



Supplement of

Speciated atmospheric mercury at the Waliguan Global Atmosphere Watch station in the northeastern Tibetan Plateau: implication of dust-related sources for particulate bound mercury

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Table S1: The monthly means (median) of atmospheric mercury species and meteorological parameters at WLG.

Month	AAI	GEM (ng m ⁻³)		GOM (pg m ⁻³)		PBM (pg m ⁻³)		AT (°C)	RH (%)	Air water content (g m ⁻³)	WS (m s ⁻¹)	RF (mm)	BC (ng m ⁻³)	CO (ppbv)
		mean	median	mean	median	mean	median							
January	0.3	1.89	1.96	24.8	23.8	133.7	127.7	-10.8	18.0	0.34	3.9		303.3	111.6
February	0.4	2.27	2.44	18.1	17.7	162.0	153.5	-7.1	22.4	0.60	5.1	3.0	344.0	124.7
March	0.7	2.36	2.24	12.2	11.5	156.6	152.0	-1.8	34.9	1.44	4.6		446.3	156.6
April	0.7	2.44	2.55	29.3	26.4	54.3	54.8	0.3	35.3	1.72	5.3	1.7	497.7	169.3
May	0.1	1.77	1.55	10.6	7.4	14.9	11.8	2.2	69.2	3.90	4.9	26.7	386.9	140.5
June	-0.1	1.78	1.54	5.7	5.1	24.4	23.1	6.1	56.0	4.19	4.8	35.8	379.8	133.8
July	-0.4	2.08	1.95	2.5	2.5	18.6	18.9	7.7	71.9	6.19	4.4	163.9	351.2	184.9
August	-0.4	1.86	1.89	5.3	5.0	20.5	20.3	8.1	57.9	4.98	4.6	78.8		152.9
September	-0.1	2.18	1.99	9.1	8.1	36.4	36.1	4.0	52.3	3.40	4.2	41.1	451.8	165.3
October	0.1	1.37	1.28	7.4	6.8	21.9	20.3	-1.8	30.7	1.26	4.3	7.3	482.9	122.0
November	0.5	1.33	1.29	6.1	4.9	35.7	35.6	-7.5	18.9	0.47	6.1	1.6	321.7	175.0
December	0.5	1.41	1.46	21.6	19.6	71.4	69.0	-11.1	17.6	0.33	5.6		269.1	
Warm seasons	-0.14	1.84	1.70	6.8	5.8	22.8	21.8	4.4	56.3	3.99	4.5	58.9	410.5	149.9
Cold seasons	0.51	1.95	1.99	18.7	17.3	102.3	98.8	-6.3	24.5	0.82	5.1	2.1	363.7	147.4

Table S2: The correlations of speciated mercury associated with CO and BC (Black carbon) during monitoring period at WLG site.

		GEM	GOM	PBM	BC	CO
GEM	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	12				
GOM	Pearson Correlation	0.310	1			
	Sig. (2-tailed)	0.327				
	N	12	12			
PBM	Pearson Correlation	0.442	0.545	1		
	Sig. (2-tailed)	0.151	0.067			
	N	12	12	12		
BC	Pearson Correlation	0.441	0.019	-0.174	1	
	Sig. (2-tailed)	0.203	0.959	0.631		
	N	10	10	10	10	
CO	Pearson Correlation	0.217	-0.296	-0.379	0.329	1
	Sig. (2-tailed)	0.522	0.377	0.251	0.387	
	N	11	11	11	9	11

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

** Correlation is significant at the 0.01 level (2-tailed).

Table S3: The statistics of the total suspended particles (TSP) Hg/TSP ($\mu\text{g g}^{-1}$) and the estimates of Hg associated with dust emission from global and China.

Site	TSP Hg/TSP ($\mu\text{g g}^{-1}$)	PM _{2.5} /TSP ($\mu\text{g g}^{-1}$)	Dust emission flux (Tg yr^{-1})	Amount of Hg associated with dust (Mg yr^{-1})	References
Yulin	0.51	0.50	(Yu et al., 2019)		
Duolun	0.48	0.44			
Hetian	0.35	0.22			
Tazhong	0.14	0.46			
Tazhong	0.13				
kashgar	0.84				(Huang et al., 2020)
Minfeng	0.13				
Ruoqiang	0.21				
Taxkorgan	0.20				
Mean	0.33	0.40			
Global			1836±903	606±298	(Engelstaedter et al., 2006)
China			242±120	80±40	(Laurent et al., 2006)

Fig. S1: Medians distribution of daily GEM, GOM and PBM concentrations in ambient air at WLG.

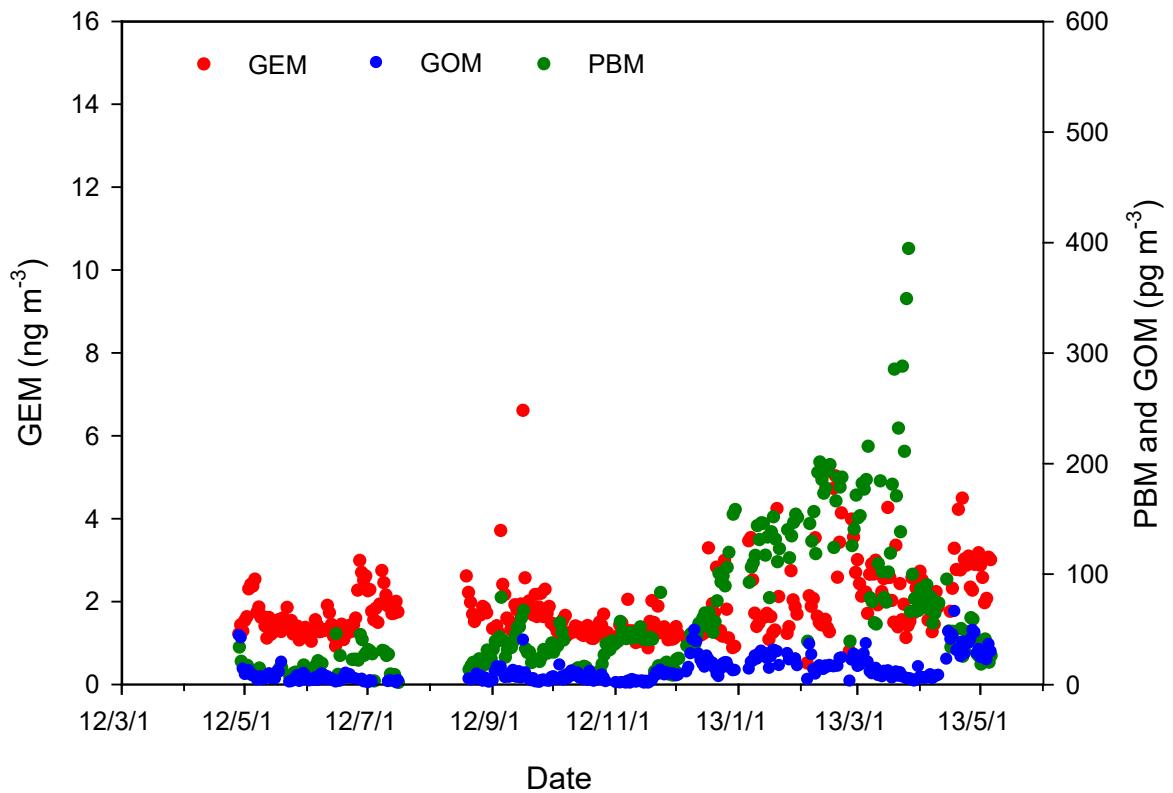


Fig. S2: Monthly medians of GEM, GOM and PBM at WLG during a full-year sampling period.

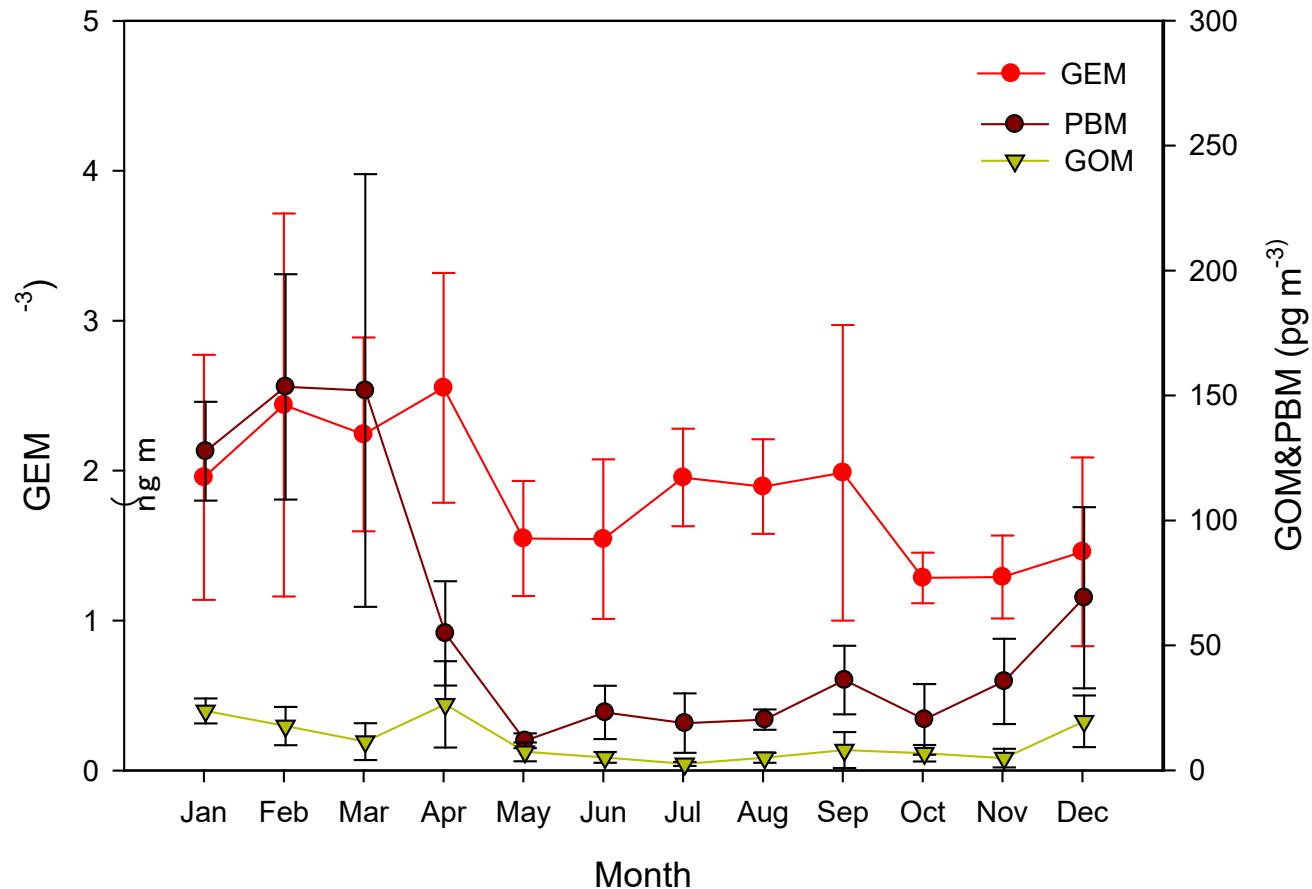


Fig. S3: Distribution of monthly event frequencies from the over mean value of GEM ($>1.90 \text{ ng m}^{-3}$), GOM ($>12.0 \text{ pg m}^{-3}$), and PBM ($>65.4 \text{ pg m}^{-3}$) respectively at WLG. The mercury pollution events were defined as the observed values higher than the annual mean values of GEM, GOM and PBM.

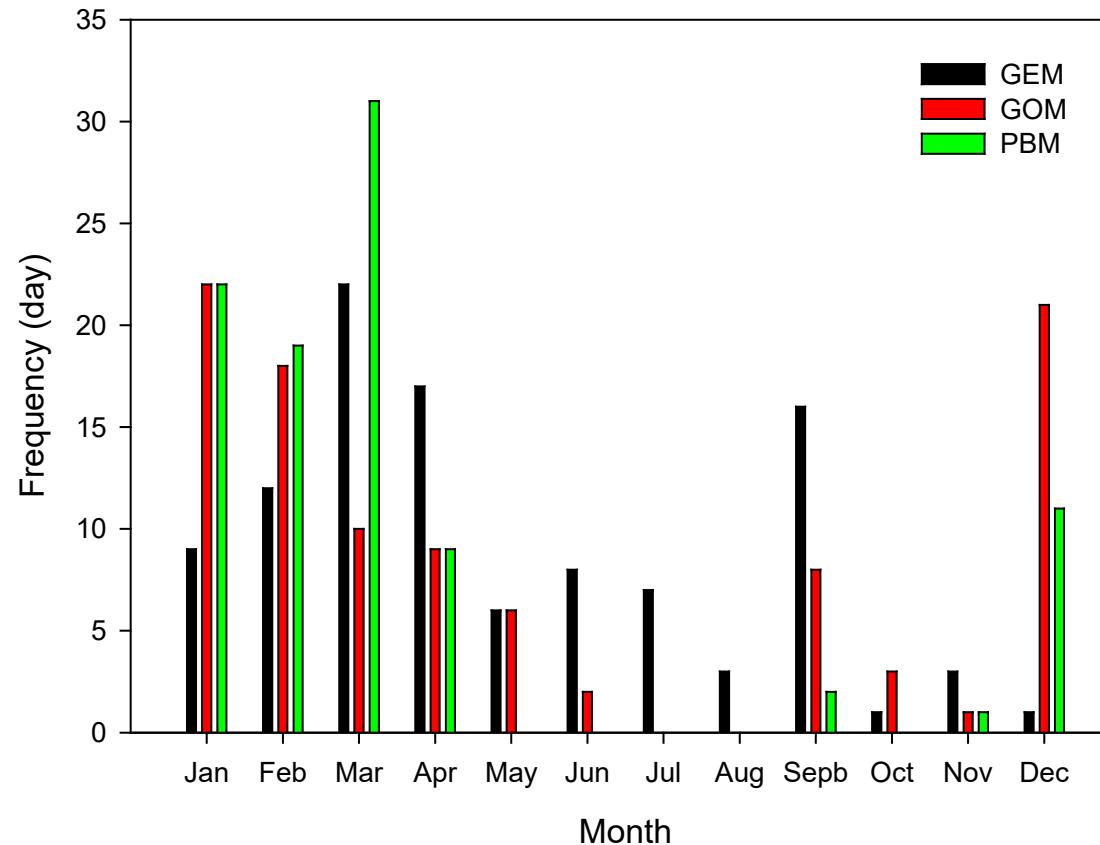


Fig. S4: Diurnal variations of GEM、GOM and PBM with AT、RH and WS at WLG.

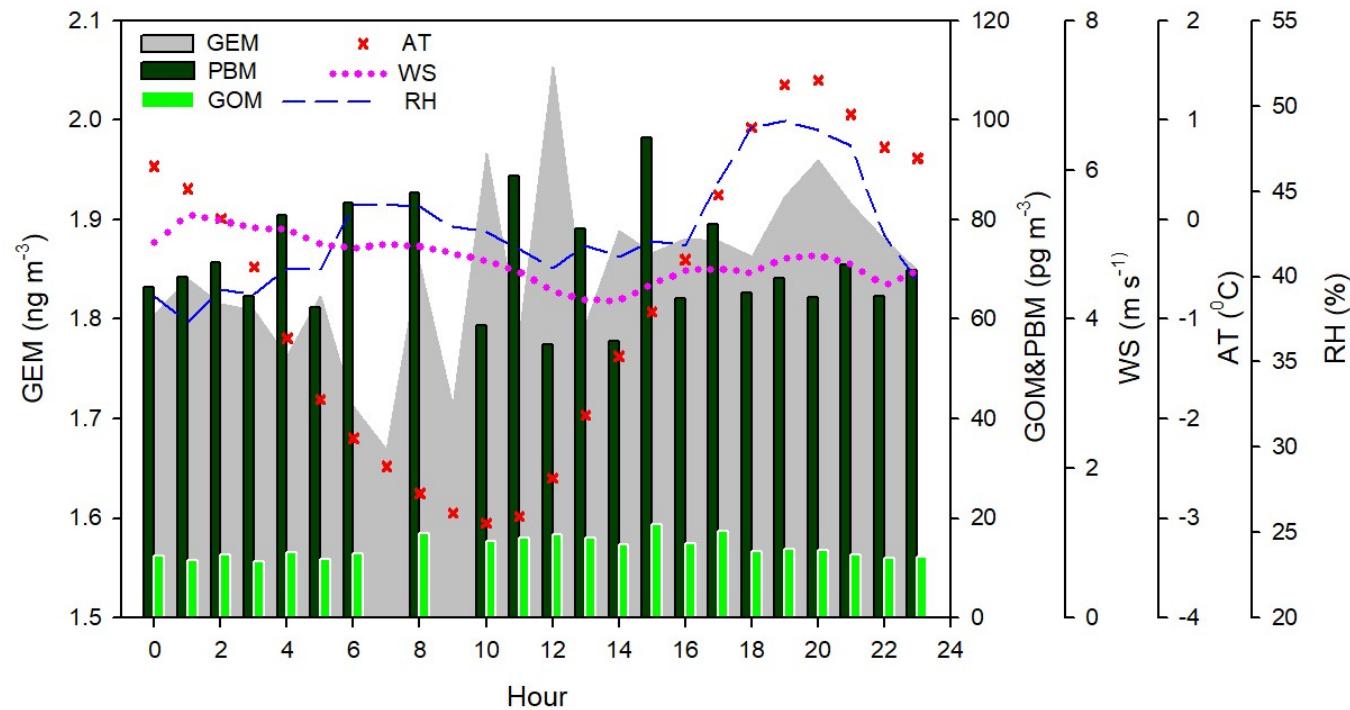
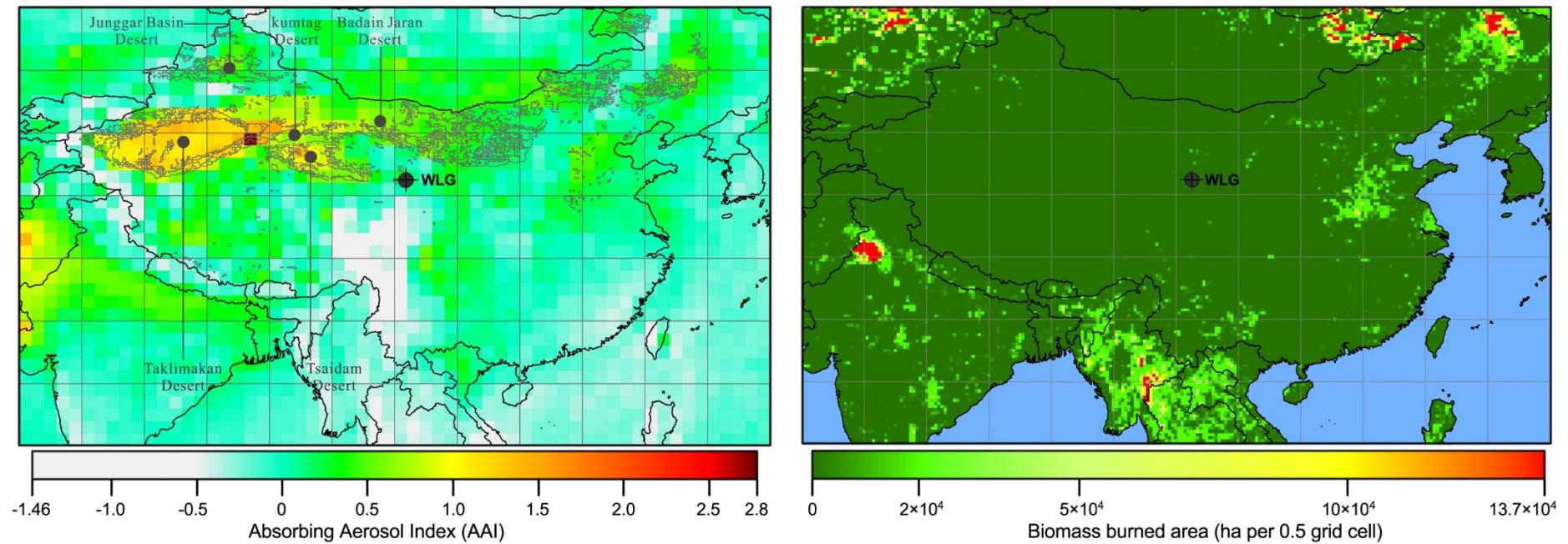


Fig. S5: The distribution of Absorbing Aerosol Index (AAI) and Biomass burned area.



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