Interactive comment on:

"Atmospheric fate of two relevant unsaturated ketoethers: kinetics, products and mechanisms for the reaction of hydroxyl radicals with(E)-4-methoxy-3-buten-2-one and1-(E)-1-methoxy-2-methyl-1-penten-3-one"

by

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Anonymous Referee #1

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The first reviewer has done a good job of summarizing the goals and results of the paper. I fully concur with everything they presented, and will not repeat those general comments.

Overall, this is a clear paper that describes high quality gas-phase kinetics results for the OH oxidation of some multifunctional oxygenates. To provide validation of models like MCM, there is the need for the type of kinetics and product information presented in the paper. The relative rate technique is very well established, two reference compounds were used, and the group performing the measurements has a strong reputation. My overall impression is that the results are solid. The paper goes into considerable depth on the oxidation mechanism and comparison to results of estimation methods.

Overall, I recommend publication. I have no substantive comments to make. Minor comments:

The authors express their gratitude to anonymous referee #1 for evaluating and reading the paper carefully and providing thoughtful comments. The comments help to improve the revised version of the manuscript. The authors reply in red for each comment bellow. The article text body of the manuscript has been amended in red with answers and modifications suggested by referee.

Page 3, line 12 – check reference format

- DONE

Page 10, line 9 – substituents

- DONE

Page 11, line 8 – change deducting to withdrawing

- DONE

Page 19, line 13 – space needed

- DONE

Figure 1 – missing line of best fit

- DONE

Scheme 1 – explain the meaning of the dashed line in the structure

- DONE

My main comment is that I would like a bit more information on how the product yields were calculated, especially their associated uncertainties. Was a multivariate fitting performed? In particular, the residual spectrum is quite large with intensity at some frequencies where products are identified.

Authors reply

The corrected product concentrations versus the amount of consumed TMBO and MMPO, respectively are presented in figures S2 and S4 in supporting information. The molar yields have been corrected for secondary reactions with OH radicals as well as for the photolysis and wall deposition processes where products are subject of these loss processes. From the concentration – time distribution could be observed a considerable conversion of reactants to the products but if for TMBO the carbon balance it is up to 80% solved for MMPO reaction with OH radicals there are around 20% carbon represented in the products. These could be explained mainly on the unidentified compounds in the reaction system.

The following uncertainties were also considered when the uncertainty range has been calculated: the error associated with the process of subtraction of the infrared spectra which was counted to 5%, the error in the calibrations carried out to calculate the effective cross section of the quantified species, and errors associated with the introduction of the species chemicals into the reactor.

Indeed, the residual spectrum has still some frequencies where products have been subtracted. However, these is expected as unidentified products have similar functionalities as subtracted products and reactants (e.g. carbonyl)