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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term Particulate Matter Modeling for Health Effects Studies in California – Part II: Concentrations and Sources of Ultrafine Organic Aerosols" *by* Jianlin Hu et al.

Anonymous Referee #1

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The authors discussed the concentrations and sources of primary and secondary organic aerosols in PM0.1 over California for 2000-2008 using the source-oriented UCD/CIT model. The article is overall well-written. I will suggest the paper accepted by ACP after the authors address my following questions/suggestions:

1. SOA module

The SOA module used in this study is based on the two-product method. Different SOA formation treatments could result in different results. It would be meaningful if an alternate SOA module (e.g., VBS) is applied in the future study of POA and SOA.

2. OC/Mass ratios

The authors discussed the underpredictions of OC/Mass ratios shown in Figure 2, which could be due to the overestimation of dust emissions. Are dust emissions affected by wind speed from WRF? Did the authors evaluate the meteorology provided by WRF? What about seasalt, since some sites are along the coast? Although most of seasalt are coarse particles, they may contribute a little bit to PM2.5?

Some other comments:

1. Page 6, line 78, UCD/CIT has been defined in page 4 line 52

2. Page 8, line 136-137, do you mean BENZ (i.e., ABNZ1_X1, ABNZ1_X2, ABNZ2_X1, and ABNZ2_X2)?

3. Page 9, line 155, change "meteorology fields" to "meteorological fields"

4. Page 13, line 246, "Condensation of SOA", do you mean the condensation of volatile VOCs?

5. Page 15, line 277, "some important sources", could you please provide some specific sources that for Riverside case?

6. Page 15, line 287, do you mean less POA converted to SOA in ultrafine size range?

7. Page 16, line 311, You may want to switch the order of supplementary figures.

8. Page 31, Figure 4b, why are PM0.1 SOA/TOA ratios very high over the southeastern corner? Is that partly due to boundary conditions?

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