

# ***Interactive comment on “Temporal trend and sources of speciated atmospheric mercury at Waliguan GAW station, northwestern China” by X. W. Fu et al.***

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This manuscript presents an annual variation of total gaseous mercury, gaseous elemental Hg, reactive gaseous Hg and particulate Hg in the atmosphere at an observatory on Qingzang Plateau and identifies the contribution of different source by simulating the transport of atmospheric Hg using PSCF model. The work is of significance for recognizing the global cycle of the atmospheric Hg cycle because the Qingzang Plateau is a sensitive zone of the world. The methodology used is appropriate. The results are clearly presented and support the drawn conclusions except some expression errors and unclear descriptions. Therefore, I recommend the manuscript to be

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accepted after the following comments and revisions.

1. Page 30054, line 25, Should "... in the atmospheric" be "in the atmosphere"?
2. Page 30055, line 6, "depicted as regional and local pollutants due to its high surface reactivity and water solubility." RGM and PHg are plural, so the sentence should be "due to their high surface..."
3. Line 7, "Even through present as a small proportion of total Hg..." should be "Even though..."?
4. Line 10, "pathway for Hg being scavenged from atmosphere and deposited to remote..." should be "pathway for Hg being scavenged from atmosphere and depositing to remote..."
5. Page 30057, Line 20, "...is generally lower than 10 people km<sup>2</sup>" should be "...is generally lower than 10 people km<sup>-2</sup>" or "per km<sup>2</sup>"
6. Page 30059, line 2, "...duration with a volumic flow rate of 10 lm<sup>-1</sup>". The abbreviation of minute should be "min" rather than "m" which represents meter commonly.
7. What is "LT" in line 14.
8. Line 25, "a soda and lime trap was installed in the..." should be "a soda lime trap..."
9. Page 30062, line 6, "...stable level", "...constant level" may be more suitable.
10. Line 7, the author thought the "PHg episodes ... also indicate a more pronounced impact of long-range transport at the sampling site...". They should give a reference or the residence time of PHg in the atmosphere to demonstrate their opinion, because PHg is also regarded as a species of Hg which deposits fast.
11. Page 30063, line 2, "1.62 ngm<sup>-3</sup> for GEM 2.2–9.1 pgm<sup>-3</sup> for PHg, and 1.8–5.2 pgm<sup>-3</sup>, respectively...". The format of the sentence should be revised, like "1.62 ngm<sup>-3</sup> for GEM, 2.2–9.1 pgm<sup>-3</sup> for PHg, and 1.8–5.2 pgm<sup>-3</sup> for RGM, respectively..."

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12. Line 18, "...Hg-enriched air masses originated from and/or pass over India was..." should be "...Hg-enriched air masses originated from and/or passed over India was..."

13. Page 30064, line 21, the authors present that "there were relatively larger differences

14. of TGM concentrations between night and daytime under northeasterly to 25 south-easterly flows than westerly flows." But the difference was only 2.8-8.6 % for TGM. So please provide the statistical evidence to strengthen this view.

15. Page 30067, line 12, the PSCF model thought the "Northwestern India was also an important source region to WLG". The model simulated transport of Hg at three heights, 500, 1000 and 1500 m. We know the average altitude of Himalayas is 6000 m above sea level, which is higher than the simulating height. So if the Himalayas have a strong obstruction to air masses from India.

16. Line 21, "and a small desert was located about 60 km south to..." should be "and a small desert is located about 60 km south to..."

17. Page 30068, line 15, "2008, while the lowest monthly value of..." should be "2008, while the lowest monthly mean value of..."

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