Supplementary Information of " Monsoon-facilitated characteristics and transport of atmospheric mercury at a high-altitude background site in southwestern China "

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Table S1: The correlation analysis for the daily TGM concentrations of ISM period and non-ISM period. TGM showed statistically higher concentrations (p=0.021) during the Indian summer monsoon (ISM, from May to September) periods than that in the non-ISM period. The mean TGM concentration in ISM period 2.22 ng m^{-3} and 1.99 ng m^{-3} in the non-ISM period. Air flows originated from South Aisa and Southeast Asia could transport Hg emitted from Southeast Asia and South Asia to ALS during ISM period. Additionally, due to the strengthening of EASM in ISM period, high anthropogenic Hg emission from inland China would inevitably contribute to the elevated TGM concentrations at ALS.

		ISM	Non-ISM
ISM	Pearson Correlation	1	-.180*
	Sig. (2-tailed)		.021
	N	164	164
Non-ISM	Pearson Correlation	-.180*	1
	Sig. (2-tailed)	.021	
	N	164	173

* Correlation is significant at the 0.05 level (2-tailed).

Fig. S1: TGM, GOM and PBM variation from north and south wind basing on the four sampling campaigns. It was very clear that TGM concentrations from north wind were higher than those from south wind to ALS, and GOM and PBM level were also relatively higher from north wind. Southwestern China including Sichuan, Chongqing, Guizhou, and Yunnan provinces is an important anthropogenic source region of China thus the air flow from these areas could suddenly increase the TGM level at ALS due to the long-range transport.

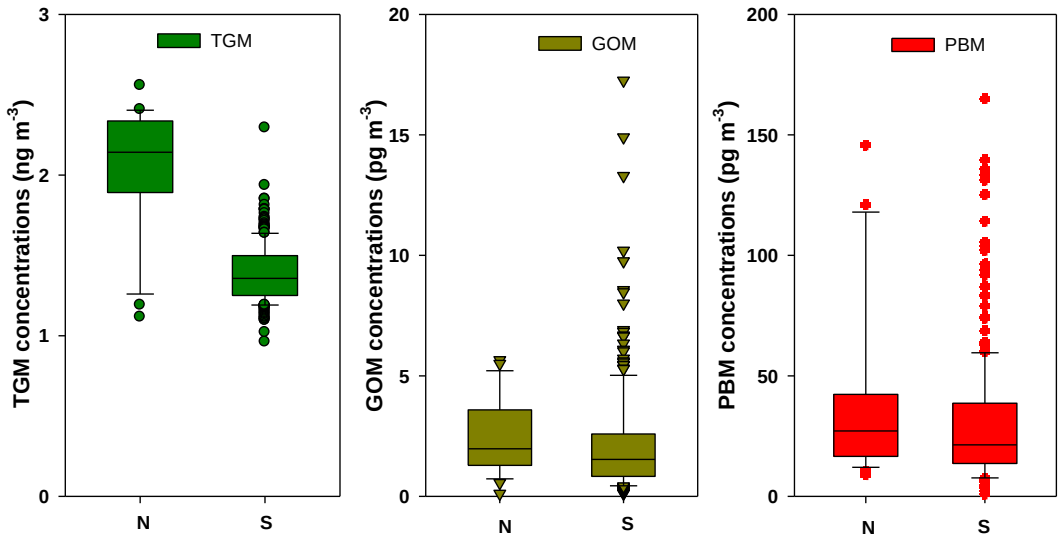


Fig. S2: Three-dimensional height of all the clusters from different direction in ASL**.** Cluster 1 has the highest height and the lowest TGM level, the height of cluster 2 is higher than cluster 3, cluster 4 and cluster 5, and cluster 2 has the highest TGM level (Fig.7). This indicates that the height and anthropogenic emission can affect the long-range transport of atmospheric Hg. Generally, air masses form high altitude has a low GEM concentrations (Shah et al., 2016;Slemr et al., 2009;Slemr et al., 2014),Andreas, Ralf et al. 2016), but if air masses were originated and passed over the area of high anthropogenic emission region, they can transport the Hg from anthropogenic emission region to the remote area.

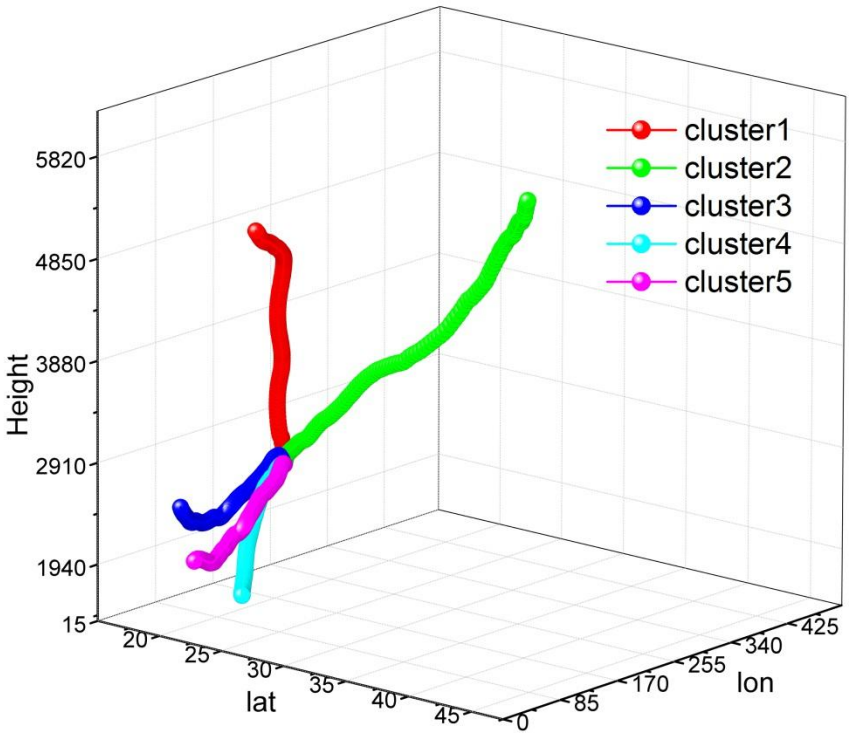
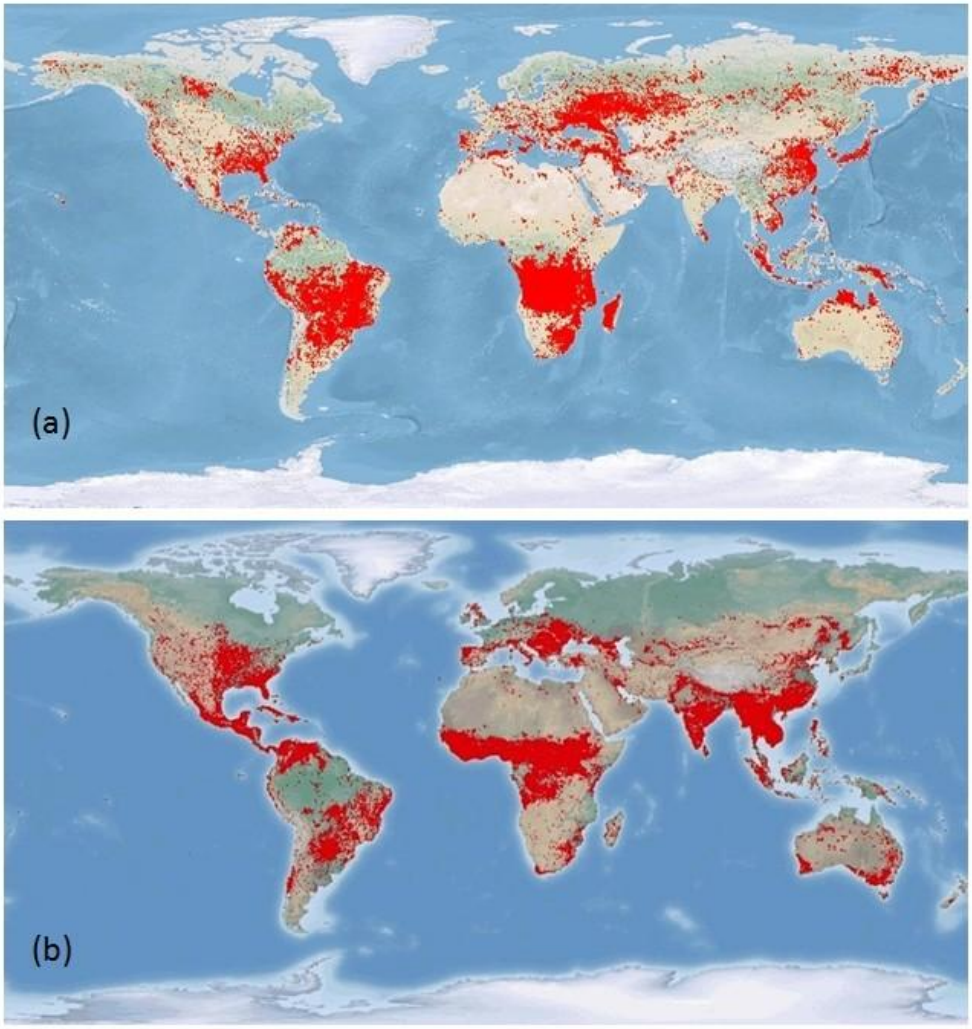


Fig.S3: The composite animations of MODIS hotspot/fire detections from the Terra and Aqua satellites in southeastern Asia and southwestern China during ISM period (May to September 2011) and non-ISM period (October 2011 to April 2012)(https://earthdata.nasa.gov/data/near-real-time-data/firms/active-fire-data#tab-content-7)**.** In ISM period, there were a much lower frequency fire events in Southeast Asia and southwestern China (a). However high-frequency fire events in Southeast Asia and southwestern China were observed in non-ISM period (b), thus the Hg emitted from biomass burning can be transported to southwestern China with the strong south tributary of westerlies in cold seasons.



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