

Interactive comment on “Emission-dominated gas exchange of elemental mercury vapor over natural surfaces in China” by Xun Wang et al.

Xun Wang et al.

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This paper argues the role and the large uncertainty of Hg emission from natural surfaces, very relevant topic in the study of Hg cycle. Particularly the authors analyze emission of elemental Hg₀ from natural surfaces in China, developing a specific mechanistic model for estimate these. It is very accurate and well described the Section 2.1, which will be useful for further scientific developments. The conclusions reached are interesting, and the methods described in a clear way. I found this paper interesting and I believe it should be published. However, I believe it should be slightly revised.

Response: We thank the reviewer for recognizing the significance of our work, and appreciate the reviewer's constructive comments, which have been addressed in our response to the specific comments below.

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In particular: Abstract, lines 23-25: I believe should be better described the fluxes, in this form there is confusion (even in lines 318-320). Need of Table 3 to understand well the sign (up or down) of the flows. The sentence should be simplified.

Response: We agree and have simplified the sentence as “The net exchange of Hg₀ between the atmosphere and natural surfaces of Mainland China is estimated to be 465.1 Mg yr⁻¹, including 565.5 Mg yr⁻¹ from soil surfaces, 9.0 Mg yr⁻¹ from water body, and -100.4 Mg yr⁻¹ from vegetation” in Line 23-25 and Line 328-329.

line 77: What is DOM?

Response: DOM stands for dissolved organic matter. It has been clarified in Line 75.

line 331: Specify what it refers the percentage

Response: The percentage refers to the fraction of forested area in China. The sentences has been revised as “From 2000 to 2013, the forested area in China increased from 14.0% to 21.6%” in Line 341.

line 336: The future projection is not clear. The sentence should be simplified.

Response: We thank for the reviewer for pointing this out. The sentence has been revised as “Given the forest coverage is projected to be 24 to 26% during 2030-2050 (FAO, 2014), the quantity of natural Hg emission in China would decrease by 9-10% compared to the estimated level of 2013” in Line 345-346.

line 835: Probably should be replaced "is" with "are"

Response: The verb has been corrected.

Figure 4: Set the y-axis in the interval [1,-11] in the two panels.

Response: We have reset the interval for y-axis in Figure 4.

In general the significant digits should be corrected (for example, line 250, tab1, etc).

Response: We have make the number of significant figures consistent with the esti-

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mate throughout the manuscript.

Moreover, can the model (or the most relevant routines) to be made available in the supplementary information? It would be very useful for those who want to deepen or use these results.

Response: That is a very good suggestion. We also plan to publish the code of this model. Given the complexity of this model, we are planning to write a user guide, and will publish these in our website later (<http://www.973hg.org/Default.aspx>).

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