

Characteristics and Risk Assessment of 16 Metals in Street Dust Collected from a Highway in a Densely Populated Metropolitan Area of Vietnam

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Citation: Nguyen, V.-T.; Duy Dat, N.; Vo, T.-D.-H.; Nguyen, D.-H.; Nguyen, T.-B.; Nguyen, L.-S.P.; Nguyen, X.C.; Dinh, V.-C.; Nguyen, T.-H.-H.; Huynh, T.-M.-T.; et al. Characteristics and Risk Assessment of 16 Metals in Street Dust Collected from a Highway in a Densely Populated Metropolitan Area of Vietnam. *Atmosphere* **2021**, *12*, 1548. <https://doi.org/10.3390/atmos12121548>

Academic Editors: Dmitry Vlasov, Omar Ramírez Hernández and Ashok Luhar

Received: 24 October 2021

Accepted: 17 November 2021

Published: 24 November 2021

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Supplementary Information:

Table S1. Location and GPS coordinates of sampling (D) and background sites (BG).

Sampling Site	Street	Coordinates	
D1	Ha Noi highway	N 10°52.694'	E 106°48.734'
D2	Ha Noi highway	N 10°51.936'	E 106°48.013'
D3	Ha Noi highway	N 10°51.382'	E 106°47.079'
D4	Ha Noi highway	N 10°49.761'	E 106°45.733'
D5	Ha Noi highway	N 10°48.572'	E 106°45.357'
D6	Ha Noi highway	N 10°48.097'	E 106°44.446'
D7	Ha Noi highway	N 10°48.097'	E 106°44.446'
D8	Ha Noi highway	N 10°47.900'	E 106°43.246'
D9	Ha Noi highway	N 10°47.917'	E 106°42.300'
D10	Ha Noi highway	N 10°47'56.8"	E 106°42'19.7"
BG1	Rung sac street	N 10°30.425'	E 106°51.850'
BG2	Rung sac street	N 10°35.619'	E 106°49.336'
BG3	Rung sac street	N 10°39.777'	E 106°46.642'

Table S2. The geo-accumulation index classification, standard criteria of enrichment factor, and pollution load index classification for the assessment of the pollution status of the sampling sites.

Index	Classification	Description
I_{geo}	$I_{geo} \leq 0$	Uncontaminated
	$0 < I_{geo} \leq 1$	Uncontaminated to moderately contaminated
	$1 < I_{geo} \leq 2$	Moderately contaminated
	$2 < I_{geo} \leq 3$	Moderately to strong contaminated
	$3 < I_{geo} \leq 4$	Strongly contaminated
	$4 < I_{geo} \leq 5$	Strongly to extremely contaminated
	$I_{geo} > 5$	Extremely contaminated
EF	$EF < 1$	No enrichment
	$1 \leq EF < 3$	Minor enrichment
	$3 \leq EF < 5$	Moderate enrichment
	$5 \leq EF < 10$	Moderate severe enrichment
	$10 \leq EF < 25$	Severe enrichment
	$25 \leq EF < 50$	Very severe enrichment
	$EF \geq 50$	Extremely severe enrichment
P_i	$P_i \leq 0.7$	Unpolluted
	$0.7 < P_i \leq 1$	Slightly polluted
	$1 < P_i \leq 2$	Low polluted
	$2 < P_i \leq 3$	Moderately polluted
	$P_i \geq 3$	Heavily polluted
PLI	$PLI \leq 1$	Unpolluted
	$1 < PLI \leq 2$	Low polluted
	$2 < PLI \leq 3$	Moderately polluted
	$PLI \geq 3$	Heavily polluted

Table S3. The potential ecological risk index (E_i), The potential ecological risk (PER) classification for ecological risk assessment.

Index	Classification	Description
E_i	$E_i < 15$	Low
	$15 \leq E_i < 30$	Moderate
	$30 \leq E_i < 60$	Considerable
	$60 \leq E_i < 120$	High
	$E_i \geq 120$	Very high
PER	$PER < 50$	Low
	$50 \leq PER < 100$	Moderate
	$100 \leq PER < 200$	Considerable
	$PER \geq 200$	High

Table S4. Concentrations (mg/kg) of metals in street dust of the different sampling sites

Sites	Se	Cd	Sb	Mo	B	Sn	As	Co	Ni	V	Pb	Cr	Cu	Mn	Zn	Ti
D1	0.3	0.3	0.9	2.7	6.3	6.0	11.9	9.7	27.2	40.6	42.9	59.5	123.5	511.4	411.0	691.1
D2	0.4	0.3	0.6	2.1	6.1	3.8	7.4	7.2	19.9	38.7	46.4	51.3	149.3	364.4	283.6	788.9
D3	0.7	0.4	0.8	4.1	7.1	7.0	8.8	8.8	28.7	41.0	75.8	83.4	162.0	535.0	1062.7	957.2
D4	0.4	0.9	1.4	7.0	5.5	14.9	10.2	10.3	55.7	41.2	93.5	123.6	289.4	642.7	801.3	812.2
D5	0.3	0.4	1.0	6.8	5.4	9.1	8.8	9.1	34.0	36.2	60.0	102.5	155.1	475.0	952.2	632.8
D6	0.3	0.4	1.0	4.9	5.8	7.6	10.0	8.1	27.5	35.6	49.6	79.0	135.4	436.1	525.7	750.9
D7	0.5	0.2	0.4	3.1	4.4	3.6	10.4	7.1	28.4	28.0	24.7	61.0	72.0	305.9	172.6	521.6
D8	0.3	0.4	0.8	3.2	6.6	7.0	5.5	8.1	30.7	36.6	71.6	94.6	163.8	359.9	423.2	625.9
D9	0.3	0.2	0.4	3.1	4.3	2.1	4.9	6.2	25.8	24.7	23.6	65.6	64.7	302.9	136.1	443.8
D10	0.3	2.2	0.5	4.3	5.6	8.9	4.7	8.3	31.5	32.5	33.8	93.3	132.3	332.4	423.0	538.5
Mean	0.4	0.6	0.8	4.1	5.7	7.0	8.3	8.3	30.9	35.5	52.2	81.4	144.7	426.6	519.2	676.3
SD	0.1	0.6	0.3	1.7	0.9	3.6	2.5	1.2	9.5	5.6	22.9	22.6	61.5	113.1	318.9	155.4
CV	0.3	1.1	0.4	0.4	0.2	0.5	0.3	0.1	0.3	0.2	0.4	0.3	0.4	0.3	0.6	0.2
Min	0.3	0.2	0.4	2.1	4.3	2.1	4.7	6.2	19.9	24.7	23.6	51.3	64.7	302.9	136.1	443.8
Max	0.7	2.2	1.4	7.0	7.1	14.9	11.9	10.3	55.7	41.2	93.5	123.6	289.4	642.7	1062.7	957.2
Background Soil	0.3	0.1	0.3	0.7	2.1	1.2	4.7	7.2	15.8	24.6	13.7	27.1	27.1	296.3	71.3	466.2

SD: standard deviation, Min: minimum, Max: maximum, CV: coefficients of variation (CV: ratio of the standard deviation to the mean)

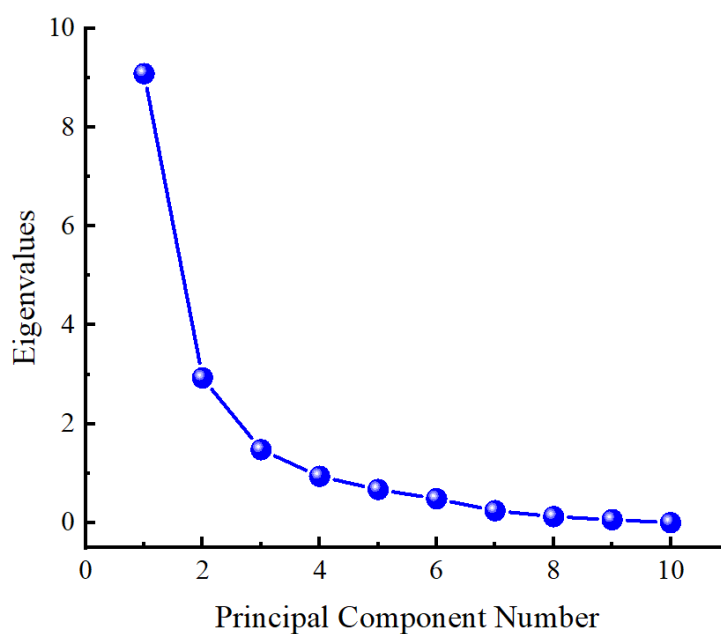
Table S5. Results of principal component analysis for 16 heavy metals in street dust in Ha Noi highway, Ho Chi Minh City.

Heavy metals	Principal Components		
	PC1	PC2	PC3
Se	0.52	0.69	0.30
Cd	0.34	−0.53	0.48
Sb	0.94	−0.13	−0.67
Mo	0.57	−0.34	−0.48
B	0.07	0.59	0.29
Sn	0.91	−0.06	0.14
As	0.89	0.05	−0.78
Co	0.90	−0.01	−0.20
Ni	0.62	−0.36	−0.43
V	0.71	0.22	0.39
Pb	0.94	0.29	0.35
Cr	0.63	−0.47	0.37
Cu	0.94	−0.33	0.29
Mn	0.44	0.96	−0.54
Zn	0.37	0.77	0.25
Ti	0.50	0.65	0.35
Eigenvalues	9.08	2.93	1.48
% of Variance	56.81	18.30	9.22
Cumulative %	56.81	75.11	84.33

Extraction method: principal component analysis

Rotation method: Varimax with Kaiser normalization

Bold values indicate high load

**Figure S1.** The scree plot of PCA.