Comment from Editor and author's response (Ma et al.)

Editor: I'd like to thank the authors for their thorough consideration of the reviewers' comments, their responses and revised manuscript. Prior to final acceptance, I'd like to invite the authors to respond to the last remaining point of referee #1: "Presumably it is the curve fitting routine, applied with Eqn 6 from the Supplement, which produces the new alphas, I wonder though if the same fit routine, applied without wall-loss, would reproduce the same alpha's as the original Tsimpidi? Assuming that this is the case, then I would just ask the authors to add some words on these large changes, and implications for simulations of regional scale OA concentrations". This is potentially important and worth commenting on. I am happy to consider this as a minor revision without sending for re-review. I congratulate the authors on a thorough and well-considered manuscript, and an enjoyable read.

Response: We thank the editor and the reviewers again for their feedback. We have verified that indeed if the curve fitting routine is applied without wall-losses, then the original Tsimpidi alpha values are obtained. In addition, a paragraph has been added to the end of Section 3.1 to discuss the implications for simulations of regional scale SOA concentrations. This is paragraph is quoted below (in bold) for the editor's convenience.

Despite having higher SOA yields initially, over regional scales (i.e. photochemical ages at and above approximately 2 days) the parameterizations with updated V-SOA yields and without aging produce less SOA, because the organic mass in higher volatility bins (c* = 100 and 1000 $\mu g\ m^{-3}$) is not further oxidized by aging reactions to produce organics with sufficiently low volatilities to form SOA (Figures S1 – S7). Furthermore, large SOA overpredictions have been shown to occur in gridded 3-D models when using parameterizations with aging that do not include fragmentation reactions (Shrivastava et al., 2015). Fragmentation with aging reactions may still play a role in determining SOA concentrations on such regional scales. However for the photochemical ages studied here, our results as well as the recent findings regarding gas-phase wall losses in chamber studies, suggest the inclusion of updated V-SOA yields as well as accurate parameterizations for I-SOA and S-SOA and for the emissions of precursors is more important for accurately predicting urban SOA concentrations.

Shrivastava, M.; Easter, R. C.; Liu, X. H.; Zelenyuk, A.; Singh, B.; Zhang, K.; Ma, P. L.; Chand, D.; Ghan, S.; Jimenez, J. L.; Zhang, Q.; Fast, J.; Rasch, P. J.; Tiitta, P. *J. Geophys. Res.-Atmos.* **2015**, *120*, 4169.