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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Long-term monitoring of atmospheric total gaseous mercury (TGM) at a remote site in Mt. Changbai area, northeastern China" *by* X. W. Fu et al.

**Anonymous Referee #2**

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Overall the paper is relevant to the atmospheric community but requires some significant modification before being published. My comments on this paper are as follows: 1. Two years is not a long term study. This needs to be readdressed in the text as such. 2. One overall issue that needs to be addressed when comparing the 2 sites and indicating a change over time is the site characteristics. From my reading, Mt Changbai is in a forested area – what is the differences between these 2 sites (in terms of foliage etc) if any. Figure 1 is unclear and doesn't provide the reader a good sense of the differences between the locations. It is challenging to read and needs to be of better quality. Was there ever simultaneous measurements at both these sites in order to ensure comparability of the 2 data sets? 3. In section 2.2 you indicate that the sur-

rounding areas were characterized by plat terrain and thus the meteorological data is comparable. This needs to be defended and also is confusing as I thought both sites were forested and measurements were above the canopy. 4. TGM is considered RGM + GEM. If you have a filter on the inlet on the outside of the sample line, are you sure you can measure TGM? The sample line is very long, is it heated all the way to make sure that all the RGM reaches the instrument? This needs to be addressed in the experimental section. 5. What was the data treatments? Was the data quality assured? If so, by what process? How did you determine the detection limit of 0.15ngm-3 as stated in section 2.2? 6. Section 2.3 discusses the PSCF analysis – I am not an expert in this area and thus am assuming that this is a reasonable approach. Please refer to comments, if any, from the other reviewer on this subject. 7. Figure 2 looks like you plotted the raw data. Need more details on what this data is. . .5 min, 30 hourly averaged? 8. Section 3.1. The TGM data look more than intermittently going above the 1-2 ng m-3 northern hemispheric range (which needs to be referenced). 9. The mean TGM is lower over this time period when this data was collected. Were the other measurements that you compare this data to collected around the same time period, same seasons etc? 10. Please reference the remote areas in Europe and North America that have average annual concentration from 1-2 ng m-3? Slemr reported 1.7 in 2003 and has updated it to be lower more recently. The range is important to discuss, the median and maxima as well. It's a bit misleading to compare this data to background sites in other areas without considering all the data and not just the mean for a certain time period. 11. I am surprised that there is no discussion of TGM uptake by the forest. This could be a wonderful discussion and rationale for differences between this and other sites in the country. This should really be added into the discussion of this data. 12. Have you done back trajectory analysis to look at source areas and specific plumes from Korea? (section 3.2) 13. page 4426 – I don't understand the relevance of opening season (Figure 5)? Where is Baihe? Please indicate what sources there are and what the context of this local town is to the data. 14. Figure 5 should be cleaned up in terms of the x-axis; properly label the times and indicate data averaging in the title 15. Page



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4427 – line 5. Before you had said there was no seasonal variation. Please clarify. 16. Page 4427 line 19 – what are the PSCF factors? Have they been specified in the text? Figure 4 is not clear – needs to be of better quality. 17. page 4429 line 5. I'd like to see this looked at in more depth as this is likely an important issue with regards to this site 18. Page 4428 - line 9-in reference to Figure 7, why is the summer so different than the other seasons for the diel cycle (diurnal is reflective of solar radiation, diel is reflective of time of day) 19. Figure 8 needs to have the x axis cleaned up and more descriptive in the figure caption. 20. page 4430 – line 12 – I don't really see how this paper shows that this is indicative of remote background concentrations. You haven't convinced me of that.

Editorial comments: Page 4418- line 2 – biennial is not properly used in this sentence Page 4418- line11 – nothing is obvious – remove that word Page 4419 – line 4 – reference needed Page 4419 – line 13 – add Slemr and Ebinghaus references Page 4419 – lines 16-19 – rephrase, awkward sentene Page 4419 – line26 – referenece needed after China. Page 4420 – line 2 – doesn't make sense to start the sentence with Nevertheless Page 4420 – line 21 – doesn't make sense to use in-turn in this sentence Page 4425– line 23 – define long range transport Page 4426 – line 5 – add reference after CBS Page 4426 – line 16 – do not start the sentence with besides

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 4417, 2012.