Responses to the Comments of the Referee

General comments
(1) Please go through all references and make sure they are all included as I found some missing ones (below).
Done. We have made the corresponding corrections including the ones suggested by the reviewer.

Comments by line numbers (with respect to the red-lined document)
(2) 296-297. Can you clarify this a bit more? You mean that the prevailing winds are from the west so OOA increases to the east because it takes time for OOA to form? Do you see similar gradients in Ozone? (if its following the evolution of photochemistry then you should see it behaves similarly as Ozone)
Yes, the west to east gradient is due to the increased atmospheric processing time. We have now added this clarification in the revised manuscript. We see this behavior in most secondary pollutants including ozone.

(3) 428-429 (and 559-560). Unless there is a study describing such mechanism, I think stating that it's based on high NO_x levels is too much of an assumption. On polluted sites/cities many other pollutants are high which could also be involved in SOA production. For instance, aqueous-phase SOA turning freshly emitted VOC into SOA, that is a well-established mechanism and is feasible due to the higher humidity in winter vs summer, could be a more likely mechanism to blame rather than hypothesize a new one.
There are actually a number of studies suggesting this potential mechanism (Bougiatioti et al., 2014; Crippa et al., 2013a,b) which we cited in the previous sentence (426-427). As pointed out in our responses to reviewers we have explored the aqueous-phase SOA mechanism (Murphy et al., 2011, 2012) and its contribution cannot fully explain such high OOA underprediction (10 % or less contribution to SOA) that is seen in the present study.

(4) 444-446. What do you mean by "base-case OA scheme in PMCAMx"? Is aqueous SOA formation included in other PMCAMx configurations? If it is included, why didn't you performed a sensitivity simulation with aqueous SOA formation? This sentence is confusing after you stated above that there is definitely something missing in the model configuration you use.
By basecase we mean the main model configuration (with regard to aging rate constants, SOA aging, etc.) that we use in all previous application of PMCAMx. As pointed out in the previous reply and in our original reply to the reviewers we have explored the aqueous-phase SOA mechanism (Murphy et al., 2011, 2012) as a sensitivity test and its contribution cannot fully explain the high OOA underprediction found in this study (less than 10 % contribution to SOA). We have re-phrased this sentence to avoid confusion.

(5) 483. I think this should be: "The model presents a delay in the timing of the morning rise of the boundary layer …". Using "underestimation" is too vague, as it could refer to a delay or to a slower growth rate. Morning growth rate seems well represented in the model.
We have rephrased this sentence.

(6) 483-485. Given the delay on the PBL growth, I encourage the authors to check in their model configuration and analysis for any shift in time that could have gone unnoticed and that could be generating this apparent delay. Many plots are in local time, so please check that the daylight savings was applied correctly when reading model output and observations, and that the emission cycle was included correctly into the model with respect to daylight savings. Also, PBL height in WRF is outputted at the valid time and it is an instantaneous value, while the observations might be an average for an hour, so they should be valid at the center time of the averaging window.

These are some of the first things that we checked when we first saw this delay. Everything checked out.

(7) 572. Please add a reference to the statement "meat grilling is one known important source of COA"

We added an appropriate reference (McDonald et al., 2003).

Technical corrections:

(8) Line 444-445. Murphy et al., 2011, 2012, references are not in the reference list. You could also add a more recent aqueous-phase SOA modeling study: Knote, C., Hodzic, A., Jimenez, J. L., Volkamer, R., Orlando, J. J., Baidar, S., Brioude, J., Fast, J., Gentner, D. R., Goldstein, A. H., Hayes, P. L., Knighton, W. B., Oetjen, H., Setyan, A., Stark, H., Thalman, R., Tyndall, G., Washenfelder, R., Waxman, E., and Zhang, Q.: Simulation of semi-explicit mechanisms of SOA formation from glyoxal in aerosol in a 3-D model, Atmos. Chem. Phys., 14, 6213-6239, doi:10.5194/acp-14-6213-2014, 2014.

Done. We have now added this reference.

(9) 484. I think this should be "BC overprediction"

Corrected.

(10) Table 2: There are ","s missing after when you switch to the next line but within the same OA component (after COA for the first two components, after HOA and after BBOA)

Added.

(11) Fig. S6. The back-trajectories for Feb 10 are not fully contained in the plot, please expand the visualization domain so they are all contained like in the other panels.

Done.