

Interactive comment on “Patterns in atmospheric carbonaceous aerosols in China: emission estimates and observed concentrations” by H. Cui et al.

Anonymous Referee #1

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The manuscript presented an updated emission inventory of anthropogenic organic carbon (OC) and elemental carbon (EC) from China, and a thorough analysis of the characteristics of carbonaceous aerosol including spatial, temporal distributions, size distribution, and share of secondary organic compound (SOC) by reviewing existing observation studies. The manuscript also used observations to test the levels and inter-annual trends of the calculated emission inventory and proposed possible improvements for future emission estimation. Overall, the manuscript is well organized, professionally written with adequate data, tables and figures, and falls in the scope of Atmospheric Chemistry and Physics. The manuscript has provided a more detailed

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and broader view on the current situation of carbonaceous aerosols in China. I would recommend the publication of this manuscript in Atmospheric Chemistry and Physics after the following comments have been addressed.

Major comments:

Methodology of emission estimation requires a more detailed description.

- The authors should clearly highlight the improvement of emission estimation in this study compared with their previous work, or even with other studies, at the beginning of the methodology part. It has been mentioned sparsely in the manuscript on the difference from previous work done by the same group. However, I think this point merits a more systematic and detailed discussion.
- The authors should provide more explanation on the sector categories.
- Kerosene and brick kiln have been recently identified as two important sources of black carbon in South Asia. Have the authors conducted any work on estimate BC and OC emissions from these two sources in China? How are these two sources incorporated in the emission inventory presented in this study?

Minor comments:

- (1) Please check the format of the references in the main text, as most of them have first name initial for the in-text citation, which need to be removed.
- (2) First and second paragraph in Section 2.3, how did the authors calculate the uncertainty associated with the share of different sectors?
- (3) Page 8994, Line 14 – 15, I would suggest the authors presented the percentage difference between current and previous studies, instead of absolute difference of emission values.
- (4) Page 8994, Line 16, the authors should be clear here about biomass open burning. Does it include forest fire? I would assume not because that is not anthropogenic, but

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the authors should clarify this point.

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