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# *Interactive comment on* "Multiday production of condensing organic aerosol mass in urban and forest outflow" *by* J. Lee-Taylor et al.

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In addition to addressing the Reviewers' comments, we have made the following changes to the manuscript. These changes deal with 1) an additional sensitivity simulation, and 2) a minor (few percent) adjustment to the calculated masses in one model scenario. Our original conclusions remain materially unchanged. We hope the editor will agree that these additions are sufficiently minor that they need not delay publication.

1) During the review period, we discovered that we had inadvertently used a different photolysis input file than in our previous work, that had the effect of lowering photolysis



rates, [O3] and [OH] in our model by ∼20% relative to LT-11. In recognition that this could potentially delay the photochemistry and slow aerosol production rates, we have performed an additional pair of sensitivity runs in which we increase photolysis rates by approximately 50% (urban scenario) and 30% (forest scenario). We have amended the manuscript by adding descriptions of these runs and discussion of their results. Initial formation rates are indeed accelerated with the increased photolysis rates and the final urban particulate mass is slightly reduced. However, the main results still stand, that the urban case shows significant particle mass formation for multiple days downwind, whereas particle mass in the forest case approaches its peak value after just over one day of outflow.

Additional text in Section 2.3: "Most of our urban outflow simulations inadvertently employed photolysis rates ∼20% lower than in LT-11. Rates of photochemical formation and transformation of condensable oxidized products scale with actinic flux, altering the particle mass formation rate. Boundary-layer aerosol pollution reduces actinic flux at the surface but enhances it aloft (Palancar et al, 2013). Simulation "HV+" tests the sensitivity of the particle mass production to increased ambient actinic flux. Effective j(O1D) in case HV+ is about twice that in our urban base case, and about one-third greater than in our forest base case."

Additional text in Section 3.2: "Increasing the available sunlight (run "HV+") speeds up initial SOA production. The final condensed aerosol mass is unaffected in the forest scenario, but lower by 9% in the urban scenario, likely owing to increased photolytic removal of semi-volatile gases. In all these sensitivity cases, the aerosol mass reductions noted are insufficient to lead to net mass loss in either the urban or the forest scenario."

2) We have adjusted the dilution-corrected masses for the urban scenario to reflect outflow beginning at 40 hours (when the dilution rate changes), not 39 hours (when the temperature and emissions change). This gives small (a few percent) changes to reported dilution-corrected masses throughout the text and in all the Figures, but does

not affect our discussion or conclusions.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 17999, 2014.