Atmos. Chem. Phys. Discuss., 10, C6522–C6524, 2010
www.atmos-chem-phys-discuss.net/10/C6522/2010/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The sensitivity of secondary organic aerosol component partitioning to the predictions of component properties – Part 1: A systematic evaluation of some available estimation techniques" *by* G. McFiggans et al.

Anonymous Referee #1

Received and published: 16 August 2010

This paper may be relevant for publication in ACP but, unfortunately, I am not able to judge the scientific relevance and quality since I fail to understand exactly what the authors have done.

According to the publication criteria for ACP the description of experiments and calculations should be sufficiently complete and precise to allow their reproduction by fellow scientists and I find the section 2.3 about the set-up of the calculations too unclear to

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understand exactly what calculations have been performed.

Since I do not understand how the different sets of model compounds are set up in the different calculations I can not judge the rest of the manuscript properly (e.g., what is meant by “probability distributions of all 29 functional groups are randomly generated as a function of carbon number”?; what are the probabilities of occurrence for the different types of functional groups?; how should I interpret the curves in Figure 1? Could you be a bit more specific about how the curves are constructed and how they should be interpreted?; how do you randomly select carbon chain lengths in the different cases?; how can a 2 compound mixture “randomly represent” the “probability of the functionality defined” for a given set of “functionality distributions”?).

Since section 2.3 is so unclear to me I think the authors should rewrite it completely with the aim to make it clear and detailed enough that the reader, at least in principle, could reproduce the work. Details and examples can be given as supplementary material. Perhaps a detailed example of a case of the simplest complexity (2 compounds) can be given in a supplementary?

In general, I find the paper a bit difficult (and tedious) to read with some long paragraphs. Maybe some of the paragraphs can be restructured and/or split to make the paper easier to read.

Some other notes (note that I, unfortunately, have not made a full check of all details):

On page 15384 it is stated that “recommendations for a methodology for VOC degradation mechanism reduction for SOA prediction are made”. Where are these recommendations?

On page 15387 there is a missing reference: "The p0 methods used in this work were that of Nannoolal et al. (2008) and – "

In section 2.2 the Joback method is denoted JR but in most Figures it is denoted J.

In general all the Figure captions are very brief and it is difficult to understand what

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the figures show in some cases. For example: there is a cryptic explanation of the left-hand bars in Figure 2 but none of the right-hand bars; what are the blue and green symbols in Figure 6?

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 15379, 2010.