

Interactive comment on “Secondary organic aerosol enhanced by increasing atmospheric oxidizing capacity in Beijing-Tianjin-Hebei (BTH), China” by Tian Feng et al.

Anonymous Referee #1

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The study provides a comprehensive analysis of the impact of changing oxidative capacity of the atmosphere on SOA levels over the BTH region in China by using the WRF-Chem model over an episode. The study is very interesting, the experiments are well-designed and justified and the manuscript is well written and easy to follow, I enjoyed reading it. I have a number of comments and few technical/editorial corrections listed below before the manuscript can be published in ACP.

Comments:

Materials and Methods

Domain setup should be described. Is it only one domain that the simulations are
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carried out or is this a inner domain of a nested domain system?

More details should be provided for the spatial, temporal and chemical distributions of anthropogenic emissions? Which profiles are used if total PM and NMVOC emissions and annual emissions are used in the study? These can be already explained in another publication in detail but for the sake of having a stand-alone paper, authors could briefly explain these.

How about dust and biomass burning emissions?

I recommend to calculate also the correlation coefficient and Normalized Mean Bias (MNB) to provide relative changes in concentrations to be clearer the size of the changes to the readers outside China. Add these relative changes also in the text wherever you write about changes in mass.

It would also help to add a table summarizing the different scenarios. In addition, lines 247-254 fits better to the Materials and Methods sections.

Results

Lines 239-242: Can the underestimation be also due to the anthropogenic emissions?

Line 251: Change numbers from “reduced to” to “reduced by” to be consistent with the rest of the text (e.g. abstract, conclusions)

Lines 279-287: Discuss the reasons of the geographical differences (emissions, forests etc.).

Lines 301-304. Explain/discuss why largest impact is seen in PSOA pathway.

Technical corrections

Fig.1. Different to distinguish the different symbols.

Fig.2. Are these annual emissions?

Fig.12 caption, add the full names of PSOA, ASOA etc. in the caption.

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Line 20: "...O3 concentrationS..."

Line 31: add units to 0.52 to 0.43.

Li et al., 2017a is not in the manuscript

Tie et al., 2016 is not in the manuscript

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