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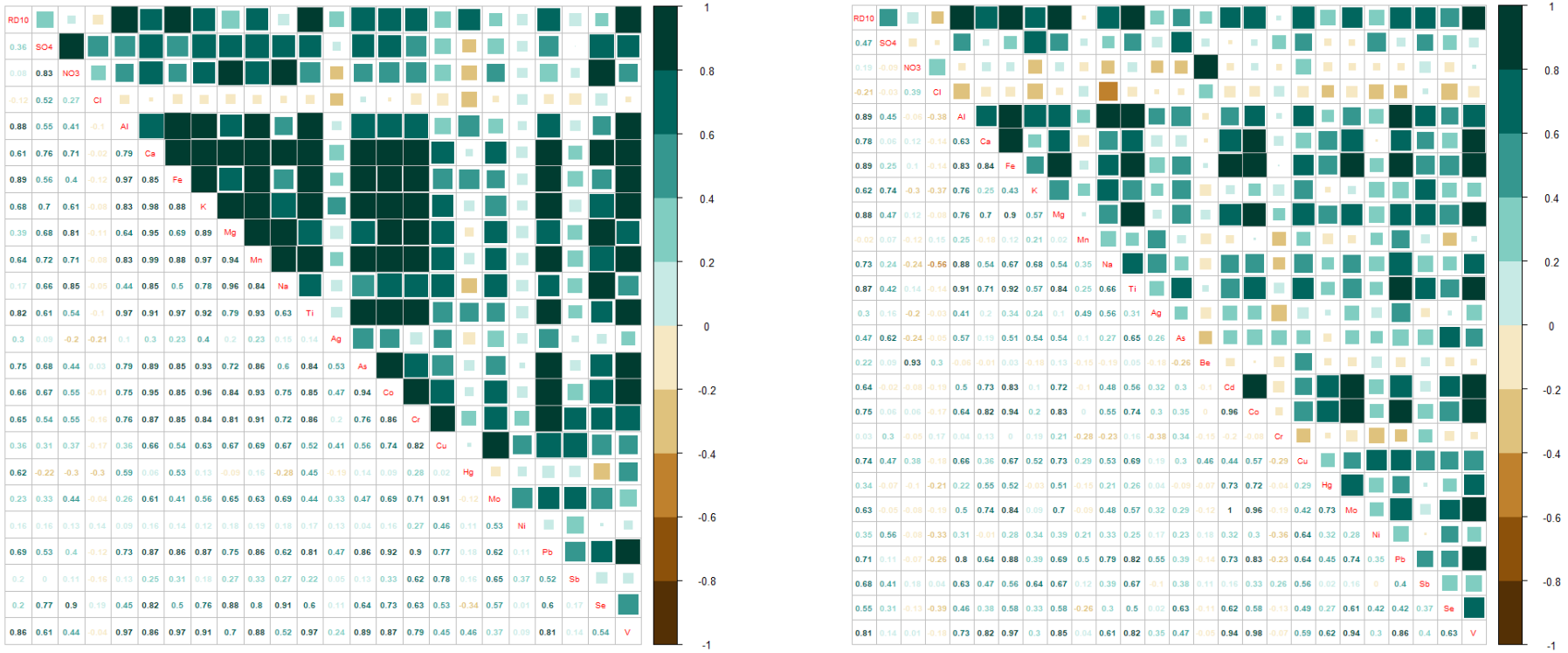
Supplementary materials: Spatial distribution and chemical composition of road dust in two high-altitude Latin American cities †

Sebastián Vanegas [1], Erika M. Trejos [2], Beatriz H. Aristizábal [2], Guilherme M. Pereira [3], Julio M. Hernández [4], Jorge Herrera Murillo [4], Omar Ramírez [5,*], Fulvio Amato [6], Luis F. O. Silva [7], Néstor Y. Rojas [1], Carlos Zafra [8] and Jorge E. Pachón [9,*]

[1] Department of Chemical and Environmental Engineering, Universidad Nacional de Colombia - Sede Bogotá, Bogotá, 111321, Colombia; jovanegasg@unal.edu.co (S.V.); nyrojasr@unal.edu.co (N.Y.R.)
[2] Hydraulic Engineering and Environmental Research Group, Universidad Nacional de Colombia - Sede Manizales, Manizales, 170004, Colombia; emtrejosz@unal.edu.co (E.M.T.); bharistizabalz@unal.edu.co (B.H.A.)
[3] Institute of Chemistry, Universidade de São Paulo, São Paulo, 05580-000, Brazil; guilherme.martins.pereira@usp.br
[4] Environmental Analysis Laboratory, Environmental Sciences School, Universidad Nacional de Costa Rica, Heredia, 40101, Costa Rica; jucemuhe@gmail.com (J.M.H.); jorge.herrera.murillo@una.cr (J.H.M.)
[5] Environmental Engineering Program, Universidad Militar Nueva Granada, Cajicá-Zipaquirá, 250247, Colombia; omar.ramirez@unimilitar.edu.co
[6] Institute for Environmental Assessment and Water Research (IDÆA), Spanish National Research Council (CSIC), Barcelona, 08034, Spain; fulvio.amato@idaea.csic.es
[7] Department of Civil and Environmental Engineering, Universidad de la Costa, Barranquilla, 080002, Colombia; lsilva8@cuc.edu.co
[8] Environmental Engineering Research Group – GIIAUD, Universidad Distrital Francisco José de Caldas, Bogotá, 110321, Colombia; czafra@udistrital.edu.co
[9] Centro Lasallista de Investigación y Modelación Ambiental – CLIMA, Universidad de La Salle, Bogotá, 111711, Colombia; jpachon@unisalle.edu.co
* Correspondence: Omar Ramírez, omar.ramirez@unimilitar.edu.co, +57 301 2414281 and Jorge E. Pachón, jpachon@unisalle.edu.co, +57 310 3173756.
† This paper is dedicated to the memory of Professor Beatriz H. Aristizábal.

Supplementary materials



(a) **(b)**

Figure S1. Correlation matrix of chemically analyzed elements for road dust in the cities of: (a) Bogota and (b) Manizales.

Table S1. Calculation methodology for determining loads in RD_{10}.

Determination	Equation	Variables
RD_{10}, sediment load or road dust with diameter less than 10 μg.	$RD_{10} = \frac{(W_2/W_1)}{(Am)}$	RD_{10} → Sediment load or road dust with diameter less than 10 μg W_1 → Filter weight without impact - before sampling (mg) W_2 → Filter weight impacted - after sampling (mg) A_m → Sampled road area (m^2)
Loading the element in the RD_{10}	$C_x = \frac{(C_i - C_{blk}) \times A_i \times V_L}{A_L \times A_m}$	C_x → Element loading ($\mu g/m^2$) C_i → Concentration of the element in the analyzed sample (mg/L) C_{blk} → Element concentration on the field blank (mg/L) A_i → Filter impacted area (cm^2) V_L → Volume leached (ml) A_L → Leached filter area (cm^2) A_m → Sampled road area (m^2)

Table S2. Concentrations in upper continental crust.

Element	Concentrations (mg/Kg)
Al	80400
Ca	29450
Fe	30890
K	28000
Mn	527
Ti	31117
As	2
Co	11.6
Cr	35
Cu	14.3
Mo	0.083
Ni	18.6
Pb	17
Sb	0.31
Se	0.083
V	53

Source: Reimann, C.; de Caritat, P. Chemical Elements in the Environment. Factsheets for the Geochemist and Environmental Scientist; 1st edition; Springer, Berlin, Heidelberg: Berlin, 1998; ISBN 978-3-642-72018-5.

Table S3. Results of chemical species analyzed for each city (Bogotá and Manizales).

ID Point	RD_{10}	SO_4^{-2}	NO_3^-	Cl^-	Al	Ca	Fe	K	Mg	Mn	Na	Ti	Ag	As	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	V
	mg/m²	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*	*µg/m²*
9	1.82	8.15	5.05	0.00	49.45	49.18	25.40	21.96	19.78	0.23	45.94	0.96	0.02	0.00	0.00	0.00	0.00	0.26	1.06	0.10	0.01	0.04	0.24	0.00	0.00	0.00
10	2.41	5.43	0.00	0.00	52.89	36.16	32.24	13.06	8.18	0.27	2.83	1.13	0.01	0.00	0.00	0.00	0.00	0.16	0.22	0.07	0.00	0.00	0.21	0.01	0.00	0.01
1	3.26	23.67	0.00	0.00	150.93	65.31	74.76	20.19	24.09	0.43	38.72	2.30	0.12	0.00	0.00	0.00	0.00	0.28	0.63	0.07	0.02	1.04	0.49	0.08	0.00	0.08
7	4.60	10.34	0.00	0.00	198.80	233.09	132.19	29.30	41.53	1.14	92.30	5.43	0.01	0.01	0.00	0.00	0.02	0.73	1.61	0.13	0.07	0.18	0.96	0.19	0.00	0.27
20	6.04	89.16	53.07	40.40	160.85	208.35	89.72	24.86	14.25	0.80	19.05	3.21	0.00	0.01	0.00	0.00	0.01	0.42	0.45	0.00	0.02	1.55	0.53	0.04	0.00	0.20
17	6.05	12.21	8.90	0.00	37.54	41.22	16.67	8.51	14.52	0.17	7.19	0.86	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.14	0.03	0.00	0.00
2	7.04	9.68	0.00	0.00	233.12	227.41	117.18	31.81	51.04	0.92	74.58	5.83	0.03	0.00	0.00	0.00	0.00	0.46	0.61	0.07	0.00	1.00	0.80	0.07	0.00	0.10
5	7.06	9.90	0.00	0.00	194.93	192.75	189.83	24.68	35.48	1.29	67.04	4.87	0.02	0.01	0.00	0.00	0.02	1.92	3.64	0.11	0.07	0.40	2.29	0.83	0.00	0.16
11	7.08	9.31	0.00	0.00	253.52	137.95	135.80	31.10	24.95	0.92	12.96	4.56	0.02	0.00	0.00	0.00	0.01	0.50	0.57	0.10	0.03	0.12	0.89	0.12	0.00	0.26
12	8.35	17.47	1.71	0.00	374.93	314.56	213.82	46.00	61.85	1.54	65.01	7.92	0.02	0.00	0.00	0.00	0.02	0.91	1.88	0.12	0.03	0.51	1.88	0.33	0.00	0.31
14	9.40	17.47	1.71	0.00	159.64	163.55	108.71	19.25	42.60	0.84	65.18	3.74	0.02	0.00	0.00	0.00	0.00	0.66	0.65	0.06	0.00	0.00	0.81	0.24	0.00	0.00
6	10.33	17.48	3.79	0.00	227.07	123.96	201.68	19.67	11.43	1.06	0.00	3.42	0.02	0.00	0.00	0.00	0.01	0.64	1.75	0.12	0.04	0.35	1.34	0.56	0.00	0.17
18	10.65	61.67	58.20	36.24	307.94	342.25	191.48	50.19	52.27	1.59	113.17	7.25	0.00	0.02	0.00	0.00	0.03	0.82	1.67	0.01	0.06	0.12	1.62	0.27	0.03	0.40
13	12.07	25.04	1.35	0.00	138.42	116.80	111.48	16.49	14.93	0.72	10.63	2.45	0.01	0.00	0.00	0.00	0.00	0.86	1.42	0.06	0.02	0.07	0.92	0.38	0.00	0.08
3	14.31	9.68	0.00	0.00	219.25	162.02	121.32	26.85	32.62	0.90	55.08	5.59	0.04	0.00	0.00	0.00	0.01	0.92	1.78	0.07	0.09	1.35	1.08	0.25	0.00	0.19
19	16.71	115.69	205.58	0.00	1077.91	1174.22	535.59	187.98	256.89	6.65	605.91	25.42	0.00	0.05	0.00	0.00	0.08	2.99	4.72	0.01	0.14	0.91	3.25	0.45	0.06	1.23
4	18.92	10.87	0.00	0.00	352.63	300.76	269.36	48.85	60.21	2.09	99.02	9.11	0.08	0.01	0.00	0.00	0.03	1.65	5.13	0.19	0.14	2.79	1.62	0.79	0.00	0.34
16	21.15	49.86	3.89	0.00	392.68	425.82	297.96	78.26	54.45	1.95	53.67	7.74	0.23	0.04	0.00	0.00	0.04	0.96	2.13	0.03	0.04	0.26	2.50	0.16	0.01	0.50
15	23.14	49.86	3.89	0.00	632.54	781.34	395.27	155.72	125.05	3.84	257.79	15.03	0.29	0.06	0.00	0.00	0.08	1.94	4.60	0.01	0.12	0.56	3.37	0.34	0.02	1.01
8	45.75	49.86	3.89	0.00	1637.30	623.76	709.82	127.10	66.77	3.79	0.00	27.01	0.01	0.05	0.00	0.00	0.05	2.06	1.08	0.42	0.00	0.40	2.64	0.16	0.00	1.69
Bog[a]	**11.81**	**30.14**	**17.55**	**3.83**	**342.62**	**286.02**	**198.51**	**49.09**	**50.64**	**1.56**	**84.30**	**7.19**	**0.05**	**0.01**	**0.00**	**0.00**	**0.02**	**0.96**	**1.78**	**0.09**	**0.05**	**0.58**	**1.38**	**0.27**	**0.01**	**0.35**
15	1.43	0.00	0.00	26.02	87.47	63.21	42.68	116.32	12.22	341.82	290.69	2.53	0.12	0.14	0.00	0.00	0.01	0.00	0.08	0.00	0.03	0.53	0.18	0.07	0.09	0.09
5	2.52	0.00	0.00	4.78	199.95	288.01	77.14	160.20	27.52	1.09	363.11	4.81	0.00	0.07	0.00	0.00	0.07	3.61	0.57	0.11	0.07	0.79	0.12	0.11	0.10	0.20
12	2.73	0.00	0.00	0.00	179.13	156.03	58.79	114.29	8.61	1.16	412.40	4.87	0.00	0.16	0.00	0.00	0.02	0.00	0.79	0.00	0.04	1.52	0.20	0.09	0.29	0.17
11	3.17	0.00	0.00	2.40	279.77	58.92	69.26	215.35	29.40	23.00	534.12	5.74	0.07	0.21	0.00	0.00	0.04	4.17	0.15	0.00	0.01	0.36	0.21	0.08	0.18	0.21
13	3.57	0.00	0.00	1.19	387.53	82.65	129.31	245.36	23.24	2.59	532.85	8.85	0.03	0.21	0.00	0.00	0.04	0.00	1.56	0.00	0.02	0.64	0.33	0.12	0.25	0.38
17	4.16	0.00	0.00	ND	308.14	344.93	107.89	298.11	32.01	16.58	744.34	5.51	0.01	0.08	0.00	0.00	0.05	2.06	0.97	0.01	0.04	0.67	0.21	0.13	0.11	0.23
18	5.92	13.84	0.00	2.46	403.60	131.62	102.90	274.62	40.68	8.48	804.19	4.71	0.03	0.09	0.04	0.04	0.03	0.00	1.63	0.03	0.04	1.65	0.23	0.14	0.15	0.21
14	6.46	87.81	ND	ND	407.40	80.04	132.11	428.80	52.76	84.31	692.17	8.07	0.11	0.22	0.04	0.04	0.05	0.00	3.83	0.03	0.05	2.70	0.43	0.15	0.27	0.34
19	6.52	6.69	0.00	0.00	476.95	434.52	157.55	279.94	8.27	3.02	935.96	8.61	0.18	0.13	0.00	0.00	0.04	0.00	0.39	0.00	0.06	0.25	0.96	0.13	0.15	0.37
16	7.14	26.83	0.00	5.70	451.19	325.60	211.77	415.50	63.38	3.50	672.25	10.32	0.00	0.18	0.00	0.00	0.06	2.45	2.31	0.01	0.06	0.38	0.57	0.50	0.28	0.45
8	7.19	28.14	0.00	0.00	716.66	249.35	336.77	415.46	57.59	730.60	1174.41	18.06	0.14	0.20	0.00	0.01	0.12	0.00	3.95	0.01	0.19	1.64	3.88	0.31	0.16	0.81
20	7.53	10.37	38.48	15.44	356.62	358.33	250.83	156.55	55.87	4.92	445.68	12.39	0.02	0.11	0.14	0.01	0.11	1.09	3.74	0.01	0.07	0.85	0.62	0.27	0.16	0.56
4	8.54	78.33	0.00	11.32	616.82	449.24	333.71	417.65	79.50	7.42	677.41	18.22	0.04	0.32	0.00	0.02	0.10	7.10	1.46	0.00	0.09	0.95	0.92	0.33	0.22	0.81
2	11.72	13.09	0.00	0.00	720.59	803.21	685.59	305.41	117.29	19.78	1106.33	20.72	0.13	0.24	0.00	0.99	0.46	0.00	3.93	0.13	11.05	1.72	4.48	0.26	0.38	2.58
Man[b]	**5.61**	**18.94**	**2.96**	**5.78**	**399.42**	**273.26**	**192.59**	**274.54**	**43.45**	**89.16**	**670.42**	**9.53**	**0.06**	**0.17**	**0.02**	**0.08**	**0.09**	**1.46**	**1.81**	**0.02**	**0.84**	**1.05**	**0.95**	**0.19**	**0.20**	**0.53**

[a] Average value for Bogotá. [b] Average value for Manizales. ND → No Data.