

## ***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.***

**Anonymous Referee #1**

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General comments: The manuscript “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 Esbri et al. discusses criteria and a minimum amount of information needed to efficiently characterize Hg contaminated site as a result of past mining activities. The authors suggest a novel monitoring design and evaluate it based on results obtained during measurement campaigns in the Almaden mercury mining districts. Overall, the manuscript brings new insights into specific pathways of Hg at contaminated sites, as well as the methodology to determine risks associated

C1

with it. The paper is well written and structured, including visualizations, statistical treatment and the interpretation of the results. However, there are some parts of the manuscript that are a bit unclear in its present form and need to be revised and simplified, respectively. To this end, in the following they are some specific comments and suggestions to improve the quality of this work. Specific comments: - Abstract: In its present form the abstract contains too many details, the second and third paragraphs in particular. It is suggested to rewrite it, focusing on the main outcomes of this work, e.g. relevant criteria and data needs for characterization of contamination and associated risks in the spatio-temporal context. - Line 46: Revise the definition of TGM - Line 64: “altitudes in the range 500-11,000 metres from background and contaminated locations;...” . Not clear. Revise and support with some references. - Lines 73-75: It is not clear what is meant by “Risk assessment”, “...worst theoretical conditions...” and “...the worst-case scenario...”. Revise and provide relevant details. - Lines 80-88: Not clear how the mentioned reference (Deng et al., 2016) is linked with the rest of the paragraph. It is also suggested to shorten and simplify this whole paragraph. - Line 97: Provide more details on the “exhaustive identification” of sources in the study area. By what means these sources were identified? - In Lines 100-103 emission sources in the study area are ranked according to their importance. Based on what criteria? - Line 109: Check if coordinates of AWTP are written in a correct format - Line 115: I suggest leaving out the sentence starting with “This situation gives...” - Lines 242-243: How were the background locations defined and separated from the rest? Technical corrections: - Line 120: Check values indicated in brackets for Lower and Upper Gradient - Lines 174-177: In Figure 2 there are no A, B and C mentioned in the text - Page 19: Location should be mentioned in Table 2 caption - Figure 5: units are not shown for scale bar in Profile 1 and Profile 3, respectively - Figure 9: scale bar is missing

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C2