

General comments:

The paper's contribution is very commendable as it reports the isotope composition of particulate Hg in marine background air, where previously only the isotope composition in precipitation samples was reported. However, there are shortcomings, generalizations and less substantiated assumptions that require revision of the manuscript. The manuscript is surprisingly short and some parts need "more meat on the bones". Furthermore, the level of English should be improved and, above all, a reader of Atmos. Chem. Phys. must require that the authors lead a deeper discussion.

Many figures are busy and difficult to understand.

Specific comments:

The abstract is full with speculation.

L21 "The correlation between $\Delta^{200}\text{Hg}$ and light conditions confirms that even-MIF is linked to photochemical reactions". If these refer to Fig. 6, several of these are weak and not always unambiguous. Please add confidence intervals. Why has the data from cruise B and C been combined? It is also difficult to explain that the highest $\Delta^{200}\text{Hg}$ values tend to occur during cruise A when the light conditions were relatively low

L45 "dark abiotic redox reaction" The wording may seem inappropriate to express atmospheric transformation.

L46 Reference 2 is out of date and does not specifically apply to atmospheric transformation. The authors should cite publications that state the current paradigm regarding atmospheric redox processes, including Shat et al. EST 2021 etc.

L114 "To reduce the potential for contamination from the ship's exhaust plume, sampling was stopped during station work and when bad weather was encountered". This is a surprisingly crude procedure to segregate internal contamination. There must be windy conditions when the plume contaminated your samples. This can be seen, among other things, in CO/O₃ ratios (if these were measured). Please comment on this.

L117 Isn't there a risk that GOM is caught on the filters and contributes to measured PBM values?

L134 it is significant disadvantage for a study that claims the troposphere as the source of even-MIF without measuring ²⁰⁴Hg. This information would have been invaluable.

L314 What is meant with RGM? Not defined.

L335 What is meant with TGM? Not defined.

L481 Awkward and vague. "Hg was photoreduced in oxidized Hg phases at high altitudes"
Oxidized Hg phase???

L512 "The isotopic compositions of PBM in the MBL of the Northwest Pacific suggest that the even-MIF and odd-MIF signatures are useful tracers for identifying atmospheric transformations". The opening of the conclusion promises too much. What follows is pure speculation.

Fig 7. The selection of data for Fig. 7 is highly subjective. The referenced publications contain more data that is omitted. The interpretation of measurement data as examples of the proposed transformation paths is self-imposed and mis-leading.