

## ***Interactive comment on “Global modeling of secondary organic aerosol formation from aromatic hydrocarbons: high- vs low-yield pathways” by D. K. Henze et al.***

**Anonymous Referee #3**

Received and published: 9 December 2007

This is a very interesting paper. It studies secondary organic aerosol (SOA) formation in the troposphere from anthropogenic volatile organics and evaluates the global significance of recently published relevant aerosol yields. For this purpose it makes a thorough calculation of the oxidation products of the aromatics in the aerosol phase by taking into account the levels of nitrogen oxides in the troposphere. This leads to somehow higher estimates of SOA production from aromatics oxidation than earlier studies, although the corresponding increase in SOA burden is not enough to account for the discrepancies between model simulations and observations of organic aerosols.

The paper is well written and in the scope of the journal. It deserves publication in ACP

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after minor improvements.

In addition to the other reviewer's comments I suggest the following additions/ changes:

1. Add an appendix explaining with one of two equations how the branching between high and low VOC/NO<sub>x</sub> ratios is taken into account in the model (mentioned in page 14577, line 3).
2. page 14577, lines 20-24. Need to better justify the use of an OM/OC ratio of 2.1 in the present study, ratio that is recommended for non-urban aerosol, although most of the primary carbonaceous aerosols are in urban areas where this ratio is closer to 1.4.
3. page 14578, line 4: Offenberg et al., 2006 suggest a lower enthalpy of vaporization for SOA from aromatics, what the result would be if that almost 3 times smaller number was used here instead of the 42 kJ/mol ?
4. page 14579, lines 21-23: This information should be given in the emissions sub section. It is also not clear if extra tropical (for instance, boreal forest) emissions are taken into account in this study.
5. page 14580, line 7: than 1%
6. page 14581, line 17. after 'larger'; add 'than those from biogenics';
7. page 14583, lines 9-11: this is a very strong statement, what about sesquiterpenes?

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 14569, 2007.

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