Atmos. Chem. Phys. Discuss.,
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the similarities and differences between the products of oxidation of hydrocarbons under simulated atmospheric conditions and cool-flames" *by* Roland Benoit et al.

Anonymous Referee #3

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In the reviewed manuscript ("On the similarities and differences between the products of oxidation of hydrocarbons under simulated atmospheric conditions and cool flames", acp-2020-1070), the authors use ultrahigh-resolution mass spectrometry to compare the auto-oxidation products of limonene in a jet-stirred reactor with molecular formulae found in the literature for reactions with ozone and OH-radicals under more atmospherically relevant conditions. The study is technically sound, the manuscript is well written and it would be good to see the results published somewhere. However, the authors don't do a very good job arguing why this manuscript is appropriate for publi-

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Discussion paper

cation in ACP specifically. Maybe one could make the argument that if one has a very good understanding of the difference between the chemistry under the two very different conditions, one could use JSR experiments to predict atmospheric chemistry. . .but why would that be beneficial compared to just directly doing flow reactor or simulation chamber experiments? Given the strong focus on the compounds which aren't atmospherically relevant and the fact that only one set of conditions was tested for the JSR (so we have no idea about the breadth of variation in composition for JSR reactions), I wonder if this article wouldn't be better suited for a different journal (i.e. something combustion related).

Specific comments

Page 6, line 160: are these 1233 molecules or 1233 molecular formulae? For a fair comparison with your acquired data, it should be the latter. In addition, it is not completely clear from the text whether the list of 1233 compounds/molecular formulae only contains formulae that were common to all of the "atmospheric" studies or every formula found in any of the studies. If it is the latter, I think some caveats regarding chemical diversity should be added since precursor concentration can affect the product composition and many of the listed studies are quite far away from atmospheric concentrations in this regard.

Page 7. Line 169: relative to what? I'm assuming it is supposed to be relative to the peak maximum of the highest mass peak in the spectrum, but this should be stated explicitly.

Page 10, line 249: could you elaborate a bit more about how you arrived at your compound family classification here? Especially since the limits you are setting seem to differ from the cited Bianco et a. regarding e.g. the aromatic structures.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-1070, 2020.