

Interactive comment on “Thermodynamics of reactions of ClHg and BrHg radicals with atmospherically abundant free radicals” by T. S. Dibble et al.

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Reply to comments by M.E. Goodsite (Referee)

1) ... This paper could be published as is without further revision, but a more in depth discussion, though not absolutely necessary for this article, would add value to the paper.

Reply: We thank the reviewer for his generous comments and his suggestions.

2) As a minor correction, I recommend that the authors cite: P.A. Ariya, H. Skov, MML Grage and M. E. Goodsite, "Gaseous elemental mercury in the ambient atmosphere:

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Review of the application of theoretical calculations and experimental studies for determination of reaction coefficients and mechanisms with halogens and other reactants", *Advances in Quantum Chemistry*, 55: 43-55 (2008)...

Reply: We will include this reference in the revised manuscript.

3). . . Other reviews also might be relevant in the introduction or discussion: such as: Parisa A. Ariya, Kirk Peterson, Graydon Snider and Marc Amyot, *Mercury Chemical transformation in the gas, aqueous and heterogeneous phases: State-of-the art science and uncertainties*, book chapter 15, *Mercury fate and transport in the global atmosphere*, Pirrone and Mason editors, Springer, pp, 459-501, ISBN: 987-0-387-93957-5 (2009); however a review from Subir et. al., (2011) is cited and probably is sufficient for the purpose of discussion in this paper.

Reply: We believe that the existing references are sufficient.

3) The authors might also develop their discussion more, as to what exactly their calculations could mean for the fate of mercury. The authors do an excellent job of discussing what follow up studies should be conducted in the field and in the laboratory to address new scientific issues arising from their studies, so this could be the subject of another short review, rather than lengthen this paper; though I feel that a more in depth discussion would add additional value to the paper. I have no technical corrections to suggest. The paper with all of its figures, tables etc. are publishable as is.

Reply: We plan to add comments on how gradients in temperature and Br concentration will heavily influence Br-initiated RGM formation in the free troposphere, and relate these issues to measurements of RGM.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 17887, 2012.

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