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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The atmospheric impacts of monoterpene ozonolysis on global stabilised Criegee intermediate budgets and SO_2 oxidation: experiment, theory and modelling" *by* Mike J. Newland et al.

Anonymous Referee #3

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General This is a very interesting and comprehensive study on Criegee chemistry related to monoterpene ozonlysis.

Schloary presentation: The text on monoterpene ozonolysis in the early part of the manuscript is a very nice and thorough summary but when read the reader is asking himself: 'And what is the outcome of the present paper for this ?' - this is then treated in the results section. Maybe some on the contents of the introductory text can be shortened and be used when the results are actually presented. That would also compact the paper to some extend.

Shortening certain sections and avoiding doubling of text appears advisable as the manuscipt reads kind of lengthy at times. There is the danger to loose the reader.

The theoretical chemistry section of the paper might be problematic, but I am not an expert in this.

Overall, the MS represents a big effort to better understand terpene-derived SCI atmospheric chemistry and its implications which in principle very well merits publication in ACP. However, the presentation and organisation of the manuscript should be improved. Overall, it seems revision is more in the direction of mayor rather than minor.

Details

Page 4, line 4: The population of CIs is formed...pls check sentence.

p12, l6: This equation looks strangely formatted. Pls check.

p13-l5 - 15: I feel this is partly repeating material already given in the introductory overview. That should be avoided. Please check and discuss the state-of-the art regarding the water reaction, the roles of the water dimer and the difference of syn- and anti- conformers once in the manuscipt and then work with internal referencing.

p16: If it has been shown, that post-CCSD(T) calculations are needed but these cannot be performed for technical reason, what is then the use of this ? It is difficult to judge how valida such calculations could be. Certain journals do not accept theoretical chemistry calculation not being performed with the best available techniques. The authors should deal with this. Maybe it is better to outsource this part and do the bigger calculations separately.

p18,l 29: Pls check sentence

p23, Is that section 5.2.4. really needed ? I think it should be skipped in order to streamline the whole paper.

p24, section 5.3: See general comment on this. Is it necessary to give all the structural

data in the SI ?

p 26, Why is section 6 separate from the 'results' section - these are also results, so it might be sensible to make this a sub-point of the results section 5 rather than a new section 6

p29, l 14: Oceanic MT emissions are expected to be small compared to the continental ones.

p30, sections 7 & 8: Maybe these sections can be combined.

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