Support information for

Comparison of Reactive Gaseous Mercury Collection by Different Sampling Methods in Laboratory Test and Field Monitoring

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Data about the major air pollutants in field application

Information about the meteorological parameters (e.g., temperature and RH) and air quality (e.g., O_3, CO, NO_2, SO_2, $PM_{2.5}$ and PM_{10}) during the sampling is collected from a nearby national air quality monitoring station (shown in Figure S1, data available at: http://www.cnemc.cn/). All atmospheric pollutant monitoring are carried out by the Environmental Monitoring of China according to the unified national standard method. In details, PM_{10} and $PM_{2.5}$ monitoring in the atmosphere are based on the national method "Specifications and Test Procedures for Ambient Air Quality Continuous Automated Monitoring Systems for PM_{10} and $PM_{2.5}$ (HJ653-2013)", with the detection limits of 0.1 and 0.1 $\mu g/m^3$, respectively. SO_2, NO_2, O_3 and CO monitoring are based on the national method "Specifications and Test procedures for Ambient Air Quality Continuous Automated Monitoring System for SO_2, NO_2, O_3 and CO (HJ654-2013)", with the detection limits of 2 ppb, 2 ppb, 2 ppb and 0.5 ppm, respectively. The details of the meteorological conditions and air pollutant concentrations are shown in Table S1.

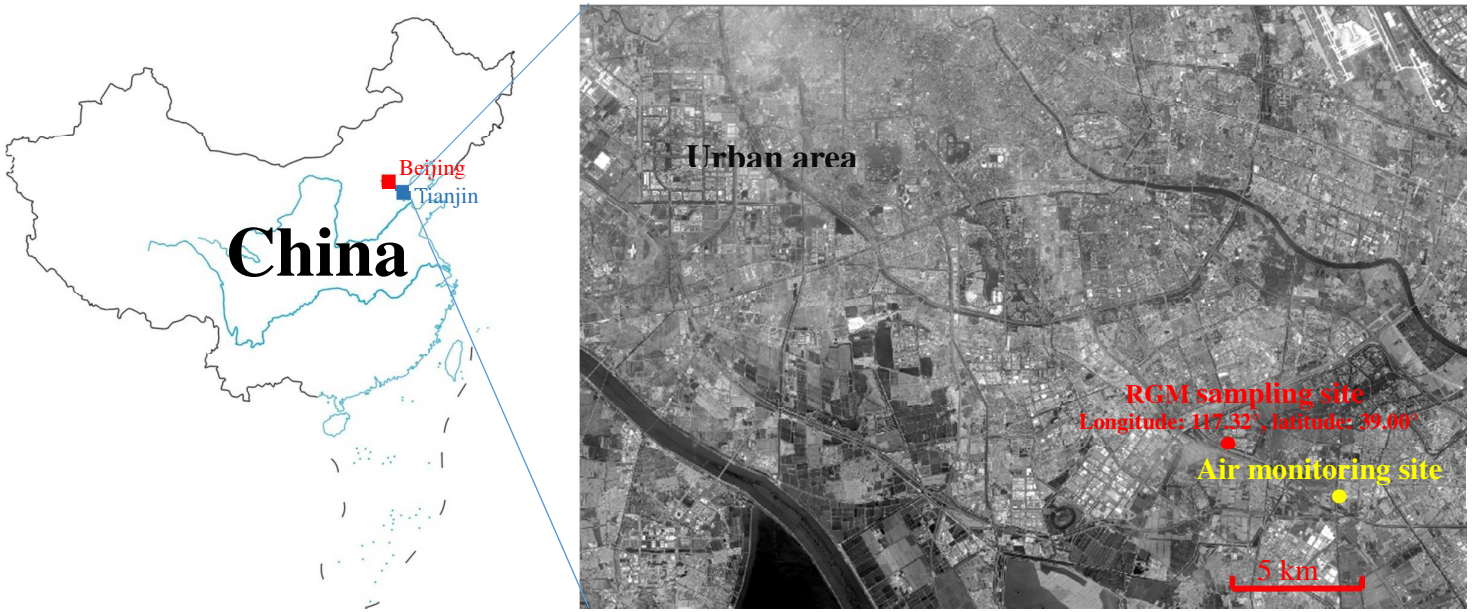

Figure S1. Location for RGM sampling site and monitoring site providing concentrations of atmospheric pollutants and meteorological information

*The map of China (left) is obtained from National Administration of Surveying, Mapping and Geoinformation of China (http://bzdt.nasg.gov.cn/). The satellite map (right) is obtained from Geospatial Data Cloud site, Computer Network Information Center, Chinese Academy of Sciences (http://www.gscloud.cn). Both of these data sources are open to the public to download for non-commercial use.

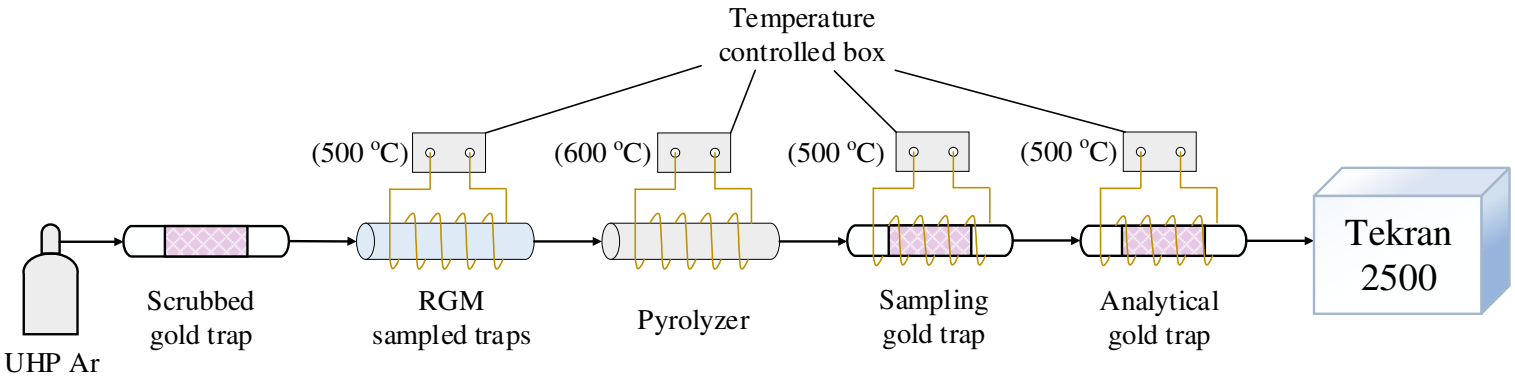

Figure S2. Schematic of Hg analysis in this study

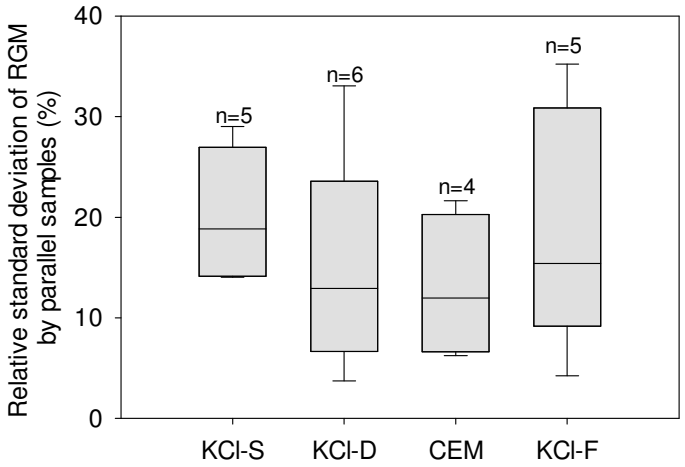

Figure S3. Relative standard deviation of measured RGM in parallel samples by different RGM sampling methods

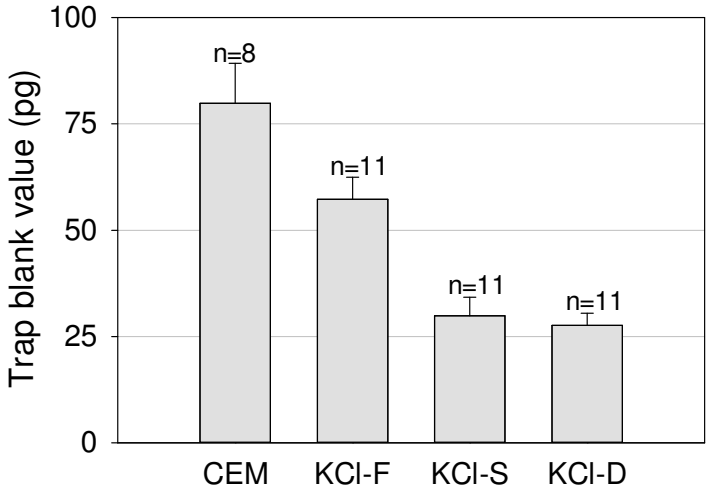

Figure S4. Hg blank in the different RGM sampling methods (pg)

Table S1. Meteorological parameters and concentrations of major air pollutants during the field application

Sampling time	Temperature °C	RH %	SO_2 (μg/m^3)	NO_2 (μg/m^3)	CO (mg/m^3)	O_3 (μg /m^3)	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)
6/10/2017 09:00	18.37	63.67	25.33	43.00	1.27	117.33	91.67	60.00
7/10/2017 11:00	17.28	74.75	37.50	49.25	1.00	37.50	98.00	88.50
7/10/2017 15:00	17.55	77.50	16.25	44.75	0.90	48.25	100.00	84.50
7/10/2017 19:00	16.25	89.50	8.50	53.25	0.98	28.50	——	75.00
8/10/2017 15:00	17.00	87.33	14.33	55.67	2.43	10.33	——	103.00
8/10/2017 19:00	16.00	92.00	9.00	67.33	1.57	22.00	——	130.33
10/10/2017 13:00	9.45	90.00	8.00	32.00	1.20	26.50	18.00	17.50
10/10/2017 17:00	10.10	81.00	8.33	27.33	1.50	39.67	13.00	14.33
11/10/2017 09:00	14.27	55.00	10.00	49.00	1.03	23.00	50.00	28.00
12/10/2017 09:00	12.60	65.33	20.67	66.00	2.10	3.33	100.67	74.33
12/10/2017 13:00	16.43	47.33	13.67	21.33	0.97	67.00	25.00	27.33
12/10/2017 17:00	15.70	52.33	12.00	21.33	0.90	82.00	36.67	34.00
12/10/2017 21:00	11.90	76.00	9.00	55.00	0.95	41.50	58.50	29.50
14/10/2017 09:00	15.93	51.00	18.33	47.00	1.30	24.00	35.00	38.00
14/10/2017 13:00	17.97	53.33	13.00	20.33	0.80	55.33	38.67	18.00
14/10/2017 17:00	15.80	66.67	8.67	29.33	0.83	62.67	47.00	23.00
15/10/2017 11:00	15.93	56.67	15.67	27.67	1.23	33.00	——	54.00
15/10/2017 15:00	16.97	56.00	13.67	18.67	0.80	62.00	37.00	22.00
15/10/2017 19:00	15.90	58.67	9.00	18.33	0.87	76.00	31.33	12.33
16/10/2017 11:00	16.10	63.00	19.33	69.00	1.47	25.67	66.33	41.33
16/10/2017 15:00	17.40	53.00	88.00	65.00	1.20	37.00	63.00	36.00
16/10/2017 21:00	16.35	62.00	14.50	50.00	0.90	44.00	56.50	30.00

28/10/2017	11:00	16.47	46.67	11.00	64.00	2.07	25.33	173.00	161.00
28/10/2017	19:00	13.50	18.67	1.67	27.00	0.40	51.33	56.67	16.33
29/10/2017	11:00	9.80	16.33	3.00	20.33	0.40	49.33	17.67	9.00
30/10/2017	11:00	11.80	36.67	7.00	64.67	1.27	23.33	76.50	52.00
30/10/2017	19:00	14.05	26.50	3.00	36.50	0.65	55.00	36.50	19.00
31/10/2017	11:00	10.53	46.00	17.33	63.67	1.17	18.67	94.00	56.67
31/10/2017	15:00	15.37	38.33	20.33	60.67	1.10	36.00	125.33	78.00
31/10/2017	19:00	14.73	46.33	15.67	80.00	1.17	33.33	130.67	85.00
22/11/2017	11:00	3.63	19.33	8.00	41.67	0.77	22.00	46.00	22.67
22/11/2017	19:00	4.40	18.50	8.00	49.00	0.70	29.00	78.00	27.50
28/11/2017	15:00	8.05	17.50	16.00	28.00	1.05	58.50	140.50	65.00
30/11/2017	11:00	-1.10	26.00	21.50	73.00	2.25	7.50	105.00	38.00
13/12/2017	15:00	0.33	20.00	40.00	63.00	2.90	21.50	72.33	39.33
18/12/2017	11:00	6.43	18.33	12.00	46.00	1.27	34.00	106.33	58.67
18/12/2017	15:00	6.85	14.50	4.00	18.00	0.50	66.50	43.00	8.00
18/12/2017	19:00	2.75	20.00	3.50	32.00	0.70	43.50	53.50	12.00
19/12/2017	11:00	0.30	28.33	11.67	52.33	1.33	18.00	40.67	35.33
19/12/2017	15:00	5.00	20.00	11.50	24.00	0.45	56.00	40.00	16.50
19/12/2017	19:00	-0.07	31.67	8.67	53.33	0.67	23.33	63.67	30.00
20/12/2017	11:00	4.33	29.33	25.33	67.67	1.93	18.00	178.50	77.00
20/12/2017	15:00	7.40	19.00	5.00	23.00	0.30	66.00	17.00	3.00
20/12/2017	19:00	1.60	33.67	7.50	57.00	0.60	35.50	42.00	13.67
21/12/2017	11:00	2.85	36.00	33.50	73.00	1.70	9.00	121.00	83.00
21/12/2017	15:00	8.35	24.00	32.00	51.00	1.25	47.00	103.00	75.50
22/12/2017	11:00	5.93	34.33	46.33	102.33	2.77	10.00	222.00	173.67
22/12/2017	15:00	9.93	12.33	11.00	36.00	0.83	57.67	53.50	48.33

22/12/2017	19:00	5.95	18.00	8.50	50.50	0.90	33.00	58.00	14.50
23/12/2017	11:00	3.87	58.00	38.00	81.67	2.13	16.00	131.67	94.67
23/12/2017	15:00	5.93	39.00	56.33	62.67	1.57	34.67	87.00	65.67
23/12/2017	19:00	1.83	58.00	22.67	91.67	2.10	2.00	88.33	62.33
24/12/2017	11:00	4.97	22.67	8.33	27.00	0.73	57.33	104.67	22.67
24/12/2017	15:00	5.10	17.33	3.33	11.67	0.60	78.67	97.33	11.00
24/12/2017	19:00	2.80	18.67	3.67	30.67	0.57	51.67	59.00	8.33
25/12/2017	11:00	1.17	20.67	16.00	57.33	1.60	20.67	55.67	33.50
25/12/2017	15:00	4.43	15.33	7.67	25.00	0.83	65.33	26.50	24.67
25/12/2017	19:00	-1.70	35.00	9.00	72.00	1.17	18.00	73.00	34.33
26/12/2017	11:00	2.83	47.00	8.33	22.33	0.83	51.67	33.67	12.67
26/12/2017	15:00	2.63	46.67	5.67	6.33	0.70	72.00	23.33	11.00
26/12/2017	19:00	-1.53	68.00	2.67	28.67	0.77	47.00	30.33	14.33

Table S2. Measured results of standard reference materials

Standard reference material	Hg certified values	Hg measured values	n
TORT-2 (ng/g)	1.20±0.01	1.14±0.02	8
SRM 2976 (ng/g)	0.50±0.04	0.49±0.07	8
Hg(0) (ng)	1.10	1.07±0.08	10

Table S3. Correlation analysis between RGM concentrations measured by different sampling methods and major air pollutant concentration or meteorological factors

	KCl-S	KCl-D	KCl-F	CEM	Temperature	RH	SO_2	NO_2	CO	O_3	PM_{10}	$PM_{2.5}$
KCl-S	1	.267	.186	.754**	-.055	.228	.347**	.496**	.348**	-.422**	.252	.441**
KCl-D		1	.139	-.271	-.379**	-.222	-.009	0.092	0.503	-.075	.025	-.065
KCl-F			1	.459	.184	.264	0.057	0.244	0.169	-.224	.293*	.308**
CEM				1	0.474	.679*	-.072	.594*	0.034	-.380	.313	.476
Temperature					1	.551**	.095	-.114	-0.07	.257*	-.13	.256*
RH						1	.106	.157	0.244	-.128	-.257*	.295*
SO_2							1	.528**	.524**	-.265*	.403*	.419**
NO_2								1	.733**	-.770**	.553**	.673**
CO									1	-630**	.440**	.673**
O_3										1	-250	-.438**
PM_{10}											1	.598**
$PM_{2.5}$												1

**P<0.01; *P<0.05

Table S4. Comparison of RGM monitoring results in this study with the monitoring results by the Tekran system

Monitoring site	RGM values pg/m^3	Time period	Monitoring method	Classification	Reference
Tianjin	203.75±139.09	Oct. 2017	KCl-S	Suburban	This study
Tianjin	87.25±101.29		KCl-F	Suburban	This study
Tianjin	9.92±17.44		KCl-D	Suburban	This study
Tianjin	264.78±130.19		CEM	Suburban	This study
Tianjin	252.54±279.83	Nov. 2017-Dec. 2017	KCl-S	Suburban	This study
Tianjin	46.38±37.78		KCl-F	Suburban	This study
Tianjin	21.64±32.10		KCl-D	Suburban	This study
Tianjin	142.63±122.83		CEM	Suburban	This study
Miyun, Beijing	10.1±18.8	Dec. 2008-Nov. 2009	Tekran 1130/1135/2537	Rural	1
Guiyang	35.7±43.9	Aug. 2009-Dec. 2009	Tekran 1130/1135/2537	Urban	2
Mt. Changbai	65±84	Aug. 2005-Jul. 2006	Tekran 1130/1135/2537	Remote	3,4
Mt. Gongga	6.2±3.9	May 2005-Jul. 2007	Tekran 1130/1135/2537	Remote	5,6
Mt. Waliguan	7.4±4.8	Sep. 2007-Aug. 2008	Tekran 1130/1135/2537	Remote	7
Shangri-La	8.2	Nov. 2009-Nov. 2010	Tekran 1130/1135/2537	Remote	8
Qingpu, Shanghai	38.87	Oct. 2014-Dec. 2014	Tekran 1130/1135/2537	Suburban	9
Chongming, Shanghai	13.39±15.95	Mar. 2014-Feb. 2015	Tekran 1130/1135/2537	Suburban	10
Hefei	4.32±8.36	Jul. 2013-Jun. 2014	Tekran 1130/1135/2537	Suburban	11
Xiamen	61.05±69.41	Mar. 2012-Feb. 2013	Tekran 1130/1135/2537	Suburban	12

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