

Response to Anonymous Referee #1

The manuscript addresses atmospheric mercury concentration changes and trends. No new concept, method or insight in time series/trend evaluation are presented. The authors based on the relation with ^{222}Rn , CO , O_3 , and CH_4 , exploit the possible reasons for the trend change. A more ambitious goal could be target assessing the strength of each one of these species on mercury concentration changes applying probabilistic mass function in rotational matrix factorization.

We show in this and the companion paper that mercury is unique in that its sources are predominantly oceanic whereas the sources of all other investigated species are predominantly terrestrial. We think that a more elaborated statistical treatment without a specific tracer for oceanic emissions here and in the companion paper would only confirm this finding without any additional insight.

Line 36: I am afraid calling this trend, seems more annual comparison. Trend evaluation for so short period could be misleading since it can be affected by seasonality (for example, starting the time series in winter and finishing in autumn or starting summer/spring and finish in winter/autumn). It also can be affected by starting or finishing the time series in an El Niño year.

We agree that trend estimations for short periods may be misleading. With the exception of 2007 at Cape Point (measurement since March) the measurements covered whole years. The trends for the 2012 – 2017 period were calculated mainly for comparison of Cape Point with Amsterdam Island. Both should be affected by El Niño and most of the other teleconnections in the same way.

Line 54-56: decrement of North Atlantic Ocean emission is rather a hypothesis than a scientific statement.

All the works cited in this and following sentence are only hypotheses with a varying degree of evidence in their support. We think that there is no monocausal explanation of the observations and would thus hesitate to consider the other works as scientific statements too.

Line 119-120: confidence level missed.

Calculated t of 0.04092 for 70 degrees of freedom is an order of magnitude smaller than P of 0.5 (t = 0.678).

Line 248: Anticorrelations should be replaced by negative correlation or inverse correlation.

Done.

Figure 2 should be replaced for a more informative time series decomposition plot, presenting trend seasonal and random variable in an hour or daily (or at least monthly) time resolution. Such graphic can improve data exhibition, facilitate reader evaluation and can be easily calculated and plotted included by using open libraries for R and Python. Furthermore, the annual median or average is not suitable for trend evaluation since it damp variance and constrain significance.

In the captions of the Tables 2 and 3 we now note that the trends were calculated from monthly averages and medians. Monthly median concentrations at CPT and AMS are shown in Figure SI1. Because of the discussion of interannual variation we prefer to plot annual values in the paper.