

Interactive comment on “In-cloud processes of methacrolein under simulated conditions – Part 3: Hygroscopic and volatility properties of the formed Secondary Organic Aerosol” by V. Michaud et al.

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We thank both reviewers for their careful examination of our work and for providing us with recent and interesting literature references which, we hope, will definitely help us ameliorate the quality of this paper.

We now will try to answer to the reviewer suggestions one by one:

“My concern with this article is the residence time of the particles used to make the volatility and hygroscopicity measurements. The authors state that the residence time

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was sufficient for their experiments because of only a few percent between 40 nm and 50 nm. However this does not necessarily demonstrate that the residence time of these experiments is sufficient. Neither these authors nor An et al. have measured the RVF as a function of residence time. A difference of a few percent could be within the error of the measurement particularly if there induction period in volatilization kinetics. While this does not detract from the authors' findings, this issue should be carefully considered in the final publication.”

Yes, we agree with the reviewer, the difference between the 40 nm and 50 nm particles refractory fraction could be due to kinetic effect and a non sufficient residence time in the oven. We stated in our original version: “. . .as the reaction time increases, the discrepancy between the RVF of 40 nm particles and the RVF of 50 nm particle becomes more important, indicating that volatilization kinetics may play a role for these less volatile SOA, and that the aerosol may not have been evaporated to the level of the gas/phase equilibrium corresponding to the temperature of the oven, given the 2s residence time.” The important information in this paper is that the fraction of volatilized organic does not vary more than a few percents when the mass of organic matter to volatilize changes from a 40 nm particle to a 50 nm particle (which is significant by mass). This observation leads us later in the paper to use the result from pure SOA in our NaCl+SOA mixture. Consequently, we now transform the following sentence: “However, the discrepancy is only of the order of a few percents, and the residual fraction measured in the VTDMA should be rather close to the residual fraction which would have been obtained at longer residence times.” By However, the discrepancy is only of the order of a few percents, and we will later hypothesis that the RVF does not significantly depend on the original SOA mass.

“Specific comments: p. 6453 Lines 11-12. This sentence is awkward as written: “The average particle’s composition varies with size, time, and location, reflecting the particles’ diverse origins and atmospheric processing.” A single particle is considered in the first part of the sentence, while particles, the plural form, are considered in the second

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part.”

The sentence was changed to: The particles composition varies with size, time, and location, reflecting their diverse origins and atmospheric processing.

“p. 6461 line 15: "ozonolysis of arachidonic acid particles." Text is missing "acid."” OK, this is now corrected

“p. 6467 lines 25-26: correct the hyphenation and spelling of dihydroxymethacrylic acid” This is now corrected

“p. 6471 line 4: incorrect abbreviation for journal.” Corrected

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 6451, 2009.