Supplement of Atmos. Chem. Phys., 25, 13815–13830, 2025
https://doi.org/10.5194/acp-25-13815-2025-supplement

Atmospheric Chemistry and Physics
Open Access
EGU

Supplement of

Quantification of anthropogenic and marine sources to atmospheric mercury over the marginal seas of China and impact on the sea–air exchange of mercury

Xiaofei Qin et al.

Correspondence to: Yisheng Zhang (doctorzys@163.com) and Kan Huang (huangkan@fudan.edu.cn)

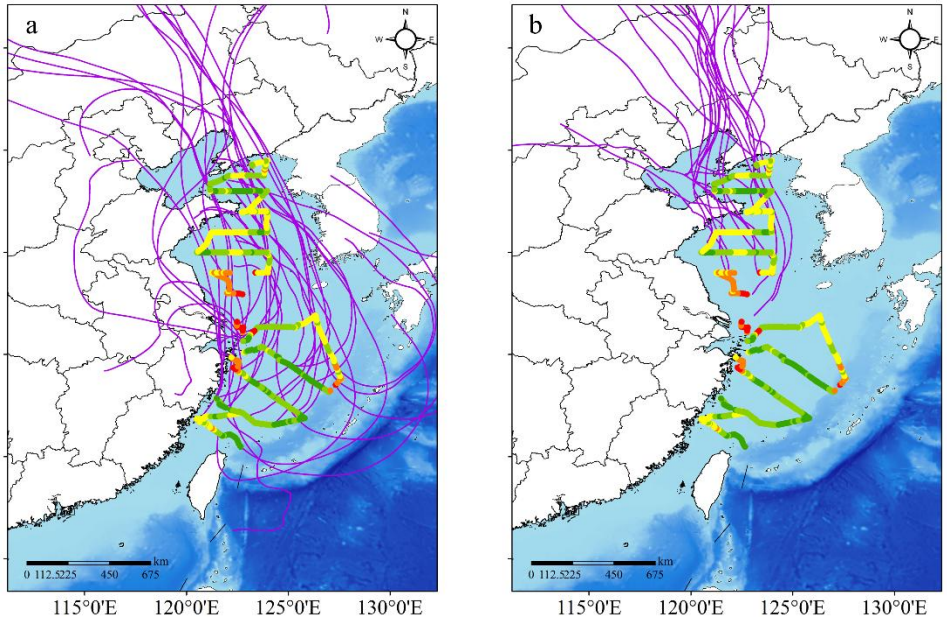

Figure S1. 72 hours backward trajectories along the cruise routes in the oceanic region of ECS (a) and YS (b).

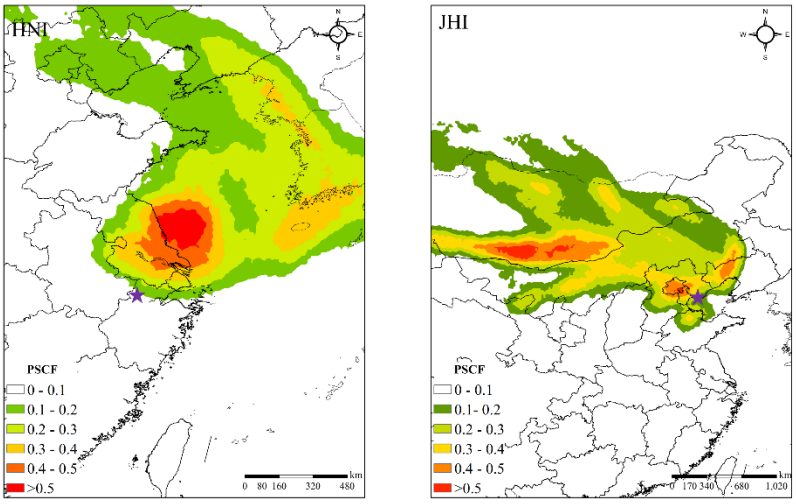

Figure S2. Potential source regions of TGM at HNI and JHI.

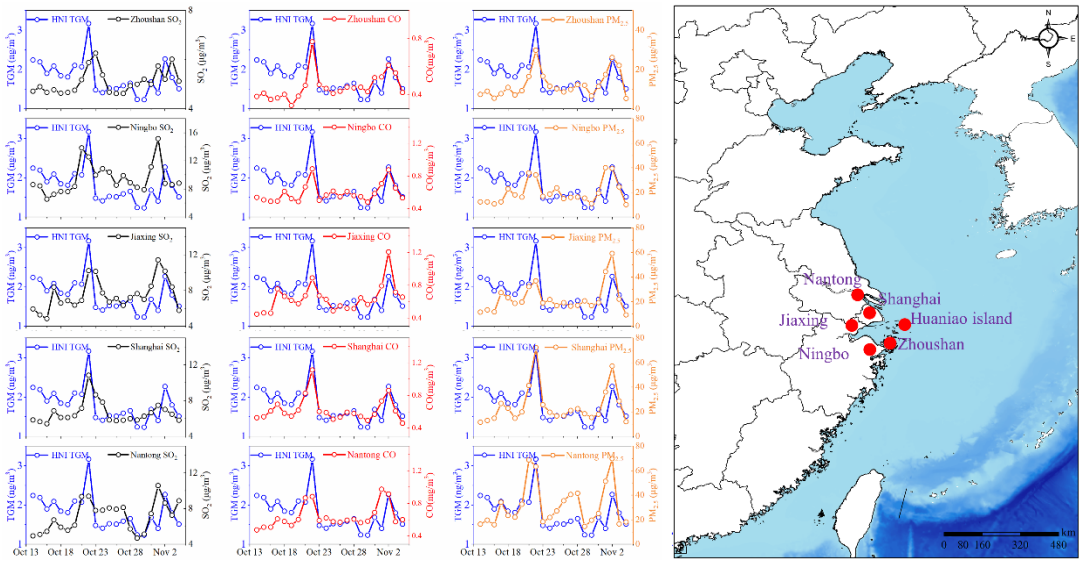

Figure S3. Time-series of TGM at HNI and SO_2, CO, and $PM_{2.5}$ at surrounding land cities (i.e., Zhoushan, Ningbo, Jiaxing, Shanghai, and Nantong). The locations of these cities are marked in the right panel of the figure.

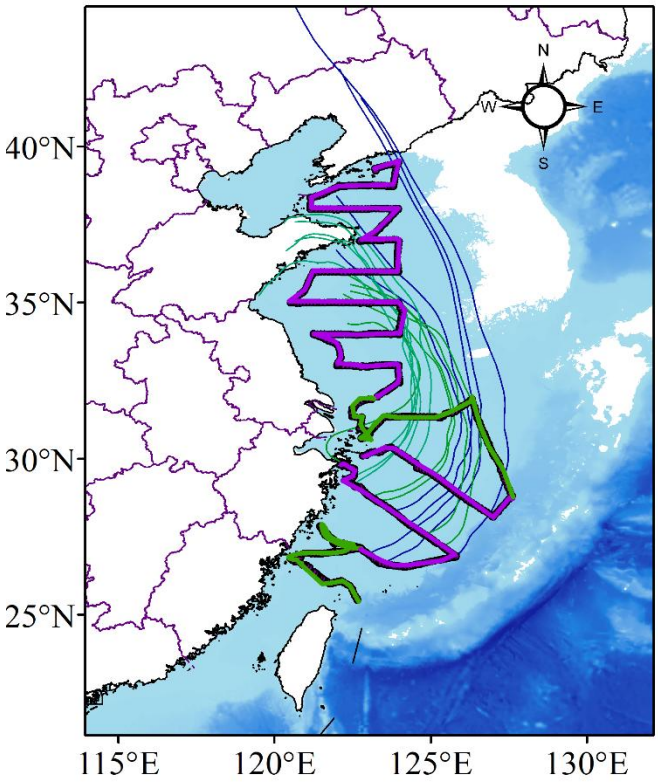

Figure S4. The oceanic regions that applied the formulas for calculating the anthropogenic vs. marine contributions of TGM along the cruise routes. The purple segments utilized the JHI-derived formula, and the green segments utilized the DSL-derived formula.

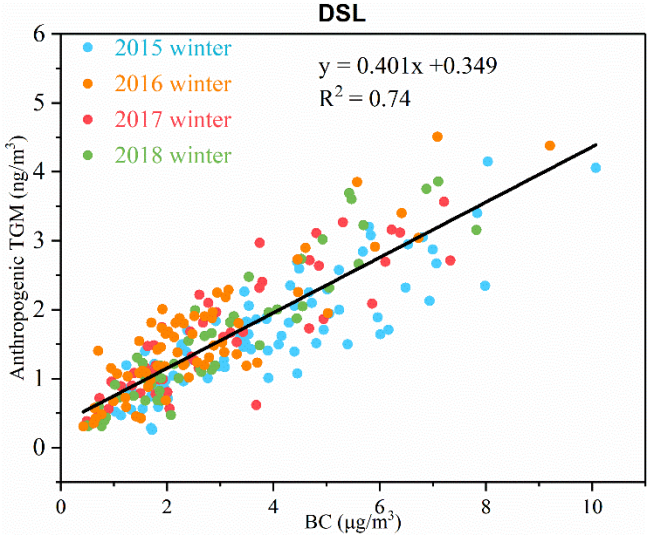

Figure S5. The relationship between anthropogenic GEM and BC concentrations (daily average) during winter periods of 2015-2018 at Dianshan Lake

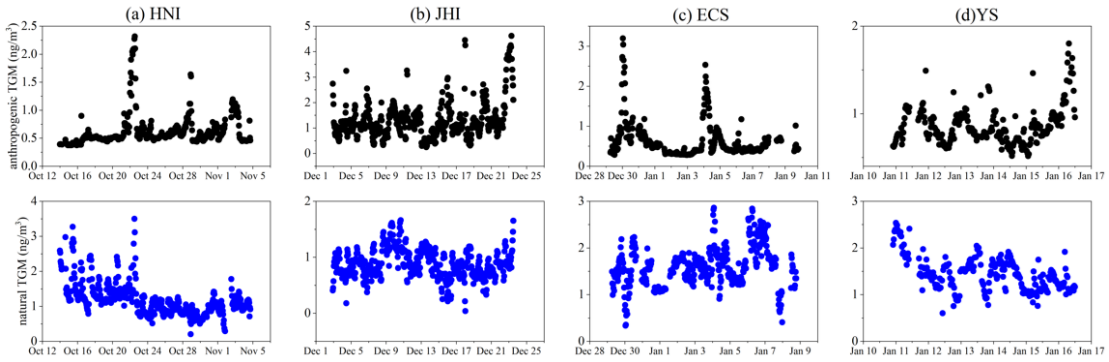

Figure S6. Time-series of mass concentrations of anthropogenic TGM and natural TGM at (a) HNI, (b) JHI, (c) ECS, and (d) YS, respectively.

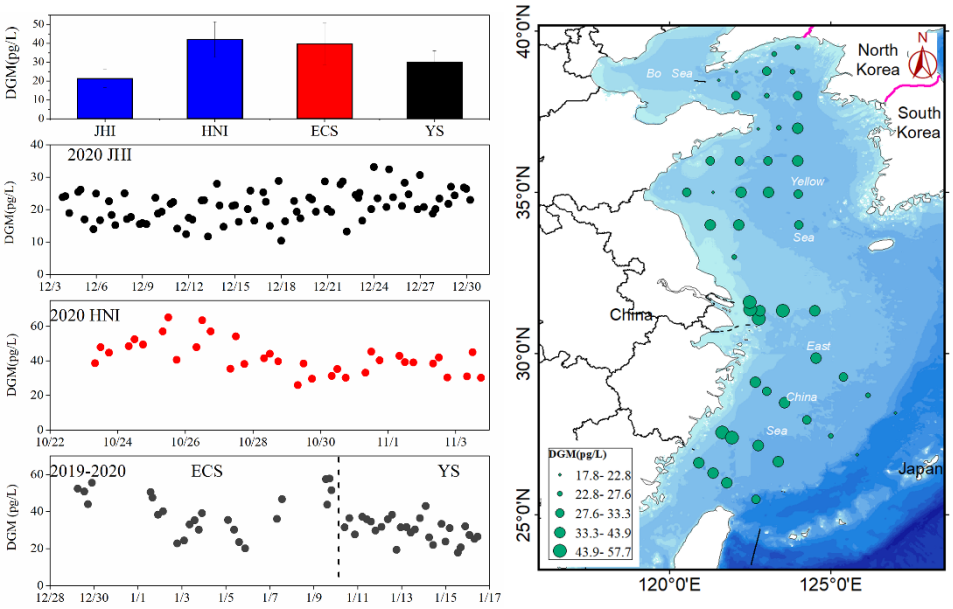

Figure S7. DGM concentrations at JHI, HNI, and ECS/YS.

Table S1. DGM and TGM concentrations, wind speed, water temperature, and sea-air flux at each sampling site during the cruise campaign.

Date (LT)	Longitude (deg)	Latitude (deg)	DGM (pg L^{-1})	TGM (ng m^{-3})	SST (℃)	WS (m s^{-1})	F (ng m^{-2} h^{-1})
2019/12/29 6:30	122.669	25.481	52.4	2.20	22.4	9.1	10.28
2019/12/29 13:30	121.771	26.002	50.8	2.47	19.8	6.7	4.93
2019/12/29 17:30	121.351	26.303	43.9	2.35	19.5	4.7	2.03
2019/12/29 22:00	120.905	26.609	55.4	2.97	17.8	3.7	1.51
2019/12/30 1:00	120.510	26.843		3.62	15.6	1.8	
2020/1/1 14:00	121.623	27.561	50.4	2.17	14.8	8.1	6.44
2020/1/1 16:00	121.927	27.396	47.5	2.17	15.5	6.6	4.04
2020/1/1 22:00	122.745	27.150	38.2	2.54	15.7	6.7	3.01
2020/1/2 3:30	123.362	26.653	40.1	2.49	16.5	5.1	1.92
2020/1/2 9:00	124.197	26.541		2.49	18	5.7	
2020/1/2 19:00	125.803	26.871	22.8	2.03	19.3	1.9	0.14
2020/1/3 2:30	125.000	27.451	24.3	2.33	17.7	4.7	0.85
2020/1/3 8:30	124.251	27.943	33.0	2.07	17.7	2.4	0.36
2020/1/3 14:00	123.565	28.481	35.2	2.30	19.3	3.3	0.76
2020/1/3 18:30	123.006	28.831	30.2	2.15	17.4	2.5	0.34
2020/1/3 22:00	122.647	29.121	39.1	2.85	14.3	6.7	2.85
2020/1/5 2:30	124.535	29.858	35.5	2.19	14	8.9	4.81
2020/1/5 9:00	125.392	29.270	30.1	2.08	17.8	6.1	2.07
2020/1/5 14:30	126.144	28.704	23.5	2.11	19.1	7	1.98
2020/1/5 21:00	126.998	28.151	20.1	2.39	20.1	7.8	1.84
2020/1/6 2:30	127.601	28.802		3.46	19.7	7.1	
2020/1/6 8:00	127.251	29.650		2.85	20.6	6.1	
2020/1/6 13:00	126.849	30.505		2.61	21.1	7.7	
2020/1/6 17:30	126.498	31.303		3.45	19.1	9.3	
2020/1/6 21:00	126.327	31.898		3.50	19.1	7.1	
2020/1/7 8:00	124.501	31.336	36.1	2.64	17.4	11.9	9.12
2020/1/7 13:30	123.504	31.331	46.6	2.67	19.5	11.7	13.12
2020/1/9 13:30	122.764	31.084	57.4	4.71	10.7	5.5	2.30
2020/1/9 15:00	122.803	31.332	43.7	7.11	10	7.7	1.20
2020/1/9 17:30	122.487	31.361	57.7	5.04	8	7.1	3.27
2020/1/9 19:30	122.485	31.597	51.4	4.09	8.3	7.4	3.42
2020/1/10 10:00	123.989	32.997	31.4	3.90	8.9	6.3	0.97
2020/1/10 15:00	123.056	32.966	36.4	4.20	8.7	5.6	0.98
2020/1/10 21:00	122.003	32.994	27.6	4.32	7	4.4	0.19
2020/1/11 5:00	121.251	34.001	37.2	3.46	7.1	6.4	1.57
2020/1/11 10:00	122.144	33.990	35.9	4.01	8.7	5.4	0.94
2020/1/11 14:30	123.051	34.003	34.5	4.53	8.4	3.6	0.31
2020/1/11 19:30	124.001	33.992	29.8	2.67	8.4	7.3	1.77
2020/1/12 2:00	123.991	34.953	31.8	2.77	5.3	10.2	3.25

2020/1/12 9:00	123.058	34.997	35.9	2.36	4.1	11.3	5.29
2020/1/12 13:30	122.205	35.001	38.3	2.91	3.8	8.5	2.87
2020/1/12 18:30	121.345	34.995	19.3	2.32	4.1	5.2	0.30
2020/1/12 23:00	120.521	34.999	31.4	2.30	3.7	3.7	0.46
2020/1/13 5:30	121.250	35.982	31.6	3.18	1.2	4.5	0.40
2020/1/13 10:00	122.152	35.979	28.7	3.36	3.5	2	0.07
2020/1/13 14:30	123.051	35.985	30.3	3.55	5.5	5.4	0.60
2020/1/13 20:00	123.964	35.979	36.5	2.42	3.9	2	0.17
2020/1/14 2:30	123.967	36.984	42.9	2.65	3.6	9.5	4.59
2020/1/14 6:00	123.381	37.000	26.1	3.01	1.2	8.7	0.92
2020/1/14 10:30	122.752	36.977	21.9	3.28	2.1	8.3	0.22
2020/1/14 19:30	123.962	38.006	33.3	2.62	-0.4	6.1	1.00
2020/1/15 0:00	123.006	37.999	23.8	2.05	0	5.4	0.51
2020/1/15 4:30	122.052	37.998	31.1	2.31	-0.7	8.9	2.07
2020/1/15 8:30	121.201	38.003		1.96			
2020/1/15 13:30	121.523	38.473	17.8	2.47	2.3	3.1	0.05
2020/1/15 16:30	122.077	38.748	20.7	2.82	-0.1	0.8	0.00
2020/1/15 21:30	123.001	38.755	32.0	2.83	0.9	2.4	0.14
2020/1/16 2:00	123.801	38.748	27.4	2.62	2	6.3	0.79
2020/1/16 7:30	123.969	39.499	25.2	3.34	-3.4	5.2	0.03
2020/1/16 11:00	123.234	39.295	26.4	2.81	-1.4	5.6	0.37