

## ***Interactive comment on “Five-year records of Total Mercury Deposition flux at GMOS sites in the Northern and Southern Hemispheres” by Francesca Sprovieri et al.***

**Anonymous Referee #1**

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General comment:

The manuscript presents description and analysis of measurements of Hg wet deposition from the newly established GMOS monitoring network. Both spatial trends and seasonal variation of Hg concentration in precipitation and wet deposition fluxes are analyzed in relation to diverse meteorological and climatic conditions. Peculiarities, of Hg deposition in different locations are discussed including sites located in Europe, Asia, in the Tropics and in the Southern Hemisphere. Various factors affecting Hg wet deposition are considered. The subject of the manuscript is relevant to the scope of the journal and the work makes up a new and original contribution. The manuscript will be suitable for publication after addressing the specific comments mentioned below.

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Specific comments:

Title: Commonly, “total deposition flux” means sum of wet and dry deposition. There is no discussion about Hg dry deposition in the paper. So, probably, “Five-year records of wet mercury deposition flux ...” would be more proper title for the paper.

Page 2, line 19. *“...in both depositional flux and concentration with the highest values...”* Page 2, line 25. *“...coastal sites receiving higher Hg concentrations and depositional Fluxes...”*

Concentrations in air or in precipitation are mentions here? Please, specify to avoid misleading.

Page 2, lines 27-29. *“...gaseous evasion of Hg from marine waters is a significant global source of atmospheric Hg and may also contribute to elevated depositional fluxes in coastal regions...”*

Wet deposition is mostly comprised precipitation removal of highly soluble oxidized Hg. Significant Hg evasion from the ocean, which is in poorly soluble elemental form, does not necessarily mean elevated deposition. Oxidation of GEM to GOM is essential.

Page 2, line 34. *“...the EMEP program ... the GMOS”*

These acronyms which appear for the first time require explanation and references.

Page 2, line 33 – Page 3, line 1. *“Long-term Hg wet deposition measurements exist at many locations within the United States as part of the MDN or in Europe as part of the EMEP program; however, before the establishment of the global Hg network by the GMOS, long-term of ambient Hg concentrations and measurements of Hg wet deposition fluxes were lacking”*

The second part of the sentence contradicts the first part.

Page 6, Section 2.3. What were the criteria of data coverage for calculation of annual and seasonal mean values? As it follows from Tables 2-3 and Figs. 1-3 the annual

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data are not available for all the stations for all years.

Figs. 1-3. The bars at the diagrams are very thin that makes difficult reading the figures.

Page 8, lines 9-12. "*Deposition of atmospheric Hg at any given location is influenced by factors such as. . .*"

Since Hg deposition mostly consists of scavenging oxidized Hg forms (GOM or PBM) the list of factors should also include the oxidizing capacity of the atmosphere. The oxidation chemistry can be a dominating factor for Hg deposition at least in remote regions.

Page 10, lines 3. Probably, the units of the average wet Hg deposition flux should be  $\text{ng m}^{-2} \text{d}^{-1}$  instead of  $\text{ug m}^{-2} \text{y}^{-2}$ .

Page 11, line 21. "*. . .showed the lowest both deposition amount (264.9 mm) and. . .*" Should it be read as "precipitation amount"?

Pages 27-28. The Conclusions are too general and does not contain any particular findings on spatial trends and seasonal variation, factors affecting Hg wet deposition etc.

There are also numerous typos throughout the text which need spell-checking.

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