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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Current Understanding of the Driving Mechanisms for Spatiotemporal Variations of Atmospheric Speciated Mercury: A Critical Review" *by* Huiting Mao et al.

Anonymous Referee #2

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General Comments

This critical review presents a survey of a large body of literature regarding the spatiotemporal variations in speciated atmospheric mercury concentrations in a variety of environmental milieu (oceans, continents, high elevation, the free troposphere, and low to high latitudes). The authors are to be commended for pulling together such a body of work in an attempt to describe the current state-of-the-science as well as present current understanding, knowledge gaps and future necessary directions in this field. The manuscript is very long and at times repetitive and should be revised to make it more succinct.

Specific Comments Suggested revisions The summary and recommendations section

could be shortened considerably. Consider using bullet points especially for the "outstanding unresolved questions" section, e.g., this reviewer believes that point 1. could be condensed into – "Measurements in the southern hemisphere especially terrestrial locations are needed" while for point 2. Lines 1519-1520 capture the essence of what you are trying to say. Similarly points 3.,4. and 5 can be simplified with bullets.

This manuscript discusses work that spans decades. The authors have described published work along with literature interpretation. They should also provide their own interpretation of this body of work. Has the work led to greater understanding and if so why? With a view to the future should we continue using the same approaches?, the same measurement-based studies? Are innovative solutions needed to address the knowledge gaps delineated in the unresolved questions sections? If so, what are they?

Line 86 should be corrected to read "Statistics from studies prior to 2009 are referred to in Sprovieri et al. (2010b)"

Line 1029: is there a citation that can be used with this statement?

There is a tremendous amount of important data in the six tables in the supplementary information. This information could be made more appealing if presented on a plot showing latitude, longitude and concentrations.

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