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Geoscientific Model Development Discussions
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Interactive comment on "ORACLE: a module for the description of ORganic Aerosol Composition and Evolution in the atmosphere" *by* A. P. Tsimpidi et al.

Anonymous Referee #1

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General Comments:

This paper documents the development of a module to describe organic aerosol composition and evolution in the atmosphere (ORACLE) within the ECHAM5/MESSy Atmospheric Chemistry (EMAC) model. The paper comprises a very comprehensive description of the module and is well written and clear; I would recommend its publication in GMD following clarification on the below very minor issues.

Specific Comments:

Saturation vapour pressures of organic aerosol (in the nucleation mode) can reach as low as 10-2 to 10-3 μg m-3 (Pierce et al., 2011), and recently Ehn et al. (2014)

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identified the production of extremely low-volatility organic compounds (ELVOCs) from the oxidation of biogenic VOCs. In ORACLE, the lowest volatility SOA generated from VOCs is 1 μg m-3. The authors explain that additional bins may be added by the user, but it may be worth mentioning that the current configuration does not account for the generation of oxidation products with extremely low volatility?

Technical Comments:

p5474, line 27: There's a mismatch between the range of saturation vapour pressures covered by SVOCs in this sentence and in Figure 2, so (unless I misunderstood!) one of these needs correcting.

References:

Ehn, M. et al., "A large source of low-volatility secondary organic aerosol", Nature, 506, p476, 2014. Pierce, J. R. et al., "Quantification of the volatility of secondary organic compounds in ultrafine particles during nucleation event", Atmos. Chem. Phys., 11, p9019, 2011.

Interactive comment on Geosci. Model Dev. Discuss., 7, 5465, 2014.