

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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The authors examine the effects of grid size on modeled concentrations of primary and secondary organic aerosols. They use the Canadian model AURAMS and describe the updated science incorporated in the model. The paper compares measurements of organic aerosols to modeled concentrations using 42, 15 and 2.5 km grid spacing. The authors conclude that high-resolution grid spacing is important, particularly for capturing the location and magnitude of directly emitted primary organic aerosol emissions in an urban area. They also suggest that the finer grid resolution improves the model's ability to predict secondary organic aerosol concentrations by better representing the

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location of VOC emissions and better representing the chemical environment in which secondary organic aerosols are produced.

This paper is well written and of interest to the ACP readership. I believe it is a great addition to the current literature on the effects of grid spacing on modeled predictions. I recommend it be published in ACP once minor comments have been addressed.

Page 30353, Lines 11-13: Readers might find it useful to have definitions of ΔH_{vap} , α_i and K_i .

Table 1: It would be interesting and strengthen the paper to see how the statistics vary with respect to the 42 km grid. Do you see the same results (i.e. under-estimation at STN and over-estimation at IMPROVE sites?) Perhaps you see very similar results and little or no improvement going from 42 to 15km? This would, at least, be interesting to note. Perhaps one must model at a finer scale (e.g. 2.5 km) before seeing improvements in model performance, particularly in an area with a significant concentration gradient.

Table 2: It would be good to show in the table how the 15km statistics compare to those of the other two grid sizes (i.e. 42 and 2.5 km).

Page 30358, Lines 3-22: I wasn't really sure how the modeling of the aircraft OA measurements fit into the paper. It didn't really add anything to the spatial resolution discussion and I'm not sure how the model evaluation results support or refute any conclusions about improvements in the model science. Perhaps this should be omitted or tied in better to the conclusions.

Page 30362, Lines 21-23: Again, the model evaluation results for the aircraft data are simply listed but not directly tied into the paper conclusions.

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