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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Asian emissions in 2006 for the NASA INTEX-B mission" *by* Q. Zhang et al.

Anonymous Referee #1

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The paper deals with the compilation of an anthropogenic inventory of Asian emissions for eight major chemical species in the year of 2006, which is a good complement to the previous studies. The authors illustrate monthly variations of China's emissions, which is an important contribution to the determination of China's emission characteristics. However, the methodology, data compilation, and discussion within this context all aim at China's emissions, and this paper has little discussion about emissions from other Asian countries, the comparisons among these countries, and spatial distributions of Asian emissions. Therefore, there is some bias in the whole context which stresses the situation in China, resulting in the noncoincidence between the title and the content.

In the methodology part, authors claimed that they have implemented six aspects of improvements. Actually, most of them (improvements a, b, d, and e) are not innovative, but are methodological transplantation from authors' own or others' research. For example, regarding the estimation of size-fractioned primary PM emission inventory, the

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authors should clarify what improvements have been achieved based on their previous methodologies (Zhang et al. (2006, 2007a)) that led to an improved inventory.

The authors described their improvements of methodology by saying "We update China's emissions to the year 2006 with these new methodologies. Second, we update emissions for other Asian countries to the year 2006 following the methodology of the TRACE-P inventory but using the most recent statistics available. Third, we incorporate the best available datasets for some selected regions, where good national inventories exist that are thought to be more accurate than the TRACE-P inventory, being built on local data sources and local knowledge." Why did not the authors use the improved methodologies to estimate all the other studied Asian counties as they did for China? Different methodologies tend to increase the difficulties in comparing emissions from China and other countries in Asia.

As for the determination of activity rate, the authors stated that "Data inconsistency in Chinese energy statistics downgrades the accuracy of emission inventories that largely rely on statistics (Akimoto et al., 2006)". However, they still chose activity rate data from China Energy Statistical Yearbook. This is a contradiction and the uncertainty of the accuracy for these activity rate data is not evaluated. As for the estimation of emissions from other countries in Asia, activity data for the year 2006 are extrapolated from 2000-2004 IEA energy data using the average growth rate during 2000-2004, and the accuracy of the results is certainly questioned. So, it is necessary for the authors to conduct quantitative uncertainty analysis regarding these problems.

In the discussion part, some of their results are close to those from other studies, but it is does not mean that the accuracy of the estimates is high. Therefore I suggest the authors should conduct a quantitative uncertainty analysis of their inventories to explain the quality of their work and the reliable ranges of inventories.

Besides, here are some more specific comments for the paper:

(1) Page 4, Line 15, "Emissions of methane (CH4) and ammonia (NH3) were not up-

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dated from TRACE-P in this work, because their sources are dominated by agricultural activities that have not changed significantly in recent years." The authors must provide convincing evidence to support their statement and explain clearly why it is not necessary to update the emissions of methane and ammonia.

(2) Page 7, Line 4-5, there are some data obtained through "personal communication", please annotate the method used or some necessary information in that personal communication to justify the credibility of the chosen data.

(3) Page 17, Line 21, "Table 3b" should be "Figure 3b".

(4) Page 18, Line 23, "OC emissions decreased by 9%, but this cannot be viewed as a real emission decrease, because in this 2006 inventory, we used lower estimates of emissions from Reddy and Venkataraman (2002a, b) than the TRACE-P estimates." The authors must clarify the reasons for using the estimation from Reddy and Venkataraman (2002a, b) instead of some other recent research, and what the emission decrease of 9% represents.

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