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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 #1

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The manuscript reports the updated ore consumption and associated mercury emissions of zinc, lead and copper smelters in China for the period of 2000 through 2010. This is an important effort in better understanding the inventory of mercury emissions from the largest mercury emitting country in the world. The data presented in the manuscript is useful for facilitating the estimates of global mercury cycling budgets and a nice addition to what has been understood regarding China's mercury emissions. On the other hand, there is room for improvement in the data treatment robustness, the presentation of the manuscripts and the writing style. I recommend the manuscript be published after addressing the following points.

1. Section 2.1 Lines 18-22 (page 5). Please state how the samples were selected (i.e., sampling scheme) to demonstrate the representativeness of the samples. 2. Section

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2.1 Lines 1-5 (page 6). Please specify the QAQC routines of the measurement. Has the instrument calibrated with internal standards or external references (such as those used by NIST)? Also, based on Figure 1, the data is very much skewed and therefore using geometric mean is not representative of the Hg content. The Hg content should be broken down into percentiles, which can be used for estimating data uncertainty. 3. Section 2.1 Lines 16-17 (page 6). The Hg content in ore concentrates (Table 2) is not relevant for emission inventory estimate; it is the consumption that counts. Suggest deletion of this table for a better focus of the manuscript. Similarly, the data regarding ore supply from each province in Table 1 dilutes the focus (e.g., emission inventory estimate) in the manuscript. 4. Section 2.1 Line 21 (page 6). How the weighted average was calculated? Again, the Hg content in the ore consumption should be broken down into percentiles for uncertainty assessment. 5. Section 2.2 Lines 21-26 (page 7). Discussion regarding how the coefficients in Eq. E3-E7 were estimated should be provided. The data presented in Tables 5 and 6, although comprehensive, are not directly useful for emission inventory estimate efforts elsewhere. I recommended that the two tables be removed while keeping the references that detail the procedures of obtaining the values in the text. 6. Section 3 (Results and Discussion). The objective of this work is to provide reliable emission inventory updates so that the uncertainty in earlier data can be reduced. To this end, I was somewhat surprised by the fact that the authors missed two important aspects in such an evaluation: 1) there is no assessment of uncertainty of the data and the estimated emission values, 2) there is no assessment of possible emission speciation in this work. These two components should be supplemented in this section. The text in Section 3.1 (including Fig. 3) seems to be off topic because it is not directly related to emission inventory estimate. Finally, how the updated emissions from the non-ferrous smelters would influence the understanding of total Hg emissions in China should be discussed. 7. Figures. There are excessive figures in the manuscript. Most of the figures are simple bar charts that can be presented in a much more succinct fashion. Figure 1's X Axis is not shown at correct scale because the data ranges are not consistent in the bins. The three subplots can

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be combined into three box-and-whisker plots in one single figure. Figures 3 and 5 have many provinces that have no data and the scale in the Y Axis makes it difficult to read the input/emission quantity. Suggest the provinces without data be removed and change the Y Axis to log scale. Figure 7 and 8 can be combined into one using a secondary Y Axis. Figure 9 (and the associated discussion on page 12) is a distraction from the points the manuscript attempts to address - suggest deletion. 8. Although the English writing does not significantly impair the technical delivery, there are many places in the manuscript where the text is redundant, lacks clarity or has grammatical errors. A thorough editorial revision should be made after the technical revision.

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