

Interactive comment on “Diel variation of mercury stable isotope ratios record photoreduction of PM_{2.5}-bound mercury” by Qiang Huang et al.

Anonymous Referee #2

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This manuscript quantified the diel variation of Hg isotope composition of particulate-bound mercury (PBM) and revealed that daily photochemical reduction of divalent Hg is of critical importance to the fate of PM_{2.5}-Hg in urban atmospheres. The topic is quite interesting and is important for understanding global mercury cycling. Publication is suggested after minor revision.

Line 114 Is one air sampler enough? PBM concentration in the air is quite small. To obtain enough mercury for isotope analysis, especially when the sampling time was reduced, it seems that we need more samplers.

Line 163 Why do you choose the height of 500 m?

Figure 2 This figure is too busy. Instead listing all data according to time series, is is

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possible to classify the figure into several subgroup according to the topic you wants to discussed? This figure can be moved to supporting information.

Figure 2(a) How to explain the negative value of $\Delta^{199}\text{Hg}$ on Sep 28?

Figure 2(f) all legends are suggested to be listed on the top of this figure. It is difficult to find “clear” “cloudy” “rain” in this figure.

Line 356 “While our results cannot exclude the effects of other possible processes, such as oxidation, adsorption (and desorption), and precipitation, based on the limited previous studies (Jiskra et al., 2012; Smith et al., 2015; Sun et al., 2016), these processes are not likely to be important to the diel variation of odd-MIF of Hg isotopes in PM_{2.5}-Hg we observed.” The observed isotope fractionation is a phenomenon while the photochemical reduction is one process leading to this phenomenon. How can you exclude the impact from other processes? Evidences are required to prove this conclusion.

Figure 5(a) What is the main reason that caused the variation of $\Delta^{199}\text{Hg}$ during the night time? Is it possible caused by measurement error? If this is true, it is better to point out this in method part.

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