

## ***Interactive comment on “Worldwide atmospheric mercury measurements: a review and synthesis of spatial and temporal trends” by F. Sprovieri et al.***

**F. Sprovieri et al.**

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Anonymous Referee # 4: A review like this one is much needed. This topic is relevant to ACP. The methods are largely sound. I have listed below items that have caught my attention.

### **Methodology**

Referee # 4: I could not find what kind of search methods were used to find the studies reviewed in this paper. For example, key words used; publication or study time periods within which the search were conducted; scope of the search, i.e. peer-reviewed journal papers only, or reports and conference papers included as well.

Response: Dear Reviewer, all authors involved in this manuscript have started publish-  
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ing papers on the subject more than 20 years ago, therefore they know very well who does what and are able to select the peer-reviewed papers that are consistent with the present manuscript. In case key publications have been missed, we would be pleased if you will suggest those that in your opinion are fundamental to refer to in this paper, we would certainly take advantage of your input.

Referee # 4: I agree with the previous reviewer that some papers were mentioned but not discussed. It would be nice to state clearly what kind of studies will be discussed.

Response: We have revised the whole manuscript according to the reviewers suggestions.

Referee # 4: In addition to the data in the references suggested by Dr. Feng, some studies conducted in Quebec and Ontario (Toronto and Windsor) Canada may be worth consideration.

Response: It has been done in the revised text. Please see section 2.4 of the revised manuscript.

Referee # 4: The title of this paper is “spatial and temporal trends” of atmospheric mercury. The authors may want to condense some summaries thus make room for more comparative reviews, for example, temporal trends at different time scales (i.e. diurnal, seasonal, and inter-annual). Furthermore, some discussion on the percentage of the studies reviewed that had one kind of trend (hypothetically summer high winter low) and the reasons of those observations, and the percentage of the studies that had another kind of trend (hypothetically summer low winter high) and the reasons. Identification of similarity and heterogeneity in the published findings will strengthen this paper. Moreover, there are other aspects of the network including the study design, instrumentation (continuous vs. integrated, detection limits), whether other pollutants and meteorological data were collected at the same site.

Response: Thanks for the suggestions. We have changed the title accordingly.

Referee # 4: The authors mentioned in several occasions that the atmospheric modeling sector will benefit greatly from a well designed and well functioned global monitoring network. However, such a network serves the scientific community in other aspects as well. Firstly, the relation between emission trend and regional/global concentration levels reveals source-receptor relationships. This kind of information will help policy making. Above all, the dataset from a comprehensive network would provide with us valuable information of the mechanisms and parameters that control the transport, transformation and removal of atmospheric Hg. For instance, formation rate of Hg(p) in urban environment with fresh (manmade) particles could be different from that with aged particles or sea salt particles. In my opinion, our modeling tools are far from being great to represent those processes due to knowledge gaps.

Response: We fully agree with reviewer's comments – the group involved in this paper just got approved a research proposal from the EC aiming to build a Global Mercury Observation System (GMOS) that will include nearly 30 ground-based monitoring sites, aircrafts and oceanographic measurement programs as well as regional and global scale atmospheric mercury models validations and applications to different emission scenarios. GMOS will contribute to fill some of existing gaps highlighted by the reviewer.

Referee # 4: Editorial suggestions I too feel that the readability could be improved, by avoiding run-on sentences and long paragraphs (sometimes more than 2 pages), and rephrasing a few awkward sentences.

Response: It has been done quite extensively.

Referee # 4: Some of the references seem pasted in from another report without a proofreading. For example, page 1291, lines 11-14, had a 2002a but no 2002b to be found. Also see L29-32 on the same page, and pg 1295, 1300. Some references should be recorded (e.g. pg 1290, 1294, 1296, 1298, 1299).

Response: We revised the references of the manuscript. We cited for example, two  
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references of the same leading author for the same year using (a) (i.e., page 1291, lines 11-14, as 2002a) to distinguish from the other paper published also in 2002. Therefore, you will not find within the reference list that cited as 2002b. The same criteria has been followed for the other references.

Referee # 4: Abstract. It is a bit hard to follow. Suggest reorganize by objective, methods, major findings and recommendations.

Response: It has been re-written completely following the reviewer's suggestions.

Referee # 4: Instruction. It is a mixture of introduction, an overview of the current status of monitoring networks, some detailed review of monitoring studies leading to the need of better networks to refine and validate models, and objective. I would suggest the following structure: introduction, the need of better networks to advance sciences, aid policy making, and help model improvement and validation, objective, methods of literature search and discussion. Move the overview of current status of monitoring networks to Results and discussion.

Response: The Introduction was revised taking advantage of the reviewer's suggestions.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/10/C2633/2010/acpd-10-C2633-2010-supplement.pdf>

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