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Interactive comment on “Development of a simple unified volatility-based scheme (SUVS) for secondary organic aerosol formation using genetic algorithms” by A. G. Xia et al.

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Received and published: 11 April 2011

The title of this paper is

"Development of a simple unified volatility-based scheme(SUVS) for secondary organic aerosol formation using genetic algorithms".

The use of the term "unified" here refers to the solid work of the authors to provide a "unification" of 1)kinetic models (as in the MCM), with 2) a simple representation of the volatility distribution for constituents of organic particulate matter (OPM) (as by application of the so-called "volatility basis set" (VBS) approach). Given the significant use that each of these model approaches is receiving, this goal makes significant sense.

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However, this reviewer finds it an overstatement to use "unified" to refer to the results of this work. In particular, "unified" would suggest that simultaneous consideration of all important parameters and modelling needs has been accomplished, and this is not the case. Indeed, aerosol OPM formation depends to a considerable extent on the abilities of the condensing species to mix (or not) and form one (or more) phase(s) from which they can express their volatilities back to the gas phase. In this reviewer's opinion, consideration of activity coefficients must thus be included in any "unified" aerosol formation model. (As a side note, on page 14 the activity coefficient ζ_i is incorrectly identified as the "molality-based activity coefficient". In fact, ζ_i is the mole-fraction-scale-based activity coefficient.) Perhaps a more appropriate title would be "Application of genetic kinetic algorithms in development of a simple volatility-based scheme(SVS) for secondary organic aerosol formation".

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 3885, 2011.

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