SUPPLEMENTAL INFORMATION

Assessment of Heavy Metals and Color as Indicators of Contamination in Street Dust of a City in SE Spain: Influence of Traffic Intensity and Sampling Location

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The supplemental information contains nine tables with data and three figures showing sample localization, an XR diffractogram and an SEM image. References cited are listed in the paper.

Figure S1. Sampling and localization.

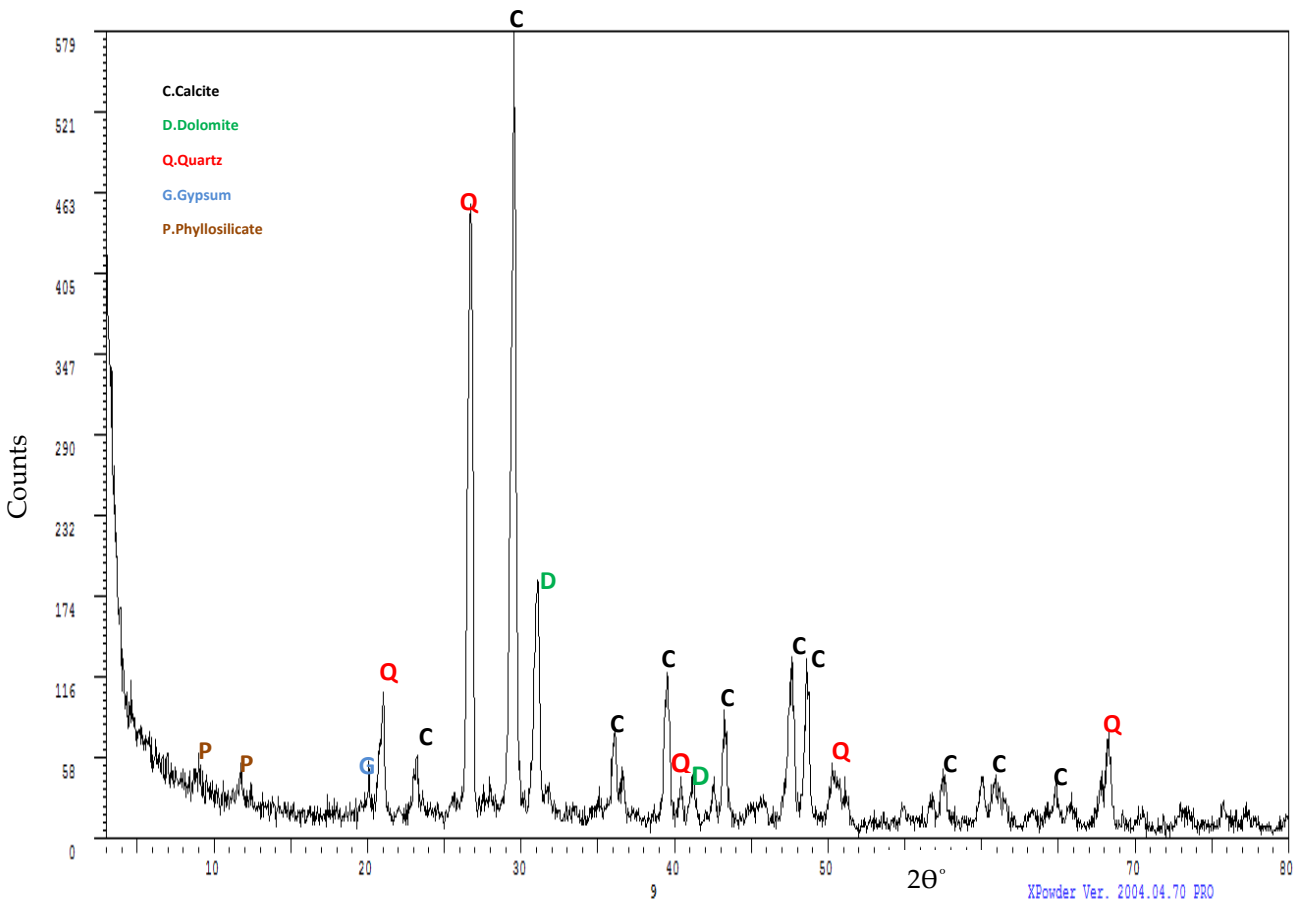

Figure S2. Example of an XR diffractogram of urban dust.

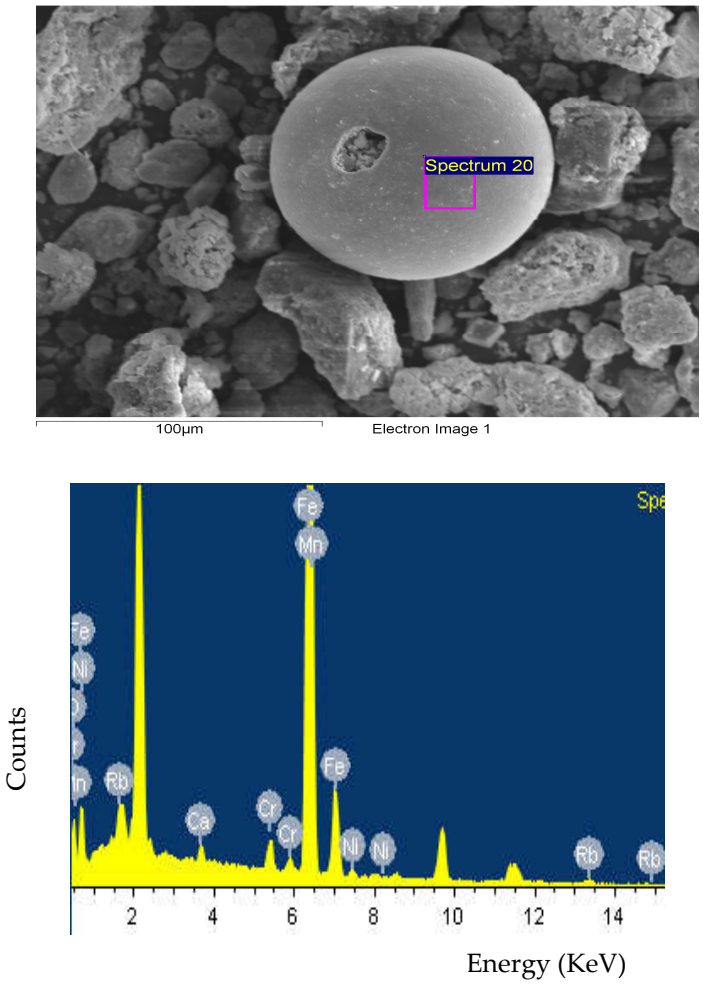

Figure S3. SEM image of a magnetite sphere and a spectrum of the chemical composition of an urban dust sample.

Table S1. Levels (mg/kg) proposed according to Aguilar et al. (1999) for the heavy metals, based on pH: Reference Level (RL), Recommended Research Level (RRL), Obligatory Research Level (ORL), and Intervention Level (IL).

pH>7				
Elements	**RL**	**RRL**	**ORL**	**IL**
Cu	< 100	100—300	300–500	> 500
Cd	< 3	3–5	5–10	> 10
Cr	< 100	100–250	250–450	> 450
Zn	< 300	300–500	500–1000	> 1000
Pb	< 200	200–400	400–500	> 500
Ni	< 50	50–100	100–300	> 300

Table S2. Discriminant analysis. Discriminant analysis carried out on the 127 samples. This enabled the correct classification of a high percentage of the samples according to three discrimination levels for each variable and for the 12 predictor variables (heavy metals and pollutant load).

Classification variable: **Location sample**

Independent variables: As, Cd, Cr, Cu, Fe, Mn, Ni, Pb, Ti, V, Zn, and pollutant load (PL)

Number of complete cases: 127

Number of groups: 3 (sidewalk, ledge, and road)

			Prediction		
Location sample	**n**	**%** (*)	**Sidewalk**	**Ledge**	**Road**
Sidewalk	29	59	17 (58.6%)	4 (13.8%)	8 (27.6%)
Ledge	12	58	2 (16.7%)	7 (58.3%)	3 (25.0%)
Road	86	72	18 (20.9%)	6 (7.0%)	62 (72.1%)
Total	127	68			

(*) % cases explained

Discriminant	**Eigenvalue**	**Relative**	**Canonical**
Functions		Percentage	Correlation
1	0.3597	70.2	0.5144
2	0.1529	29.8	0.3641

Derivative	**Lambda**			
Functions	of Wilks	Chi square	GL	P-value
1	0.6379	52.5987	30	0.0066
2	0.8674	16.6417	14	0.2758

Classification variable: **Color sample**

Independent variables: As, Cd, Cr, Cu, Fe, Mn, Ni, Pb, Ti, V, Zn, and pollutant load (PL)

Number of complete cases: 127

Number of groups: 3 (Darks, browns, and lights)

Discriminant	Eigenvalue	Relative	Canonical
Functions		Percentage	Correlation
1	0.5178	83.22	0.5841
2	0.1044	16.78	0.3075

Derivative	Lambda			
Functions	of Wilks	Chi square	GL	P-value
1	0.5961	60.5199	30	
2	0.9046	11.6966	14	0.6307

			Prediction		
Color sample	**n**	**% (*)**	**Dark**	**Brown**	**Light**
Dark	63	71	45 (71.4%)	14 (22.2%)	4 (6.4%
Brown	32	63	5 (15.6%)	20 (62.5%)	7 (21.9%
Light	32	50	6 (18.8%)	10 (31.3%)	16 (50%
Total	127	64			

(*) % cases explained

Classification variable: **Traffic intensity**

Independent variables: As, Cd, Cr, Cu, Fe, Mn, Ni, Pb, Ti, TV, Zn, and pollutant load (PL)

Number of complete cases: 127

Number of groups: 3 (Low, medium, high)

Discriminant	Eigenvalue	Relative	Canonical
Functions		Percentage	Correlation
1	0.2676	75.25	0.4595
2	0.08802	24.75	0.2844

Derivative	Lambda			
Functions	of Wilks	Chi square	GL	P-value
1	0.7250	37.6222	30	0.1597
2	0.9190	9.8737	14	0.7714

			Prediction		
Traffic intensity	**n**	**% (*)**	**Low**	**Medium**	**High**
Low	62	66	41 (66.1%)	10 (16.1%)	11 (17.7%)
Medium	51	43	15 (29.4%)	22 (43.1%)	14 (27.5%)
High	14	64	4 (28.6%)	1 (7.1%)	9 (64.3%)
Total	127	57			

n. number of samples, (*) % cases explained

Table S3. Mean values of pollutant load (PL) in mg/kg. Kruskal-Wallis analysis. The dark-colored samples are the ones with the higher PL, which are those that were subjected to medium or high traffic intensities.

Factor	Type	n	Mean (mg/kg)	Statistic	P-value
Color	Dark	63	1026.0	10.2155	0.0061
	Brown	32	1206.4		
	Light	32	1287.1		
Sample localization	Sidewalks	29	1196.1		ns
	Ledges	12	1942.5		
	Roads	86	1088.3		
Traffic intensity	Low	62	1084.8	12.4936	0.0019
	Medium	51	1328.3		
	High	14	1254.0		

Table S4. Spearman correlation coefficients for the elements and PL.

	As	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Ti	V	Zn	PL
As	1											
Cd	0.160	1										
Cr	0.025	0.116	1									
Cu	−0.117	0.187*	0.095	1								
Fe	0.032	**0.523** **	**0.549** **	0.308 **	1							
Mn	0.244 **	0.284 **	**0.491** **	0.128	**0.543** **	1						
Ni	0.041	0.109	**0.991** **	0.043	**0.530** **	**0.483** **	1					
Pb	0.126	0.170	0.023	0.049	0.144	0.045	0.010	1				
Ti	−0.023	0.195*	0.395	0.168	**0.448** **	0.272	0.384	0.041	1			
V	−0.163	0.196 *	0.121	0.076	**0.406** **	0.185 *	0.127	0.104	0.335 **	1		
Zn	−0.011	**0.507** **	0.053	0.078	0.271 **	0.114	0.039	0.007	0.031	0.061	1	
PL	0.016	**0.554** **	**0.580** **	0.320**	**0.991****	**0.542** **	**0.558** **	0.254 **	0.218 *	0.086	**0.861** **	1

* significant correlation at the 0.05 level (bilateral), ** significant correlation at the 0.01 level (bilateral)

Table S5. Kruskal-Wallis statistical test for Zn as a function of color, sample localization, and traffic intensity. The accumulation of Zn was significantly higher in the light-colored samples from the ledges of streets with high traffic intensity.

Factor	Type	n	Mean (mg/kg)	Statistic	P-value
Color	Dark	63	608.8	5.5947	0.0408
	Brown	32	668.9		
	Light	32	725.7		
Sample localization	Sidewalk	29	680.1		ns
	Ledge	12	1403.9		
	Road	86	539.6		
Traffic intensity	Low	62	673.2	5.4636	0.0450
	Medium	51	618.3		
	High	14	693.3		

Table S6. Kruskal-Wallis statistical test for Pb as a function of color, sample localization, and traffic intensity. The concentration of this metal was highest in the light-colored samples and lowest in the brown-colored ones.

Factor	Type	*n*	Mean (mg/kg)	Statistic	*P-value*
Color	Dark	63	181.8	12.4958	0.0019
	Brown	32	110.6		
	Light	32	235.2		
Sample localization	Sidewalk	29	252.9		ns
	Ledge	12	189.4		
	Road	86	150.1		
Traffic intensity	Low	62	137.8	30.1665	0.000
	Medium	51	229.2		
	High	14	163.6		

Table S7. Kruskal-Wallis statistical test for Cu as a function of color, sample localization, and traffic intensity. The concentration of this metal was highest in dark-colored samples from roads with high traffic intensity.

Factor	Type	n	Mean (mg/kg)	Statistic	P-value
Color	Dark	63	267.8	37.9467	0.000
	Brown	32	144.8		
	Light	32	126.0		
Sample localization	Sidewalk	29	148.4	9.3935	0.0091
	Ledge	12	201.0		
	Road	86	218.9		
Traffic intensity	Low	62	157.6	11.2797	0.0035
	Medium	51	234.7		
	High	14	271.3		

Table S8. Kruskal-Wallis statistical test for Cr as a function of color, sample localization, and traffic intensity. The concentration was highest in dark-colored samples but, in relation to the traffic intensity, was statistically higher in roads affected by medium traffic intensity.

Factor	Type	n	Mean (mg/kg)	Statistic	P-value
Color	Dark	63	158.4	23.6812	0.0000
	Brown	32	75.6		
	Light	32	78.6		
Sample localization	Sidewalk	29	80.6		ns
	Ledge	12	100.7		
	Road	86	132.2		
Traffic intensity	Low	62	80.0	14.5552	0.0006
	Medium	51	169.5		
	High	14	93.5		

Table S9. Kruskal-Wallis statistical test for Ni as a function of color, sample localization, and traffic intensity. The Ni concentration only differed statistically according to the color, being highest in the dark-colored samples.

Factor	Type	n	Mean (mg/kg)	Statistic	P-value
Color	Dark	63	69.7	12.5942	0.0018
	Brown	32	26.5		
	Light	32	40.2		
Sample localization	Sidewalk	29	33.5		ns
	Ledge	12	46.6		
	Road	86	58.1		
Traffic intensity	Low	62	35.6		ns
	Medium	51	76.0		
	High	14	31.7		