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Geoscientific Model Development Discussions

Interactive comment on "Development of aroCACM/MPMPO 1.0: a model to simulate secondary organic aerosol from aromatic precursors in regional models" *by* M. L. Dawson et al.

Anonymous Referee #2

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General Comments

In this manuscript the authors report results of a modeling study that incorporates a new gas-phase mechanism for aromatic oxidation, a multiphase partitioning model, updated vapor product pressure estimates, and an improved lumping scheme into an airshed model. The model was used to simulate SOA formation in the Southern California Air Basin. It is generally accepted that aromatic hydrocarbons are an important contributor to SOA formation in urban areas, so developing SOA models for these compounds is important.

The improvements made to the model all seem appropriate. Unfortunately, the atmospheric chemistry of aromatic hydrocarbons is still poorly understood, and their role in SOA formation even more so. Information on reaction product yields are incomplete, for both high and low NOx conditions, and oligomer formation, which adds enormous complexity and uncertainty to the particle chemistry, is known to play an important role in SOA formation. Nonetheless, the approach taken here with regards to incorporating various improvements into the model seem to be about as good a one can currently do, and so are justified. It is to be hoped that future field studies can identify and quantify some of the major SOA compounds that are predicted by this model, thus providing information for better model evaluation. The paper is concise and well written, the model improvements seem straightforward and reasonable, and the results of the test simulations provide some useful information on the likely importance of both high and low NOx chemistry in the region. I think the paper can be published in GMD as is.

Specific Comments

None.

Technical Corrections

None.

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