

## ***Interactive comment on “Global evaluation and calibration of a passive air sampler for gaseous mercury” by David S. McLagan et al.***

**Anonymous Referee #1**

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This paper provides data from around the world collected using a GEM passive sampler. Based on previous work with GOM passive samplers Huang and Gustin 2015 I doubt that this system collects GOM. I appreciate the effort to get so many people to collaborate.

The paper is well written, and the figures and tables relevant. I think it would be really useful if the authors would make the sites as they have separated them out in the text as urban, rural, and high elevation with different symbols on Figure 3. I wonder also if it would be useful to make a graph that shows correlations of sampler uptake concentrations with Tekran concentrations that plot data based on the time resolution instead of lumping all into one figure?

The limitation of this method is the long time resolution and lack of collection of GOM

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that is really the atmospheric form of most concern. The authors need to be honest about this. If there are short higher periods of exposure of GEM would the sampler resolve this in anyway given the very long sampling time? I also wonder about the activated carbon material. Is the uptake only surficial or can Hg penetrate into the interior given the design of the sampler? Some discussion of the past use of this sampling system for other gases should be mentioned (O<sub>3</sub>, nitrogen compounds) as well as any limitations.

Linear regression is not R<sup>2</sup> it is r<sup>2</sup> and these should be associated with a p-value. I also am not sure of the utility of this method overall. I would personally not promote this as a device that could be used for personal exposure sampling especially since GEM concentrations measured are so below the human health exposure limit. This certainly needs to be tested before being promoted.

Figure 1. I think it is misleading to present lines for 2 points and even 3 when the intercept starts with the blank. The blank has been subtracted from the sample so I am not sure if it is a relevant point. I think it might be more appropriate to just present data from each location with the same time resolution. This may better illustrate the different slopes. Just a thought.

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