 January 2016

The paper describes a new plant chamber - PLUS coupled with a well known atmospheric simulation chamber SAPHIR. I consider the paper containing two parts. First part, the main one, where are included all the technical characteristics and details, the performance tests and are addressed all queries and second part where the SAPHIR-PLUS assembly is validated through an ozonolysis experiment of the complex mixture emitted from real *Quercus Ilex* plants. The manuscript adds substantial contributions to scientific progress within the scope of AMT. The plant chamber it is of outmost importance as BVOCs are emitted as a complex mixture under natural conditions and it is important to study all parts of this mixture simultaneously. Many of the strategies for building up a contamination free chamber has been imported from the SAPHIR chamber, well known as one of the best existing atmospheric simulation chambers for

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“clean” experiments. Additionally, the research group has expertise with plant emissions measurements. Overall the work makes a useful contribution to the literature in this area.

There is a concern related to main compounds emitted from plants and the ozonolysis experiment with the formation of acetone. Firstly, according with Blanch et al., 2007 and Llusia and Penuelas, 1999, almost all the compounds presented in text in section 3.5 and in figure 6 are considered mainly emitted by *Quercus Ilex* in different conditions of temp, fertilization, drought, etc. However, in section 3.5 line 15 there are presented the main compounds emitted from the plants as including Z-beta-ocimene, the compound which is missing from figure 6. Please make consistency between fig. 6 and the text of section 3.5. Most probably should be reconsidered the figure 6 and add the not considered compounds in section 3.5.

Secondly, both calculated and measured acetone fit well. However, there are some comments which need to be addressed, which are linked somehow with previous comment. Table 4 must include the contribution to acetone formation from delta3-carene and beta-phellandrene for both reactions with OH and ozone, respectively. If there it is a reason for not including these compounds please specify. Probably section 3.6 needs to consider the new fit of the calculated acetone concentration after contribution of carene and phellandrene to the total acetone yield.

How much acetone is added directly from PLUS chamber into the SAPHIR chamber? That 680 pptv maximum acetone concentration includes background acetone as it was measured from PLUS outlet or it was not significant to be considered?

How much ozone was added into the SAPHIR during ozonolysis? Please specify conditions of temperature and humidity in SAPHIR before ozone addition?

Why authors are not providing data on OH radical formation as there are all the facilities to perform these measurements? Why authors do not provide any information for SOA formation as the PLUS chamber will be used for testing SOA formation from complex

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plant emissions?

Minor comments:

Please order by decreasing year the multiple in text citations.

P11780 Please be consistent with the description of abbreviations in Abstract as only some of them are described and some of them not (e.g. PAR, RH,).

P11780 line 11 replace "leafes" with "leaves"

P11790 Please provide in section 3.2 a concentration of the contaminants level at inlet and not only inlet vs outlet relative increase. In section 3.2 line 14 specifications of contaminant concentrations to be 3 order of magnitude lower it is probably too ambitious. Probably "2 to 3 order of magnitude lower" it is more adequate.

p11792 how the RH increased to only 3% in second experiment as there the starting RH was 100% in comparison with first one where starting RH was 64% and in SAPHIR was 7% after addition?

P11794 line 1 replace "calucalted" with "calculated"

P11794 line 9 use subscript for "CO₂"

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