Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2019-1107-AC4, 2020


Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "4D dispersion of total gaseous mercury derived from a mining source: identification of criteria to assess risks related with high concentrations of atmospheric mercury" *by* José M. Esbrí et al.

**José M. Esbrí et al.**

josemaria.esbri@uclm.es

Received and published: 3 June 2020

This manuscript offers monitoring alternatives for contaminated areas that seem to offer very significant results in mining areas such as the chosen one. In the context of emission reductions required by the Minamata Convention, these procedures should offer valuable information about the evolution of the gaseous Hg concentration values in areas with real problems of risk for people.

Thanks for this suggestion. The new scenario generated after the approval of the



Printer-friendly version

Discussion paper

Minamata Convention and its ratification by 120 countries will mean a major change in the levels of Hg available in the environmental compartments. This expected reduction should be monitored, to assess the evolution of the process and assess the adoption of more restrictions if the desired objectives are not achieved. In this sense, our systematic monitoring approach should offer comparable results over time and significant conclusions. Considering the importance of this suggestion, we have decided to include in the abstract a short sentence that indicates this aspect: "Furthermore, these systematic monitoring strategies can offer significant information in the context of the Minamata Convention emission reduction scenario." In addition, this is also commented in the last paragraph of the discussion section, which is now: "This approach is applicable with little variations to any area affected by diffuse Hg emissions, but will require adaptations if Hg emissions are active, whether it is anthropogenic (mostly industrial) or natural (volcanic related). In these cases, the monitoring procedures must be extended to the emission processes, with the aim of incorporating these data into the built model. In this way, the model will also serve to foresee changes in emission rates, either due to changes in technology in industrial activity, due to changes in emission patterns in natural processes or changes in emissions rates derived of restrictions of Minamata Convention (UN, 2019)." And we have added a reference: United Nation (2019). Minamata Convention on Mercury. Available at http://www.mercuryconvention.org/Convention/Text/tabid/3426/language/en-US/Default.aspx (Last access, 03/06/2020)

Among all the work presented in the manuscript, I am very interested in making transects that can be compared over time, both in daily cycles and at different seasons. The method seems to work well in the chosen mining environment, but I wonder if it would offer meaningful information in an environment with less spectacular emissions, for example, in a bay entering sediments contaminated with cinnabar and native mercury droplets. For the application of this transect monitoring method, is prior identification of the emission sources essential? What phenomena could I register in this case?

The better situation is to know the location of the most important emission sources prior to design the route of the transects, although locations of temporary sources (still unknown) can be incorporated into them, such as flood events that bring sediments rich in cinnabar and mercury droplets. The main advantage of this method of transects in different periods of time is the rapid and low-cost obtaining of comparable information that serves to establish background levels and anomalous levels and their evolution in the different meteorological seasons, in the day/night or in occasional events such as flood events, tides or that considered to have an influence on the activation of mercury gas emissions. As in other situations, prior knowledge improves the effectiveness of the approach.

Otherwise, the manuscript is very well written, and there are only a few minor errors that may have already spotted in the comments above. To name the ones that seemed most striking to me, the term TGM is not well defined on line 47

Done. Now the term is defined as: GEM and RGM constitute 'total gaseous mercury' (TGM).

on line 60 I don't understand the term "forb"

It is not a common term, it does not correspond to a single plant, but to plants with herbaceous flowers.

, and the weather station is unclear where it is in Figure 1.

Done. We have added a detail in the sentence: "The location of this device (WGS84 30S 351714 E/4289255 N) is shown in Fig. 1, in the AWTP Almadenejos."

---

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-1107, 2020.