Comments to 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

The authors describe experiments with emissions from real trees in a photochemical reaction chamber. Focus was put on SOA formation and characterization of the gaseous precursors and oxidation products by GC-MS, PTR-MS and a CIR-TOF-MS. Experiments were conducted with and without ammonium sulfate seeds. The authors contrast a monoterpene (& other BVOC) emitter, birch, with tropic trees fig and palm, which are isoprene emitter. The birch serves also to test the current results against previous experiments. As expected SOA mass from isoprene emitters is small and was only achieved in seeded experiments. The isoprene SOA yields are a high while the MT yields are in the ball park of previous experiments. The authors show indirectly that the relative large yields for the isoprene emitter likely arise from other BVOC, partly below the detection limits. The study was well conceptual well designed and the manuscript presents new material, especially about emissions from tropical tree species and their oxidation products as well as their SOA formation potential. The manuscript is well written.
It should be published in ACP after the authors addressed the following major and minor points.

Major remarks:

Contaminations ?
Section 2.2, p. 14296f
The description of the plant chamber unit cast some doubt about contaminations: “PVC foam stripes ensured an airtight seal between chamber”; “Heavy-duty double-sided tape (RS components, UK) was used to secure the Teflon bags to the frame”
Was the plant chamber tested for contaminations ? Could intrusions and emanations from tape material have affected the SOA yields for the isoprene emitter?
Section 2.5, p. 14302
“Both the pots and soil were isolated by enclosing them in PFTE sheeting; this acted to prevent VOC emissions from the plastic pots and soil NOx emissions from entering the chamber air.”
Was this explicitly checked ?

Mass balance considerations (section 4.1, p. 14315, l.26ff and section 4.2, p. 14319, l.4ff):
The authors argue that, *cum grano salis*, the mass balance is closed in the experiments (Figures 3 and 6). However, the mass should increase by addition of oxygen. The conservative quantity is the amount of carbon. Insofar the mass balance discussion is inconclusive; it should be cancelled/or weakened and or the Carbon balance should be discussed.
Moreover, the mass concentrations axis on the right side in Figures 3 and 6 seems strange. Did you really measured exactly 100 respectively 200 ug/m3 in the experiments ?

Missing detection limits:
Section 2.4.1, p. 14299
Detection limits are not stated for PTR-MS and CIR-TOF-MS, however, these are used to argue later, e.g. sec 3.1.1, p. 14307, lines 5f, in the isoprene case (sec. 4.2, p. 14320, line 18ff).

SOA yields for birch:
Values in abstract and section 3.1.2 do not match the values given in section 4.1 (p. 14315, l. 13). This questions the comparison with Mentel et al. 2009, and the qualifying as low end yields.

Minor remarks

p. 14305, §1st : [OH] for birch and palm experiments are not given? How large were they?
p. 14306, l. 25: "…only 2.0 (±1.0) ppbV isoprene was detected". The fraction of isoprene amounts to 10-15%. This is a significant contribution! Please, comment in the manuscript.
p. 14306, l. 25f : Table 3 states the species found but not their relative abundance !
p. 14308, l. 14ff: The authors discuss lifetimes but they quote rate coefficients. I suggest to use a mean [OH] from the experiments and explicitly state the lifetimes.
p. 14308, l. 24ff: a-hydroxy carbonyl compounds from OH addition to double bonds have also short lifetimes.
p. 14321, §2nd: This paragraph is difficult understand. A few more descriptive words about the concept and what the authors are aiming at will be helpful.
p. 14326/14327: Did the authors found indications for induced emissions in PTR-MS data etc. ?

The reference Hamilton et al. (2013) is missing in reference list.

Table 2: The authors should state relative abundances, at least for the main components.
Figure 3 and Figure 6: There are already reaction products in the first bin. I suggest plotting the VOC mix just before the oxidation starts into the first bin.

typos
p. 14295, l. 6: ~~Jiang~~
p. 14 309, l. 21: Hex *e* nal ?
p. 14 310, l. 2: towards *the end of* the experiment ?
p. 14 314, l. 11: calcu *l* ation
p. 14 317, l. 6: Figure *10* ?
p. 14 323, l. 1: (Kiendler-Scharr et al., 2009 *a*) ?
p. 14 326, l. 6: (Kiendler-Scharr et al., 2009 *a*) ?
Figure 9, captions, a blank is missing before Ficus