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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Mercury vapor air–surface exchange measured by collocated micrometeorological and enclosure methods – Part II: Bias and uncertainty analysis" *by* W. Zhu et al.

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Response to comments on "Mercury vapor air-surface exchange measured by collocated micrometeorological and enclosure methods – Part II: Bias and uncertainty analysis" by W. Zhu et al.

Anonymous Referee #1: We thank the reviewer for the positive comments on our manuscript. Our point-to-point response to the specific comments and questions is given below (in blue). Additional editorial revision has been incorporated in the

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manuscript.

Comment #1: page 4644, line 18, the authors mentioned water condensation, do you think there might be certain chemical reactions that could occur in the water inside the chamber and inïňĆuence ïňĆux measurement? Response: Concerning atmospheric Hg forms, the water film would primarily scavenge GOM present in the flow-through air while Hg0 will insignificantly partition into the aqueous phase. The resulting dissolved Hg(II) species will be available for redox and complexation reactions. However, the formation of specific reactive Hg(II) complexes, e.g. HgSO3 and Hg-dicarboxylates, is required for reduction pathways to gain importance. Given the low ratio of GOM/Hg0 in ambient air (typically less than <2%, Gustin and Jaffe, 2010), it is most unlikely that aqueous-phase reduction of dissolved GOM will have a measureable contribution to Hg0 in the outgoing air. Even if this was the case, the contribution will be incorporated into the chamber blank and accounted for. Gustin, M., Jaffe, D., 2010. Reducing the Uncertainty in Measurement and Understanding of Mercury in the Atmosphere. Environ. Sci. Technol. 44, 2222-2227.

Comment #2: for dynamic chamber, the bias varies with hour of day, is there any way to correct the bias? Response: The bias induced by the modified environmental conditions present within the chamber was assessed by using an empirical relationship established between in-situ measured fluxes and observed controlling environmental variables (Section 3.4). In future studies, sufficient measurement is required to generate site-specific prediction terms to correct the flux bias for a specific chamber type.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 4627, 2015.