

## ***Interactive comment on “Two new sources of reactive gaseous mercury in the free troposphere” by H. Timonen et al.***

### **Anonymous Referee #2**

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I was a bit confused by this manuscript. Anytime there are the right oxidants in the atmosphere, elemental mercury will be oxidized. I do not think that it is surprising at all that oxidation is occurring in anthropogenic pollution plumes. I always assumed that this would be the case.

Apparently, the authors have not seen the recent paper by Dibble et al. (ACP, 2012). They should read it if they have not. It might change their box model calculations.

I believe that the title and a few of the statements in the manuscript need to be edited. In particular, the last sentence of the abstract is off-base. To me this certainly did not change my conceptual understanding of the formation and distribution of oxidized mercury in the atmosphere. I have always assumed that it was going on throughout the troposphere; it is just very difficult to observe a slow process with such small mixing

ratios. Another sentence is in the Introduction section, lines 18-20. Again, this seems to be a startling statement. Whoever assumed that oxidation was only occurring in the stratosphere?

One other comment is that I think the authors should use mixing ratios in parts per quadrillion by volume (ppqv). If you talking trace gases why use mass concentrations?

In summary, I think that the authors should change the title to refer to oxidation of elemental mercury in anthropogenically influenced air mass. Then, they should re-assess the overall content of the manuscript and focus on oxidation in anthropogenic air masses. In other words, drop the drama and focus on the science.

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 29203, 2012.

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