

Interactive comment on “Carbonaceous aerosols in China: top-down constraints on primary sources and estimation of secondary contribution” by T.-M. Fu et al.

Anonymous Referee #1

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The paper by Fu et al studies surface concentrations of carbonaceous aerosols in China. EC and OC concentrations as observed at 31 sites are used in combination with the GEOS-CHEM model which is run using top-down and bottom - up emission estimates. The study concludes that EC and OC is systematically underestimated in common emission inventories for China. This paper a very nice paper, showing a thorough analysis of carbonaceous aerosols in China, and I would recommend publication in ACP after only some minor corrections:

- 1) Language, the grammar needs to be edited.
- 2) The discussion in this study should take into account that all conclusions are

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drawn using only surface measurements. However, especially when discussing foreign sources the authors should be careful. I understand that vertical EC/OC observations might not be available, but at least this should be mentioned.

3) What are the uncertainties of the measurements? Can these uncertainties be included in the modeling estimates? How much of the top-down estimates could be explained by observational biases?

4) The paper only discusses emission uncertainties, but does not take into account that aerosol processes such as secondary aerosol formation, transport and removal might be responsible for a portion of the disagreement between model and observations.

5) Page 3, L8: VOC is not the only possible precursor of SOA. A small portion can come from condensing primary organics, but this might be just a small fraction.

6) Can the authors comment on the currently used historical CMIP5 (Lamarque et al 2010) inventory?

7) Figure 1 -3 should be enlarged.

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