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

**Anonymous Referee #2**

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This manuscript presents a one year of continuous measurements of atmospheric TGM concentration at an urban site in East China, which is one of most polluted areas of China. The sampling method is sound. The presentation of result and discussions are in overall good. Except some discussions which should be further explained, I did not find any significant errors in the manuscript. Therefore, I suggest that this manuscript could be accepted after some major revisions. The contribution of natural sources to the TGM distributions were highlighted in the manuscript, which were based on the discussions of seasonal cycles of TGM, relationships between TGM and air temperature and solar radiation, as well as ratios of TGM/CO in cold and warm seasons. This is an important approach for evaluating the effect of natural sources on atmospheric Hg distribution; however, I would like the author to address more detailed discussions in this section. Firstly, natural emissions in urban areas are supposed to increase because

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reemissions of historical deposition of Hg or industrial pollutions. Feng et al. (2004) measured soil Hg fluxes in Guiyang city and demonstrate that soil Hg emission could be a significant contributor to the local atmospheric Hg budget. However, the seasonal TGM variation in Guiyang did not exhibit summer maximum. And I also noticed some other inland cities including Chongqing and Beijing showed maximum TGM in winter. So, what is the difference between Najing city and other cities mentioned above? Secondly, have the authors examined the relations between city predominant wind and seasonal TGM cycles. If the sampling site was located downwind of industrial sources, it may be possible that the summer maximum was resulted from industrial sources. For the TGM/CO ratios in winter and summer, it is not very clear whether they were directly related to natural and anthropogenic sources. Plumes from coal power plants in general have very high tGM/CO ratio, but some other sources like non-ferrous activities, small boilers, vehicles, etc. may have much lower TGM/CO ratios. If the site in summer were affected by the combined effect of many kinds of sources, the less pronounced correlation between TGM and CO should be expected. I think the authors should convince me by more discussions. The sampling site was close to a major road, did the emissions of vehicles affected a lot to the observations? What kind of sampling tube did you use, how long was it? Are you sure that your measurement of mercury contains all the RGM portions as you mentioned that the measured atmospheric mercury was TGM. Did you make a precision test for the GEM measurement? If not, you should not declare your accuracy of 5% in this study because instrument and field environment are quite different in some studies. Figure 15 is not clear enough, and it is better to present a colorful digraph.

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

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