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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Multi-year record of atmospheric mercury at Dumo d'Urville, East Antarctic coast: continental outflow and oceanic influences" *by* Hélène Angot et al.

Anonymous Referee #1

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This paper presents the first multi-year dataset on atmospheric gaseous mercury from Antarctica, and places the results into context by describing the meteorological and other atmospheric processes responsible for the patterns observed. Although some periods of time do not have data owing to technical failures, data are presented for at least a good part of each year for over three years. I rate this MS very highly. The paper itself is well laid out and clearly written, and is comprehensive in its discussion of the processes and implications of the results; the quality assurance is clearly described and appropriate. More than anything else, the paper is the culmination of several years of careful measurements on Hg in air and snow, conducted under logistically challenging and very remote conditions. All in all, the team is to be congratulated on

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this achievement. My comments below are minor and editorial in nature.

L. 30. Abstract should end with summary of the implications.

L. 43. The sentence beginning “Mercury can be. . .” is too brief, and misses out mention of the photo-reduction step in re-emission.

L. 304-305. These lines present BrO and NO2 “mixing ratios”, but are not the data presented actually concentrations?

L. 328. The p value is incorrectly expressed as it is – the exact value looks to be the p value, not less than this value. The format is wrong as well. I would suggest simply “p<0.0001”; more precise than this is pointless.

L. 330. Seems to be a missing word or phrase after the Angot et al. (2016) reference.

L. 337. Insert a new heading for this following text on snow Hg results.

L. 391. Paragraph ends abruptly. Needs more explanation of what the other processes could be to explain the daily Hg(0) cycle.

L. 399. By “snow accumulation” I think you mean “snowfall” or “wet precipitation”; are you saying here that scavenging of Hg(II) by higher rates of snowfall on the coast is responsible ?

L. 411. How likely is it really that Asia – which is separated from Antarctica by tropical and sub-tropical regions with extremely high rates of photo-oxidation and rainfall (scavenging of Hg (II)) – will contaminate Antarctica?

L. 419. When you write “turn left”, I think you mean “turn west” (?).

Figure 11. I recommend deleting this figure. Its only purpose is to show seasonal changes in sea-ice around the DDU site. But one could simply refer to the sea-ice dataset on the website to support your statement about this. In any case, the scale is insufficient for a reader to clearly see anything changing around DDU.

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