

## ***Interactive comment on “Primary aerosol emission trends for China, 1990–2005” by Y. Lei et al.***

**Anonymous Referee #1**

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In this study, Lei et al. attempt to estimate the primary particulate matter emissions of different size ranges (PM<sub>2.5</sub>, PM<sub>10</sub>, and TSP) from China during 1990–2005, using a bottom-up approach. They compile activity data from various data sources and employ a technology-based method to estimate the net emission factors, in which the fast changes in both production and emission control are accounted for. The trends of primary aerosol emissions from China during 1990–2005 are analyzed, and compared to some other emission inventories. This is an interesting study and sheds some light on China's air pollution issue that comes with the tremendous economic achievements. The data set may also be of use to the modeling community interested in the climate impact of aerosols. The paper is generally well written and the results are presented in an organized fashion. There is still, in my opinion, room for improvement (see the specific comments) and I'd recommend that the paper be accepted for publication in C7954

ACP after some revision.

Specific comments

1. There is large uncertainty in both the activity data and the EFs, as acknowledged by the authors in the manuscript. More importantly, the reliability of the data sources likely changes with time, from the beginning to the end of the study period. This is reflected by the generally larger error bars assigned to the 1990 inventory than those to the 2005 inventory. All these make it dangerous to try to derive some general emission trend(s) from the data set. An uncertainty analysis is done but I feel that more detailed breakdown of the error bars should be given in the paper for potential users. Estimates assuming no and complete compliance in emission regulation may be interesting as well, and may reflect the effect and the potential of pollution control in China.
2. It is unclear to me whether some primary aerosol sources are included in the inventory or not, for example, fugitive dust from construction or traffic, and the burning of agricultural residuals. Natural sources are not included in the inventory, and this should be reflected in the title.
3. The authors mention historical high in emissions of several species in 2005, the end of the study period. Does this imply drop in emissions starting in 2006?
4. One important source of uncertainty is the penetration of PM control technology, estimated based on government emission standards. I'd suggest that the authors elaborate their methodology more in section 2.2.4.
5. The emissions from the residential biofuel deserve further examination, given that this sector contributes a large fraction of BC and OC. The 20–30% decrease from 1990–2000 followed by the increase of similar magnitude from 2000 to 2005 (Table 9) has not been explained. What's the possible driving force behind the change or is this simply an artifact resulting from the energy use data?

Technical comments:

Tables 3, 4, and 8, what's the connection between EUROII, II, GB14762, 17691, and Stage I, II.

Tables 5-7, specify the units.

Figure 10, explain the "Statistical TSP".

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