Interactive comment on “Influence of NO\textsubscript{2} on secondary organic aerosol formation from ozonolysis of limonene” by Changjin Hu et al.

Anonymous Referee #1

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This manuscript describes a laboratory and modeling study of SOA formation from the ozonolysis of limonene in the presence of NO\textsubscript{2}. The manuscript is topically relevant to ACP. The authors need to make clearer the unique contribution of this research, and how this manuscript advances the field. Specifically, I have two main criticisms: (1) Are the SOA yield differences meaningful for cases when similar delta SOA is observed with and without NO\textsubscript{2}? (2) Are the resulting changes in SOA yield and composition a consequence of different O\textsubscript{3} chemistry or do they just reflect NO\textsubscript{3} chemistry at high NO\textsubscript{2}? The impact of the research is clearly reduced if the authors are merely reproducing NO\textsubscript{3} oxidation experiments under high NO\textsubscript{2} conditions.

Specific comments:

1. Experimental methods - were these experiments conducted in the dark?

2. Figure 2 - I suggest that the authors place error bars on the yield data. Is the difference between NO\textsubscript{2} and non-NO\textsubscript{2} experiments truly meaningful?

3. Figure 2, Lines 295-310. The figure shows that the experiments with the highest SOA yield had NO\textsubscript{2}. But I am unconvinced by the argument NO\textsubscript{2} is causing the higher yields, because it is extremely difficult to compare "paired" sets of experiments (e.g., X ppb limonene and no NO\textsubscript{2} versus X ppb limonene and Y ppb NO\textsubscript{2}).

4. Line 367 - what drove the temperature difference between the sets of experiments?

5. Figure 4 would benefit from having a 1:1 line

6. The authors should comment on what fraction of the limonene reacts with O\textsubscript{3} versus NO\textsubscript{3} - at least for the endo bond - in the various experiments. It seems like this should be retrievable from the MCM runs.

7. Is scheme 1 new - generated as a result of this work - or reproduced from the MCM? If it is from the MCM, the authors need to clearly state that the Scheme is not their original work. The same applies to Table 2.