

Table S1. sampling sites

	longitude	Latitude	Sampling type
S1	117.848	29.132	Sediment
S2	117.753	29.07	Sediment
S3	117.717	29.013	Sediment
S4	117.487	28.927	Sediment
S5	117.588	28.959	Sediment
S6	117.57	28.951	Sediment
S7	117.704	29.056	Sediment
S8	117.677	29.073	Sediment
S9	117.678	29.073	Sediment
S10	117.68	29.073	Sediment

Table S2. Precision and accuracy of each method

	RSD %	Repeatability limit (mg/kg)	Reproducibility limit (mg/kg)	Relative error %	Detection Limit (mg/kg)
Hg	3.42	0.01	0.01	3.00	0.002
As	4.44	3.03	3.55	-0.70	0.01
Se	3.92	0.03	0.03	0.90	0.1
Bi	4.92	0.30	0.49	-3.20	0.1
Sb	7.69	0.36	0.66	-1.80	1.0

	RSD %	Repeatability limit (mg/kg)	Reproducibility limit(mg/kg)	Recovery rate%	Detection Limit (mg/kg)
V	24.00	7.80	27.10	102.00	4.0
Sr	18.00	11.00	6.60	94.80	2.0
Ti	21.00	0.20	0.40	87.90	50.0
Cr	23.00	6.00	21.00	99.20	3.0
Mo	17.00	0.10	0.40	96.90	0.1
Ni	17.00	2.00	11.00	96.60	1.5
Zn	10.00	8.00	17.00	94.50	2.0
Pb	23.00	5.00	25.00	96.80	2.0
Cu	21.00	2.00	10.50	96.40	1.2

Table S3. Statistical analysis of pollution load index

site	Cf					PLI
	Cr	Pb	As	Cu	Zn	
S1	1.65	3.15	8.46	30.00	5.70	5.96
S2	1.58	11.56	10.23	32.22	23.14	10.69
S3	1.24	35.29	61.69	74.67	36.10	23.56
S4	2.84	1.30	1.30	8.20	0.99	2.08
S5	2.52	0.86	0.97	3.53	0.68	1.38
S6	2.13	1.75	2.96	57.33	2.08	4.21
S7	0.05	0.54	1.18	12.84	0.43	0.70
S8	2.02	1.17	1.98	3.00	1.22	1.77
S9	1.05	0.34	0.85	6.16	0.27	0.87
S10	1.85	1.06	0.99	0.86	1.13	1.14
average	1.69	5.70	9.06	22.88	7.17	

Table S4. Pearson correlation (PC) coefficient matrix of all elements and magnetic parameters in the study area.

	Cr	Pb	As	Cu	Zn	Bi	V	Hg	Au	Mo	Ni	Sr	Ti	Sb	Se	Ag
IRM _{20mT}	0.124	- 0.107	- 0.108	0.026	0.029	- 0.166	0.564	0.657*	- 0.239	-0.292	0.302	-0.595	0.257	- 0.243	0.029	- 0.196
IRM _{200mT}	0.211	- 0.159	- 0.155	- 0.130	- 0.059	- 0.217	0.457	0.472	- 0.249	-0.408	0.108	-.642*	0.264	- 0.281	- 0.176	- 0.231
IRM _{300mT}	0.221	- 0.166	- 0.165	- 0.143	- 0.064	- 0.226	0.445	0.456	- 0.257	-0.414	0.090	-.651*	0.258	- 0.289	- 0.190	- 0.239
SIRM	0.221	- 0.185	- 0.179	- 0.162	- 0.091	- 0.241	0.430	0.452	- 0.268	-0.415	0.076	-.638*	0.244	- 0.302	- 0.192	- 0.253
IRM _{-20mT}	0.339	- 0.302	- 0.304	- 0.425	- 0.276	- 0.348	0.126	0.005	- 0.306	-0.431	-0.270	-0.557	0.139	- 0.367	- 0.471	- 0.330
IRM _{-300mT}	0.231	- 0.153	- 0.151	- 0.135	- 0.055	- 0.213	0.446	0.453	- 0.242	-0.418	0.092	-.649*	0.267	- 0.275	- 0.199	- 0.225
ARM	0.329	- 0.180	- 0.155	0.151	- 0.114	- 0.168	0.701*	0.798**	- 0.243	0.098	0.613	-0.511	0.321	- 0.235	0.155	- 0.219
ARM/SIRM	0.296	- 0.036	- 0.014	0.424	- 0.073	0.060	0.426	0.509	- 0.012	0.775**	0.829**	0.202	0.154	0.047	0.441	0.000
SOFT	0.141	- 0.111	- 0.101	- 0.026	0.003	- 0.164	0.512	0.593	- 0.218	-0.356	0.220	-0.595	0.261	- 0.236	- 0.045	- 0.188
HIRM	0.226	- 0.170	- 0.165	- 0.149	- 0.073	- 0.228	0.438	0.452	- 0.255	-0.417	0.084	- 0.644*	0.256	- 0.289	- 0.196	- 0.239
S-ratio	0.395	0.459	0.412	0.435	0.528	0.397	0.376	0.317	0.329	-0.300	0.344	-0.391	0.341	0.333	- 0.175	0.376

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

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