

## ***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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### **Response to anonymous reviewer #1**

The authors are grateful to the anonymous reviewer for dedicating the time to read our paper and raise important issues. The comments are helpful for us to improve the manuscript. We revised the manuscript following each of the comment and all the corrections were marked with red. 1. The previous sentence is too well determined and we made revisions for it as shown in line 15–18 on page 2. 2. The time series plots of PHg and RGM concentrations are shown in Figure 3 on page 25. 3. We made a detailed clarification of calculations of trajectories and uncertainty of the trajectory

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and PSCF analysis in Sect 2.3. The gridded meteorological input data was shown in line 6-10 on page 7. The calculation method including the interval and number of the trajectories were shown in line 23-25 on page 7. The selection of observations were based on the over all mean concentrations of TGM, PHg, and RGM as shown in line 1-6 on page 8. The uncertainty of the trajectory was roughly made by calculating the mean deviation of between forward and backward trajectories originated from the source and receptor location, and the result was shown in line 20-28 on page 8. We did not exclude the 'grounded' trajectories and showed the reason in line 10-11 on page 8. 4. The discussion of the impact of ocean fresh air and Hg emissions on Hg levels of India was deleted. 5. The high PSCF value for PHg in northwestern India was calculated on the basis of 48-h trajectories which have PHg concentrations higher than the overall mean of 19.4 pg m<sup>-3</sup>. The number of the trajectories was shown in line 10-14 on page 13. 6. We agree with the reviewer that detailed discussion of relations of high Hg events and trajectories are helpful to identify the sources. However, we suppose that large number of trajectories analysis including cluster analysis and PSCF analysis may decrease the limitation and uncertainty of single trajectory analysis for pollution event. Moreover, we found that the single trajectory analysis of high Hg events showed similar result of sources in western China and northwestern India as cluster and PSCF calculation (not shown in the manuscript). Therefore, we did not discuss the trajectories associated with extreme high Hg events.

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