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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characteristics of atmospheric total gaseous mercury (TGM) observed in urban Nanjing, China" *by* J. Zhu et al.

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We thank the referee for the positive comments and suggestion. In our response, we have addressed all of the concerns of the reviewer and revised the paper accordingly.

Q: I think the discussion on wind directions and trajectories, while interesting, could be relegated to supplemental information. It seems to dilute the analysis of the balance of anthropogenic vs. natural emissions which I think is the most important part of the paper.

Re: Yes, the analysis of the balance of anthropogenic and natural emission is the most important part in our paper. However, we also hoped to explore the position of sources. So we discussed about the relationship among TGM, wind and trajectories. We thought

this discussion also can give something for further research on the sources of gaseous mercury in Nanjing.

Q: What evidence is there for positive TGM vs. solar radiation relationships in other studies in China?

Re: We haven't found any papers with detail analysis of TGM vs. radiation relationships in China. Most papers paid close attention to anthropogenic source, so radiation was ignored. Some papers mentioned radiation to explain the morning peak of TGM, but without the data of radiation.

Q: On p.25052, line 25, the authors state that Nanjing is the largest emission region in China. Is this because of the high concentration of emitting facilities in the region or is it because of the natural sources?

Re: P25052, line 25 : "Nanjing and the surrounding area is the largest emission region in China with large seasonal variation.". It is because of the natural sources. We detailed this on P25045 line 24∼28. It may be better to change this sentence to "Nanjing and the surrounding area is one of the largest natural emission regions in China with large seasonal variation."

Q: Without measurements of other copollutants besides CO and O3 (like SO2 and NOy and particulates) it is hard to infer sources of TGM from wind data and correlations with meteorological variables.

Re: Yes, it's very hard and complex to infer sources of TGM exactly. We just hoped to conjecture the direction or position of some important sources from wind data and trajectories.

Q: Figure 1: is that a wind rose? Cannot decipher the scale.. no mention of it in text.

Re: Yes, it's a wind rose of urban Nanjing in 2011. It's just a general wind characteristic of urban Nanjing and we described it in section 2.1 briefly. Figure 1 is used to show the position and general characteristic of Nanjing. We have analyzed the wind data in

detail in section 3.4.1.

Q: Page 25047 Line 18: The TGM/CO slope, how did you get that from the graph? The slope shown on Fig. 11 is 2.59. The number reported 0.00719 ng m-3 ppb-1 is that for the whole season or one plume? Can it fairly be compared to Friedli et al from one plume?

Re: In Figure 11 top (winter), 2.59 is intercept and 0.00312 is slope. In Figure 11 bottom (summer), the intercept is 6.94 and slope is 0.00719 ng m-3 ppb-1. These intercept and slope are all for the whole season. The intercept are analyzed after slope in our paper. The slope is compared to the results in others' paper including Friedli et al. We changed P25047 Line 18: "Our observed TGM/CO ratio in winter was 0.00719 ngm$-$3 ppb$-$1, which was very close to the TGM/CO ratio of 0.0074 ngm$-$3 ppb$-$1 found in a Shanghai plume during the ACE-Asia campaign by Friedli et al. (2004)." to "Our observed TGM/CO ratio in winter was 0.00312 ngm$-$3 ppb$-$1 and in summer is 0.00719, which was close to the TGM/CO ratio of 0.0074 ngm$-$3 ppb$-$1 found in a Shanghai plume during the ACE-Asia campaign by Friedli et al. (2004)."

Q: Page 25048, line 1-2: Is this annual anthropogenic mercury emission of 4.26 t calculated based on the data in this work or from Huang et al. (2011).

Re: The annual anthropogenic mercury emission calculated here is based on the TGM/CO ratio in our work and the annual CO emission in Huang et al. (2011).

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 25037, 2012.