Interactive
Comment

Interactive comment on "Thermodynamics and kinetics of the hydrolysis of atmospherically relevant organonitrates and organosulfates" *by* K. S. Hu et al.

K. S. Hu et al.

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Received and published: 29 July 2011

We thank the reviewer for the thoughtful responses. We include below our reply to the specific issues:

- Conclusions: Since a major goal of the work was to identify structure activity relationships associated with the hydrolysis of organonitrate and organosulfate compounds, it may be useful to include bullet points in the conclusions section clearly stating these structure activity relationships for future reference for others. The conditions under which hydrolysis is expected to occur in the atmosphere could also be summarized similarly for greater clarity.

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We feel that the structure activity relationships are currently well-described in the conclusions section (role of carbon substitution and adjacent OH groups). However, we do intend to add some more specific information concerning the relative lifetimes of the tertiary organonitrates as compared to typical SOA lifetimes.

- Page 14404, Lines 20-22: What characteristics would these other tertiary organosulfates be expected to have?

Basically, we are arguing here that the isoprene-derived tertiary organosulfate is actually relatively long-lived (in part due to the presence of two adjacent OH groups) and that it should not be assumed that other tertiary organosulfates would be similarly long-lived. We intend to add this clarification to the revised manuscript.

- Tables 1 & 2: Please clarify in the text how delta(Hexp) and –Tdelta(Sexp) were obtained.

In the usual van't Hoff analysis, ln K is plotted vs 1/T, with the resulting slope of the line equal to -deltaH/R and the resulting intercept equal to deltaS. The values deltaH and –TdeltaS are then directly calculated from these regression parameters using the values of the gas constant R and the standard temperature, 298 K. We intend to add this specific information to the revised manuscript.

- Figure 1: This figure is only referred to in the introduction and does not appear to be revisited in the remainder of the manuscript; thus, it could be removed from the manuscript, as it was published in a previous paper.

While this figure is similar to the one previously published in Darer et al., the new figure is for the isoprene system specifically, and shows how 5 of the 7 isoprene-derived species detected in ambient SOA can be rationalized by the mechanism. It also includes additional pathways not included in original Darer et al. figure. Therefore, we feel the new figure valuable to include in the present manuscript.

Technical Comments: - Page 14384, Lines 20-23: Please clarify sentence.

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Presumably, the reviewer feels that this sentence isn't specific enough. We will refer to SOA's specific role in air pollution and climate change in the revised manuscript.

- Figure 3: Clarify the y axis.

We will include a clarifying sentence in the revised manuscript indicating the y-axes of Figures 2 and 3 involve the fractional contribution of each species to the total concentration of all species.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 14383, 2011.