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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluation of the atmospheric significance of multiphase reactions in atmospheric secondary organic aerosol formation" *by* A. Gelencsér and Z. Varga

Anonymous Referee #3

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General Comments

To make the life for the authors of this manuscript with a third reference not more complicated I was also reading the comments of referee 1 and 2 very carefully and I agree in general with their conclusions. Multiphase pathways for in clouds SOA formation is and will be in the future a very important contribution for all regional and global models. This manuscript uses a simply (in some places to simplified) approach to contribute useful aspects to the aerosol community how - based on Henrys constant - different precursors could participate and to what extend. The subject is still not very well un-

derstood and for this reason certainly appropriate for publication in ACP with minor revisions.

Two main topics which are already mentioned by referee 1 and 2 are in my opinion important to be added to this manuscript. First, although I'm a modeler, it took me a couple of times to read section two, the model introduction before understanding the way of the model half way. I would recommend and encourage the authors to include a schematic template of the model and the gas/aqueous-phase reactions used. Also the authors should point out if the gas, gas/aqueous and aqueous-phase reactions are running simultaneously or if the reactions are coupled. This can be easily achieved in a nice schematic picture which would give an easy overview for other readers.

Second, I would also encourage the authors to perform some sensitivity studies with different input parameters (e.g. vapor pressures of the products). The simplified way used by the authors for the model only based on Henrys constant with a mean gas-phase, aqueous-phase and global reaction rate expression (should be also explained in more detail - see referee 2) is not satisfactorily. It would provide more input for future research if a wider range of different parameters would be included in the model calculations.

One special comment - the word source areas on page 4409, line 12 is misleading and should be replaced.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4407, 2005.