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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Update of mercury emissions from China's primary zinc, lead and copper smelters, 2000–2010" *by* Q. R. Wu et al.

Anonymous Referee #2

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This paper provides a useful summary and update of mercury emissions from this sector in China with spatial and temporal resolution that will be very helpful for atmospheric mercury modellers. The methodology is mostly clear and sound, though some detailed information would be better presented as supplementary material in order to improve the clarity of the paper. The only major shortcoming is a lack of discussion of the uncertainty of the emission estimates presented.

Section-specific comments:

P. 18208 l.24 -18209 l. 3: Provide context for this emission of 203 t – what % of the total anthropogenic emissions is this?

P. 18209 l.12: What is "Brook Hunt"? Define or omit.

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P. 18209 l.20 – 18210 l.2: It is not clear how this paragraph presents a reason for high uncertainty in past budgets (previously 99% was assumed, measured values are 99.2-99.8%?). It may just be an issue of unclear language that needs to be explained better.

P. 18210 Section 2 (Methodology): There is no mention of AZSP in this list of smelting processes, though it is later mentioned in the text and Table 5.

P. 18212 l. 10: Refer reader to Table 2 here.

P. 18212 ll.24-26: Provide reference for the "trade and transport among provinces" information.

p. 18213 ll. 20-22: Change to, "The CAT may be a double conversion. . .tower or a single conversion. . .tower."

p. 18213 ll. 22-24: Please provide more details about how the information was obtained, or reference appropriately.

p. 18215 l. 13: What is the fate of the fly ash? Is it all collected or is a fraction released as atmospheric particulate (if so, do you have an estimate of the emission of particulate mercury to the atmosphere)?

p. 18214 ll. 15-17: Change to, "Some mercury is washed. . .while some flows into the sulphuric acid. . ..A limited fraction is recovered. . ..There is still a trace amount of mercury remaining. . .."

p. 18216 l. 4: Is this "consumption of CHINESE ore concentrates in 2010"?

pp. 18218-18220 (Section 3.4): As mentioned by Referee #1, this section can be condensed a great deal. I suggest changing the last line on p. 18218 to, "The increased application of acid plants, particularly after 2003, was the main reason for atmospheric mercury abatement in the past decade." The remainder of this section can be removed along with Fig. 9, or condensed to 2-3 sentences summarizing regulation changes and

ACPD

12, C7044–C7046, 2012

perhaps including only the 2000 and 2010 numbers for percent of smelters with acid plants.

p. 18220-21 (second paragraph of 3.5): Clarify that the similar results of Hylander and Herbert are coincidental due to lower estimated ore mercury concentrations but also lower application rates for acid plants. This was not obvious as written. Remove final sentence.

p. 18221 l.25-27: what is the "wide range"? Can you include uncertainties on the 91%, 71% and 92% listed in the previous paragraph?

TABLES AND FIGURES: I recommend that Tables 1 and 6 and Figures 3, 8, and 9 be moved to supplementary material, and possibly Table 7 as well. Also, I agree with Referee#1 that you should remove provinces with no data (you can mention in a footnote that there were no data in those if you like).

Table 3: Are these geometric means as in Table 2? Can you provide some measure of uncertainty (e.g. standard deviation based on propagation of the largest errors)?

Table 5: Include entries in all rows in column 1 (Metal); it is not clear which processes are for which metal otherwise. In column 2, is "RE" supposed to be "RLEP"?

Table 7: Does "This study" simply refer to an average of the literature values shown in this table? This needs to be discussed in the text (or in the supplement if you move this table).

Figure 5 would be better presented as a map (or 3 maps for zinc, lead, and copper smelting), colour-coding each province by mercury emissions. This would help non-Chinese readers quickly understand the regions of high mercury release.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 18207, 2012.