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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Newly observed peroxides and the water effect on the formation and removal of hydroxyalkyl hydroperoxides in the ozonolysis of isoprene" *by* D. Huang et al.

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To Reviewer 1

General comments:

The goal of this manuscript is to investigate the role of relative humidity (RH) on the mechanism of ozonolysis of isoprene, specifically on the formation of various peroxidic products. Ozonolysis accounts for a relatively small fraction of atmospheric oxidation of isoprene but it may become comparable in importance to oxidation by OH and NO3 under certain conditions. Because of the known reactivity of Criegee intermediate, a reactive intermediate of the ozonolysis, towards water vapor it is reasonable to expect

that the product distribution should be sensitive to RH. This is indeed what the authors observe in their measurements. Furthermore, they observe several peroxide products that were not detected in previous studies of isoprene ozonolysis. The manuscript thus contains new data, and it definitively falls with the scope of this journal.

I had a number of comments in my "quick review" of this manuscript, which the authors addressed prior to the ACPD publication. I found no significant additional issues with this manuscript, other than minor editorial corrections listed below. I was especially impressed by the analytical capabilities of the method that successfully detected (and quantified) rather complex peroxides. The list of peroxides that the authors synthesized as standards for their measurements is also quite impressive. It would of course be great the unknown peroxides observed by the authors were identified also but I appreciate the difficulty of a positive assignment of all products in such a system.

A: We thank you for your effort and constructive comments.

Technical corrections: Abstract: the sentence "Recent laboratory investigations of this reaction identified hydrogen peroxide (H_2O_2) and hydroxymethyl hydroperoxide (HMHP)." should end with "in ozonolysis of isoprene" to avoid ambiguities.

A: We have added "in ozonolysis of isoprene" into the sentence in the revised manuscript.

Abstract: the sentence "These standards are needed to accurately specify HAHPs, although their synthesis is a challenge." is redundant and can be deleted.

A: We have deleted this sentence.

Page 5281, line 8: I would replace "cause the death of" with "harm"

A: We have done this.

Page 5281, line 13: what does 25-60

A: Yes, you are right. Surratt et al. (2006) measured the total mass content of perox-

ides (sum of ROOH, ROOR, and H_2O_2) in the collected aerosol using the iodometric-spectrophotometric method.

Surratt, J. D., Murphy, S. M., Kroll, J. H., Ng, N. L., Hildegrandt, L., Sorooshian, A., Szmigielski, R., Vermeylen, R., Maenhaut, W., Claeys, M., Flagan, R., and Seinfeld, J. H.: Chemical composition of secondary organic aerosol formed from the photooxidation of isoprene, J. Phys. Chem. A., 110, 9665–9690, 2006.

Page 5282, line 14: “paths” should be replaced with “pathways”

A: Yes.

Page 5287, line 18: replace “linearly” with “steadily”

A: Yes.

Page 5292, line 29: replace “regularity” with “pattern”

A: Yes.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 5279, 2013.