

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

Anonymous Referee #3

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The manuscript presents an excellent and comprehensive description of the characterisation of a new plant chamber facility which can be coupled to the large SAPHIR atmospheric simulation chamber or operated independently for "PLUS related experiments". The PLUS facility appears to have been well-motivated, designed and constructed and should prove to be a valuable facility for future studies in this important area. The characterisation of the facility is extensive and resulted in a largely robust quantification of all key characteristics.

Some information on the sampling of potential semi-volatile OC concentrations in the PLUS outlet would be useful. Was a heated line used for the PTR sampling? It is stated that the likely source of acetone and isoprene was offgassing from the pneumatic seals. Such a source may also emit semi-volatiles and any experiments for SOA precursors

will be sensitive to lower volatility components and their oxidation products.

The transfer characterisation was similarly well executed and described. I have one brief question surrounding the differences in purification of air in PLUS and SAPHIR - the latter uses air generated from liquid nitrogen and oxygen whilst PLUS uses scrubbed ambient air. Has SAPHIR been filled with air from PLUS without plants in order to establish the background chemistry from the scrubbed air introduced into SAPHIR. If so, it would be useful to see results from this "blank background".

It is noted that the RH in SAPHIR was very low and remained largely unchanged during the transfers from PLUS. Could the authors clarify whether SAPHIR experiments were usually conducted under such dry conditions and comment on the implications for atmospheric extrapolation? Does water vapour condensation influence the condensation of SOA components, for example? What will be the influence on the phase state of any semi-volatile components of transfer from humid to dry conditions and hence on measurements of such components in either phase?

In characterising the emissions from *Quercus ilex*, Figure 6 seems to be missing the ocimene fraction, stated as being one of the main emitted compounds.

The characterisation of emission with light intensity is useful. A spectral characterisation of the lights would also be a useful additional panel rather than showing the integrated light intensity across all wavelengths. Whilst uv will likely be too low to initiate any OH driven photochemistry from ozone photolysis, have the authors considered any other potential sources of oxidants that may be photochemically produced in PLUS in the wavelengths emitted by the lamps?

The photochemistry experiment provides a useful demonstration of the coupling of SAPHIR and PLUS. I have no further comments on the execution of this experiment beyond those of the first reviewer. I look forward to further work from this interesting facility.

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Minor p 11780 line 5 - "flow through" should be hyphenated, replace with "flow-through"

p 11780 line 11 - replace "leafes" with "leaves"

p 11780 line 11 - replace "exposed to FEP Teflon film and other Teflon surfaces only" with "exposed to only FEP Teflon film and other Teflon surfaces"

p11782 line 2 - the study of Wyche et al., 2014 falls into this category and is missing

p11782 line 12 - replace "atmosphere" by "atmospheric"

p11782 line 12 - add comma "brief, SAPHIR"

p11782 line 23 - add comma "SAPHIR, this"

p11788 line 17 - add comma "For gas phase measurements, a sampling line"

Ref: Wyche et al., Emissions of biogenic volatile organic compounds and subsequent photochemical production of secondary organic aerosol in mesocosm studies of temperate and tropical plant species, Atmos. Chem. Phys., 14, 12781-12801, doi:10.5194/acp-14-12781-2014, 2014

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