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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Isotopic composition for source identification of mercury in atmospheric fine particles" *by* Q. Huang et al.

Anonymous Referee #3

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Atmosphere Hg is considered to be the main source of mercury deposition into terrestrial ecosystem. Hence it is necessary to understand the primary mercury sources in the atmosphere and how they change with seasons. The manuscripts uses multiple proxies to understand the changing Hg sources in Beijing air. Using multi proxy is always a stronger tool as compared to using solely concentration based studies. The manuscript is well written and well organized. However, I have two major issues with the argument :

1. The authors mention in the supplementary section (lines 70-72) from factor analysis results "Low loading of Hg in factors F-3 and F-4 suggest traffic emission and biomass burning sources may be not the major contributors for PM 2.5 bound Hg. " However from isotopic (negative Δ199Hg) signature biomass burning emission Hg was considered a major source in Autumn. The contradictory statements derived from two

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Discussion paper

different proxies are confusing. This is a major drawback of the manuscript that needs to be fixed.

2. I am not sure whether enrichment factor (EF) can be used for PBM as it is only a small fraction of total atmospheric Hg. Hence the PBM EF will always be underestimated as compared to atmospheric Hg EF.

Minor issues:

1. There is a recent paper on PBM Hg isotopes in Elementa Special Issue by Das et al.,(Mercury isotopes of atmospheric particle bound mercury for source apportionment study in urban Kolkata, India), it will be nice to see how the Hg isotope results compared from India and China.

2. Line 455- Type "Lank". Should be lack.

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