

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.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 28219, 2011.