

Interactive comment on “A high-resolution regional emission inventory of atmospheric mercury and its comparison with multi-scale inventories: a case study of Jiangsu, China” by Hui Zhong et al.

Anonymous Referee #1

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The article presents a comparison of international, national and a new local bottom-up Hg emission inventory for the Jiangsu region in China. The study highlights the serious discrepancies, in both emission totals and speciation, between emission inventory estimates. This has serious implications for the regional atmospheric Hg burden and deposition flux. If the underestimate for Jiangsu is representative for the major economies of the region then this would have global repercussions. Unfortunately the authors do not comment on how wide-spread the underestimations in Hg emissions they have identified for Jiangsu may be. Are the shortcomings in the national and global inventories identified for Jiangsu applicable to other heavily industrialised regions of China? It

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would improve the article if the authors could provide estimates of the possible range of underestimation of Chinese emissions and how this would influence the global Hg emissions total. The difference in Hg emission speciation (and to a lesser extent emission height) between the inventories will have an impact on local deposition and Hg export estimates from the region, neither of these aspects are discussed in any detail.

The description of the database compilation is thorough but rather repetitive of previous work. The English requires substantial improvement and overall the manuscript could be more concise.

Collaboration with modelling groups or at least performing some trajectory calculations with the previous and revised speciation would make the paper far more interesting. Making the emissions database available would seem a good idea as I am sure it would lead to fruitful joint research beneficial not only to the science community but also to local environmental agencies and policy makers. The fact that some of the data sources are not publicly available is a concern.

However the evidence presented raises important questions concerning the accuracy of current emission inventories, and in particular global inventories and warrants publication.

Sections 2.1 and 2.2 could be shortened with reference to sections 2.1 and 2.3 of Zhao et al., 2015 (Evaluating the effects of China's pollution controls on inter-annual trends and uncertainties of atmospheric mercury emissions, *Atmos. Chem. Phys.*, 15, 4317-4337), which are very similar. Section 2.3, is this really a sensitivity analysis, or more simply an analysis of the scale of the differences in emissions which result from the assumptions made in the compilation of the inventories? Section 3.1.2 particularly is rather long and full of acronyms, it would likely aid the reader if it were divided into subsections. Section 3.3 would also benefit from being more concise.

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