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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quantitative assessment of atmospheric emissions of toxic heavy metals from anthropogenic sources in China: historical trend, spatial variation distribution, uncertainties and control policies" *by* H. Z. Tian et al.

Anonymous Referee #1

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The authors developed an anthropogenic emission inventory for toxic heavy metals (HMs) in China for the period 1949-2012. The emission inventory for HMs is essential and important data for assessment of their effects on human health and policymaking for their emission control. The topic certainly is suitable for ACP. The manuscript presents the spatial and temporal variations for HMs emissions in China, the comparison with other inventories, and uncertainty analysis. Compared to previous works, the author's inventory has advantages in the targeted period covering almost 60 years (1949-2012) and in the comprehensive emission covering 12 typical HMs. However,

there are some points which should be clarified. In conclusion, he reviewer is recommending the minor revision of the manuscript.

(Major comments) (1) One of the advantages of the author's work is the using of time-varying (dynamic) emission factors. Why do the authors apply the S-shaped curve in dynamic emission factors? The authors should explain the reason. Additionally, the authors should demonstrate how to set the shape parameter, Sk.

(2) Another advantage of the manuscript is a long-term historical emission inventory for HMs during 1949-2012. The authors should add the uncertainty analysis for historical emissions in section 3.5. Additionally, it is recommended that the authors make the verification for historical emissions. For example, the trends of the historical emissions are consistent with those of ambient concentrations of HMs?

(3) In developing country including China, the older statistical data for activity data are considered to have high uncertainty. The author should discuss about the uncertainty and its effects to emission estimation in the uncertainty analysis in section 3.5.

(Minor comments) (1) Eq. (1): In the right hand, Ei, Ej, and Ek are needed? The averaged fraction of HM which is removed from flue gas by the conventional emission control devices can be separated into PM/SO2/NOx emission control devise?

(2) Lines 14-18, page 12122: It is considered that the emission factors of HMs from biofuel for household use and open burning are different due to different combustion condition.

(3) Figs. 1 and 4: These figures are not clear. They need to be improved.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 12107, 2015.