

## ***Interactive comment on “In-situ and Denuder Based Measurements of Elemental and Reactive Gaseous Mercury with Analysis by Laser-Induced Fluorescence. Results from the Reno Atmospheric Mercury Intercomparison Experiment” by Anthony J. Hynes et al.***

**Anonymous Referee #1**

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This manuscript summarizes the results obtained with a two-photon technique applied to measuring atmospheric mercury. It put a new perspective on the results of the RAMIX inter-comparison which in my opinion is more accurate than two previously published papers.

P. 4, line 124 – Your inlet was 25 feet long and made of Teflon (type unknown). Teflon is OK for passing elemental mercury, but it has memory problems when going from high to low mixing ratios. Did you determine the passing efficiency of the tubing that

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was used and check for memory (passing zero air through it after sampling air)? This memory problem is not obvious unless it is carefully checked. It may have influenced some of your results. RGM will also stick to that length of Teflon tubing. This may also have influenced your results (TGM).

P. 4, Section 2.3 – Measuring TOM by difference is tricky to accomplish accurately, especially in ambient air. What was your estimated LOD for TOM using this method? How was the uncertainty determined?

P. 6, lines 184 ... - These syringe injections can be difficult to duplicate with high precision. Did this add additional uncertainty to your data?

P. 7, lines 230-233 – I agree that these changes are highly unlikely to be caused by chemical reactions in the manifold. This was a dark environment presumably without photochemical processes occurring.

P. 8, line 258 – I agree that the calibration of the elemental mercury spikes in the manifold must of have much higher uncertainty than stated by the operators.

P. 8, lines 273-274 – This is hard to rationalize and it points to the need for a new blind inter-comparison done with third party observers as suggested in this manuscript. The NSF and NASA inter-comparisons are an excellent example of how these should be conducted.

P. 16, lines 563 ... - This all points to the need for better calibration of all instruments and a more carefully conducted inter-comparison. The LIF system is capable of finding problems not apparent with the two Tekrans.

In summary, this manuscript emphasizes the need for a more carefully conducted inter-comparison for atmospheric mercury.