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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Passive air sampling of gaseous elemental mercury: a critical review" *by* D. S. McLagan et al.

Anonymous Referee #2

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Mercury is a pollutant of global concern and is distributed worldwide mainly via atmospheric transport. Therefore, monitoring of mercury concentration in the atmosphere is important. However, because of the issues associated with the commonly used active sampling devices, such as high cost, electricity requirement, and well-trained personnel for operation, monitoring activities of atmospheric mercury are mainly limited to developed countries or affluent regions. Passive air samplers of atmospheric mercury are gaining popularity recently because of their lower cost and simplicity to operate, and no need for electricity. These advantages of passive air samplers can extend ambient mercury monitoring to developing countries and remote regions and thus enhanced the spatial resolution of measurements. This manuscript, instead of giving a detail review of the existing passive air samplers for gaseous elemental mercury (GEM), focuses

mainly on the developments of passive air samplers of GEM and discusses whether existing samplers meet these requirements. In general, this manuscript is well written and organized, and is timely for an important topic. Therefore, I think this manuscript can be accepted for publication in Atmospheric Chemistry and Physics by addressing the following comments.

1. Switch the order of Section 2 (Basic elements of passive air sampling) and Section 3 (The rationale for a passive air sampler for gaseous elemental mercury). It seems more reasonable to first provide the rationale for passive air sampling of GEM in the beginning of the manuscript then followed by presenting the basic elements of passive air sampling, which is then followed by discussing the requirements of passive air samplers for GEM.

2. The authors discussed potential problems with sorbents in existing samplers, such as passivation, memory effects, and physical degradation. However, in addition to those issues, how to assure that the adsorbed or absorbed GEM is not lost due to reactions with other constituents of the atmosphere, such as ozone and water vapor, because passive sampler is often used for longer sampling intervals (weeks or months)?

3. This manuscript focuses on the discussion of passive air sampling of GEM, not on the review of existing devices, and thus the existing passive air samplers for GEM are only briefly presented and summarized in Section 5, Table 1 and Figure 2. This may be fine for those who are familiar with these devices. However, for those who are interested but do not have experience with these devices, it may not be easy to understand this information. Therefore, I would suggest the authors to expand Section 5 to include an introduction of existing PASs for GEM and the guidelines for the selection of proper PAS for various purposes.

4. The title of right-hand side y-axis should be Uptake Rate instead of Sampling Rate? According to the definitions in page 34610, it is the Uptake Rate that will change over

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time, not the Sampling Rate, right?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 34605, 2015.

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