Review Comments

In this study, the authors established long-term Hg emission maps for anthropogenic sources in China using an integrated P-CAME model. The temporal trends and spatial distributions of sectoral Hg emissions were analyzed. Key sectors and spatial hotspots of cumulative Hg emissions were identified. This dataset could provide crucial input for chemical transport models and Hg budget models. The yields of this study are of broad interest. The manuscript is well organized and written. Overall in my opinion, the manuscript is acceptable for publication on Earth System Science Data after minor revision.

Here are some specific comments:

1. Introduction: Emission inventories are fundamental inputs for chemical transport models (CTMs). Applications of existing Hg emission inventories in CTMs and their performances in different regions can be introduced. The emission maps in this study could contribute to future atmospheric Hg simulations.

2. Section 2.1.2: The method of Monte Carlo simulation should be mentioned here instead of only in Section 2.2, with an introduction to the basic principle.

3. Section 2.3: Did the authors adopted the improvement of the GEOS-Chem model in their recent study (Liu et al., 2022)?

4. Line 183: It should be “tended” instead of “tented”.

5. Line 196: It should be “reflects” instead of “reflecting”.

6. Lines 239–241: What is the confidence level of the uncertainty ranges?

7. Line 251: It should be “NME” instead of “MNE”.

8. Sections 3 and 4: The sub-sections in these two sections are more like parallel ones instead of results and discussion, respectively. Therefore, I recommend the authors to change the structure to a combined section “Results and Discussion”. More discussion is encouraged for the current Section 3.

Reference:

Liu, K. Y., Wu, Q. R., Wang, S. X., Chang, X., Tang, Y., Wang, L., Liu, T. H., Zhang, L., Zhao, Y., Wang, Q. G., and Chen, J. S.: Improved atmospheric mercury simulation using updated gas-particle partition and organic aerosol concentrations, J. Environ. Sci., 119, 106–118, 2022.