

Reviewer Responses

We thank the anonymous reviewers for their time and suggested improvements for our paper. Reviewer comments are in red. Responses are in black and include page and line numbers where changes are made in the accompanying manuscript.

1 Reviewer # 1

Summary

This study investigates the large source of glyoxal (GLY) in China's Pearl River Delta (PRD) as observed by the Ozone Monitoring Instrument (OMI). The authors show that aromatics are the dominant GLY source in this region, and they use a 1-D plume model to further demonstrate that OMI GLY is consistent with current VOC emission inventories and aromatic chemistry. This is in contrast to previous studies using older, less reliable GLY retrievals from SCIAMACHY. This paper is short and to the point. It is well written and appropriate for ACP. My comments are minor.

General Comments

There is no Conclusions section. Admittedly the paper is short and perhaps this is not vital, but it makes the manuscript feel unbalanced (to me, at least). Perhaps the last paragraph could be put under a Conclusions header. Also, perhaps the authors could expound upon which aromatics or products deserve the most attention for improving yield estimates.

We now start the last paragraph with the phrase "In conclusion" (Page 6, Line 11), and state that the later generation CHOCHO yields from aromatics require attention (Page 6, Line 16).

Specific Comments

P. 2, L.7: Presumably GLY is one such aerosol source; might be worth mentioning this link.

We now state that CHOCHO is also an aerosol precursor (Page 2, Line 7)

Figure 4 and text: the model does OK overall, but there is clearly over-prediction of HCHO and underprediction of CHOCHO at the peak, as well as over-prediction of CHOCHO at longer timescales. Is this a consequence of the model setup (e.g. using constant yields), or is it indicative of some actual issues in the chemistry (related to different generations, etc.)? It might be worth adding a brief discussion on this to help identify where future work might be done.

We have amended the text to reflect the limitations of the simple plume model to capture the dependence of CHOCHO line densities on transport time (Page 5, Line 6).

Technical Comments

P.1, L.18: "in the PRD and their?"

We have fixed the last line of the opening paragraph (Page 1, Line 19)

P. 3, L.1: Zhu et al. (2016)

The reference has been updated (Page 3, Line 1)

P.3, L.20: Since this deals largely with aromatics, you might also cite Bloss et al., ACP (2005), doi: 10.5194/acp-5-641-2005

We now include the reference to Bloss et al. (Page 3, line 20).

P. 5, L.3: "of CHOCHO?"

We have amending the text (Page 5, Line 2).

2 Reviewer # 2

great paper and an important step for the validation of space-based glyoxal observations. am not an expert in VOC chemistry, thus am unable to comment on the details of chemical modeling and reaction mechanisms. recommend publishing as is. check the last sentence of first paragraph of the introduction (line 18): should the ", " be an "and"?

We have fixed the last sentence in the updated manuscript (Page 1, Line 19).