

Interactive comment on “Impact of model grid spacing on regional- and urban-scale air quality predictions of organic aerosol” by C. A. Stroud et al.

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Review of “Impact of model grid spacing on regional and urban-scale air quality predictions of organic aerosol” by Stroud et al.

This paper investigates how model grid size can affect the prediction of organic aerosol. The model uses state-of-the-art representations of primary and secondary organic aerosols. The effect of instantaneous dilution due to coarse resolution was found to have large effects on both primary and secondary organic aerosols.

This paper is well written and of interest to the ACP readership. I recommend it be published in ACP once some minor comments have been addressed.

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Specific comments

Page 30352, Line 15: “IVOC emissions, which are not accounted for in the standard national emissions inventories, were calculated by multiplying the POA mass emissions by a factor of 15 1.5, which is calculated assuming that the POA emissions have the volatility basis set (VBS) in Robinson et al. (2007).” Did you mean to say “assuming that the POA emissions have the volatility distribution as in Robinson et al. (2007) within the volatility basis set (VBS). Also, it might be good to say that you are using the VBS and say what volatility bins you are using before this.

Page 30352, Line 16: I find the following confusing, “Emissions in the $C^* = 10^6 \mu\text{gm}^{-3}$ and $C^* = 10^5 \mu\text{gm}^{-3}$ volatility bins and half of the mass emissions in the $C^* = 10^4 \mu\text{gm}^{-3}$ volatility bin are used to derive the factor of 1.5. It is assumed that the remaining half of the mass emissions in the $C^* = 10^4 \mu\text{gm}^{-3}$ bin is included in the POA emissions inventory.”

Page 30356, line 25: “Table 1 lists the...”. This should be mentioned during the STN comparison too, right?

Page 30357, line 1: Were the ICARTT2004 and BAQS-MET2007 comparison results published? Is this the Gong et al., 2010b citation that's shown a few sentences later?

Page 30357, line 29: Has more effort be put into getting Canadian Emissions correct than US emissions?

Table 2 and Page 30358, line 22: Can you expand Table 2 to give the statistics for the 42 km and 2.5 km data? This will help quantify some of the points you are making.

Page 30360, line 9: How do you define “maximum grid-cell PM_{2.5}” is this the highest PM_{2.5} found anywhere in the domain at any time, the highest PM_{2.5} found anywhere in the domain once averaged over all times, or something else?

Figures 5-7: Would be nice to have a 3rd panel that is the ratio of the concentrations at 2.5 km resolution to 15 km resolution.

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