Response to the editor and reviewers' comments

Editor's comments

Dear authors: Please make the changes suggested by Reviewer #1. Additional grammatical suggestions are provided in the non-public comments to authors. I will leave it up to you as to whether the data/code are made publicly available as suggested by Reviewer #2.

Non-public comments to the Author:

While the manuscript is very clearly written and easy to follow, I think some grammatical improvements can be made. In addition to addressing the comments from the two reviewers, please replace the existing wording with the phrases suggested below.

Many thanks !

John\

Line 27: "When evaluating their impact…"

Line 30: "…with a gas chromatography…" . Also, delete the word "technology".

Line 35: "… , we…"

Line 39: "… can contribute large fractions …"

Line 40: "which are comparable…"

Line 57: "… species are the largest…"

Line 75: "… due to limitations on available instrumentation …"

Line 85: "… heterogeneous uptake on aerosols…"

Line 100 (and other places): I think "OVOC species" is better.

Line 115: "… to determine the background…"

Line 140: "… lower than the concentration of …"

Line 160: "…because of its additional carbonyl functional group…"

Line 222: "… all correspond to radical formation channles, and do not include contributions from channels forming stable molecules."

Line 252: "… PTR-ToF-MS and GC-MS instruments to …"

Line 268: "… were contributed to by both…"

Line 291: "… with larger carbon number…"

Line 313: "… that reported that OVOCs contributed…"

Line 333: "… cross-sections and quantum yields…"

Line 350: "… concentrations was…"

Line 356: "… secondary sources…"

Line 451: "… can be measured by emerging online chemical …"

Reply: Many thanks! We have modified these grammar errors according to your suggestions.

Reviewer #2:

Minor correction:

Lines 293-297, this sentence is not clear. The readers cannot understand why the other OVOCs calculated by model simulations may lead to large uncertainties.

Reply: Many thanks. We have further explained it.

Line 299-302: which may lead to large uncertainties. These uncertainties are likely, due to various possibility in modelling errors, including missing primary emissions of OVOCs (McDonald et al., 2018), unknown secondary sources of OVOCs (Bloss et al., 2005;Ji et al., 2017), heterogenous uptake on aerosols and unknown dilution and transport processes (Li et al., 2014).

Line 332, "observation-determined P(RO_X)" might be typos.

Reply: Many thanks. We have deleted it.

The difference of the carbonyls' concentrations measured by the GC-MS and PTR-ToF-MS is very large (Fig. S1), and thus it is better to mention the uncertainty of OVOCs measurements in the text.

Reply: Many thanks. We have modified it accordingly.

Line 36-41 in Supplement: The measurement results of the two instruments are generally similar (Figure S1). The differences of the two instruments for MVK+MACR, C3H4O and C4H8O are within 20%. However, acetone measured by GC-MS is 46% higher than that measured by PTR-ToF-MS. The differences between GC-MS and PTR-ToF-MS are acceptable, as uncertainties of OVOCs measurements of GC-MS and PTR-ToF-MS are in the range of 20-30%.