Dust characterization and its potential impact during the 2014-15 Fogo volcano eruption (Cape Verde)

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Figrue S1. Fogo island sampling sites at (a) location with displaced population; and (b) human settlements.

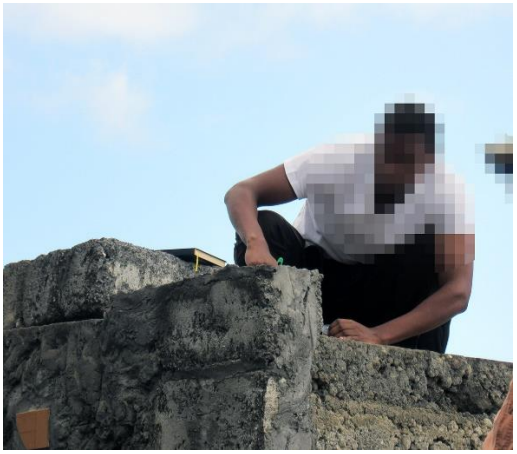
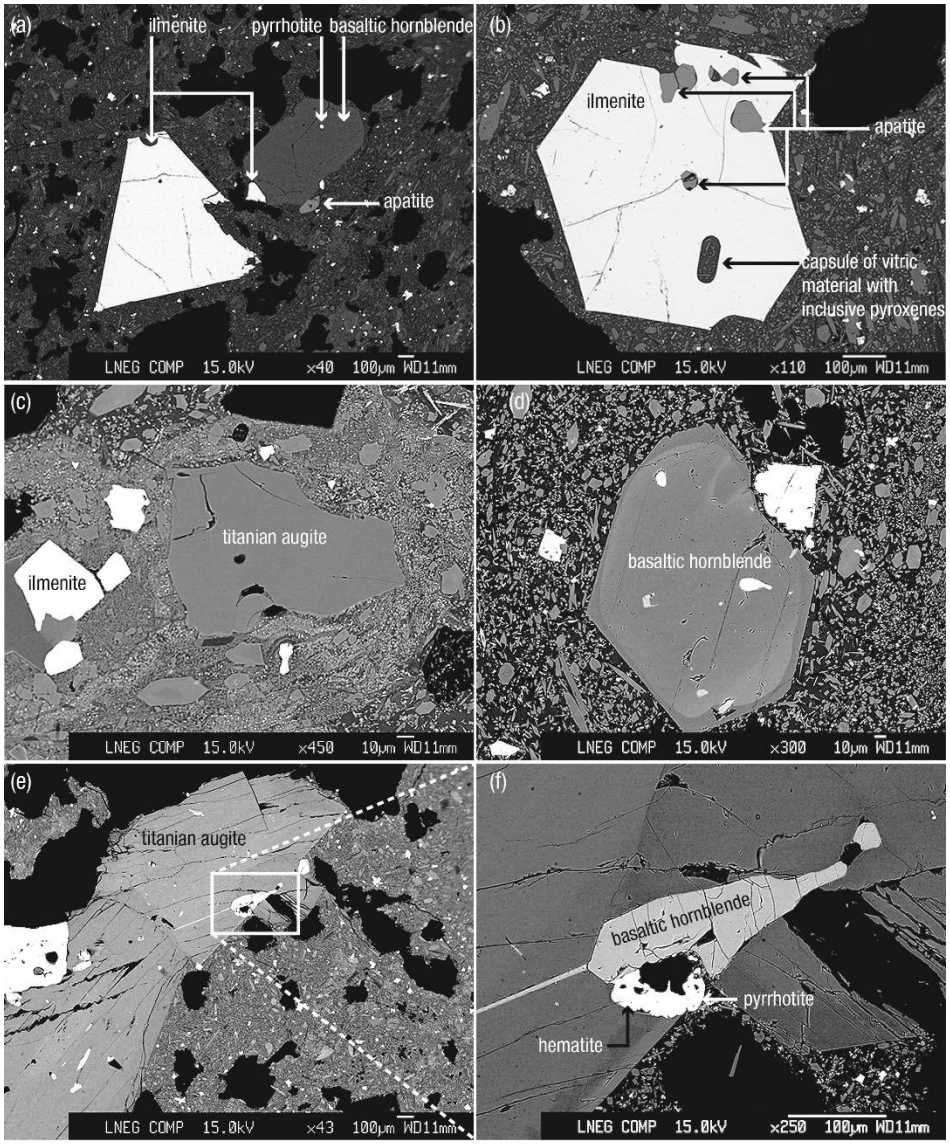


Figure S2. Rooftop dust collection, with new plastic broom and shovel.



Figrue S3. Backscattered electron imaging of Fogo 2014-15 eruption lava samples.

Table S1. Main mineral occurrence (DRX analysis) in the two lava samples and different dust size fractions [µm].

Mineral	Lava	Rooftop dust					
		[1000, 2000[	[500, 1000[	[500, 250[	[250, 125[	[125, 63[	[-∞, 63[
Quartz [SiO_2]	+++	++++++	+++++++	+++++	++++	+++	+++
Aegirine [$(Na,Ca)(Fe^{3+},Fe^{2+},Mg,Al)Si_2O_6$]	++	++++	++++++	+++++	++		
Augite [$(Ca,Na)(Mg,Fe,Al,Ti)_2(Si,Al)_2O_6$]	++	+++++++	+++++++	+++++++	+++++++	+++++++	++++
Calcite [$CaCO_3$]			+++	++	+	++	++++
Diopside [$CaMgSi_2O_6$]	++	+++++	+++++	++++++++	++++++++	++++++++	+++++++
Fluorite [CaF_2]	+	+++++	+++	+++	+++	+	++
Forsterite [Mg_2SiO_4]		+++	+++	++	++	++	++
Hematite [Fe_2O_3]	++	++	++	+++++	++++	++	++
Ilmenite [$Fe^{2+}TiO_3$]	++	+	+++	++++++	+++++	+++	+++
Leucite [$KAlSi_2O_6$]	++	+++++	++++++	+++++			
Magnesioferrite [$MgFe^{3+}O_4$]	++			++	++++	+++++	++++

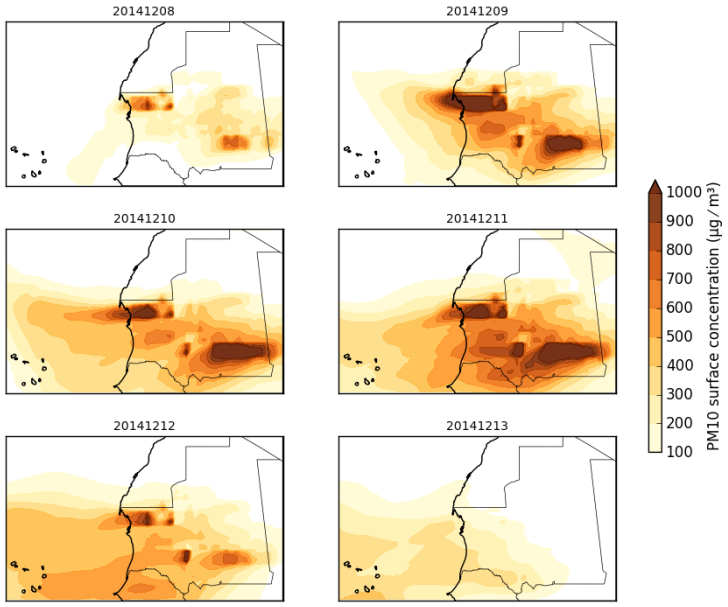


Figure. S4 Daily evolution of the modeled mean PM_{10} surface concentrations within the inner domain (CV_{d2}) during a dust storm impacting air quality in Cape Verde (December 08 to 13, 2014).

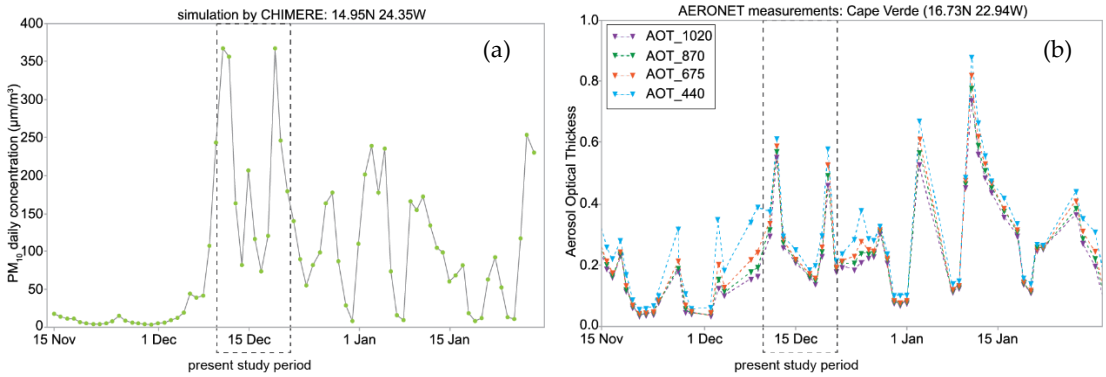


Figure. S5. (a) Modeled daily mean PM_{10} concentrations in Fogo Island, Cape Verde, between 15 November 2014 and 31 January 2015 (simulation by CHIMERE: 14.95N 24.35W); and (b) Aerosol optical thickness (Level 2.0; daily averages) observed in the AERONET site installed in Sal Island, Cape Verde, between 15 November 2014 and 31 January 2015.

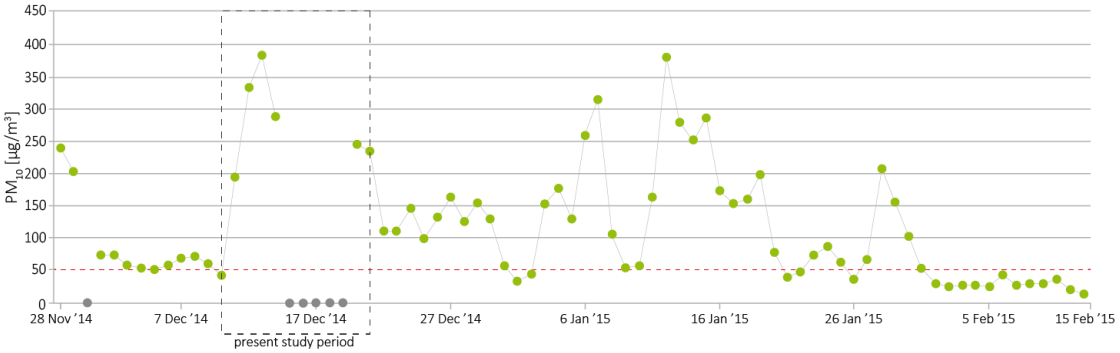


Figure. S6. Daily mean PM_{10} concentrations in São Filipe, between November 28th 2014 and February 15th 2015 (courtesy of INMG - National Institute of Meteorology and Geophysics, Cape Verde). The red dashed line represents the daily mean 50 µg/m³ guideline proposed by WHO (2006). Days without readings are in grey dots.

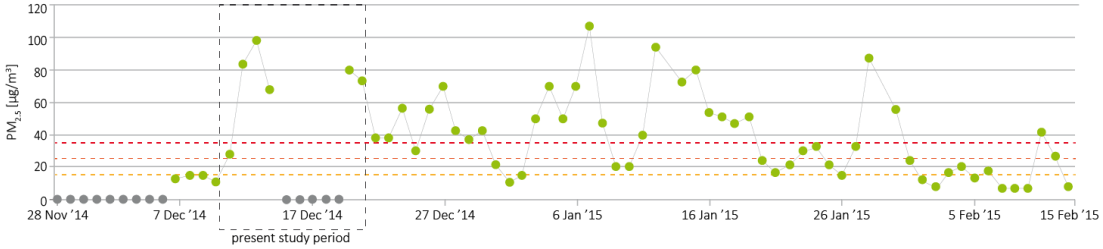


Figure S7. Daily mean $PM_{2.5}$ concentrations in São Filipe for the eruption time-lapse, between December 7th 2014 and February 15th 2015 (courtesy of INMG - National Institute of Meteorology and Geophysics, Cape Verde). Dashed lines represent the daily mean 25 ($AQG_{PM2.5}$), 15 (IT-3), 25 (IT-2) and 35 (IT-1) µg/m³ guidelines proposed by WHO (2006). Days without readings are in grey dots.

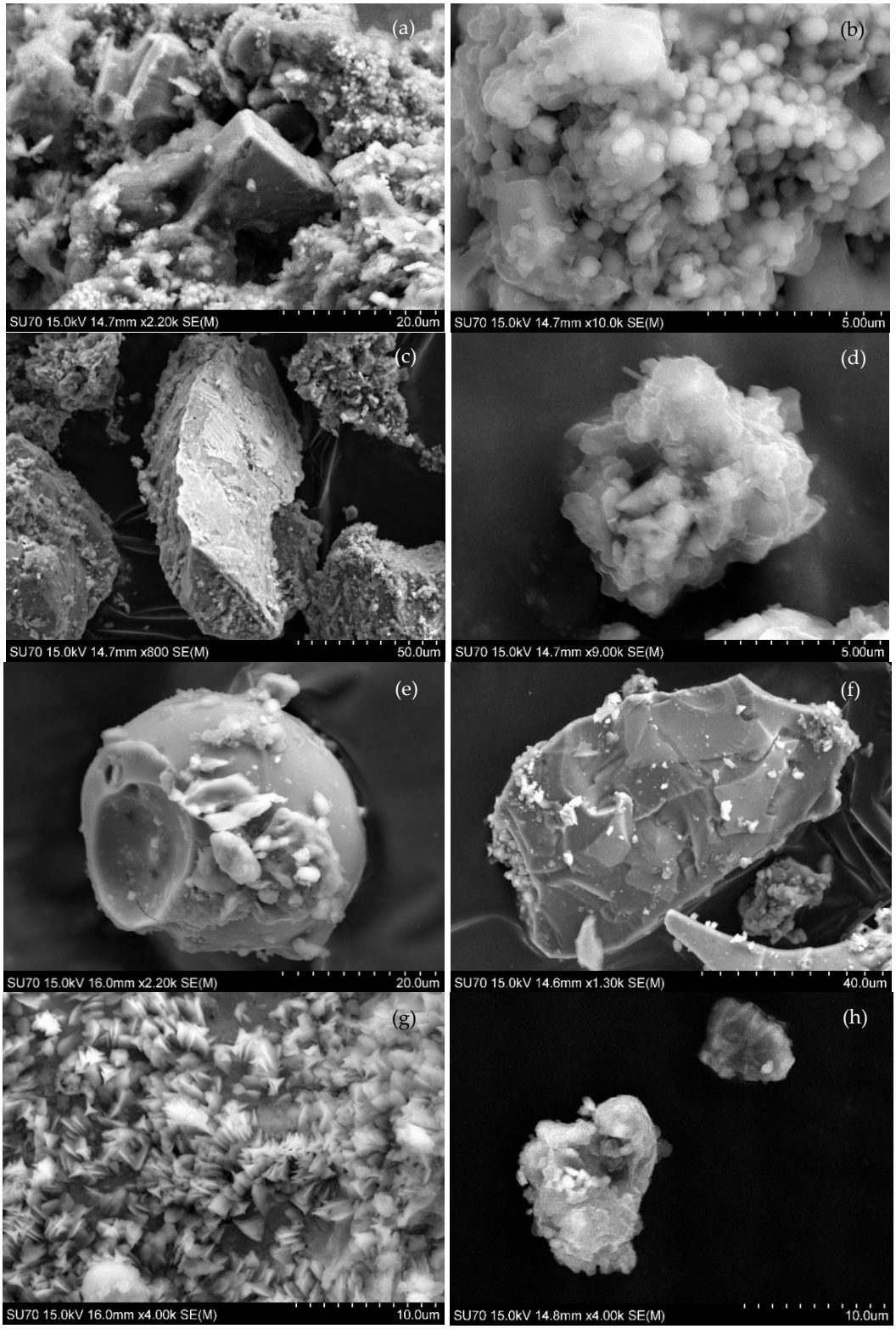


Figure. S8. SEM images of dust collected on the rooftops of private houses: (a) cubic particles of augite [(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al)$_2$O$_6$] surrounded by small fluorite [CaF$_2$] particles; (b) detail of fluorite aggregate; (c) hematite [Fe$_2$O$_3$] with marks that suggest brittle fracture processes, covered with Ti oxides cristals; (d) particle aggregate with quartz and haüyne [(Na,Ca)$_{4\text{-}8}$Al$_6$Si$_6$(O,S)$_{24}$(SO$_4$,Cl)$_{1\text{-}2}$]; (e) Fe oxide with vesicular marks; (f) sharp Fe and Ti rich particle with marks resulting from brittle fracture conditions characteristic of the eruption; (g) raft-like calcite aggregate; (h) rounded Fe and Ca enriched particles (Sahara dusts?).

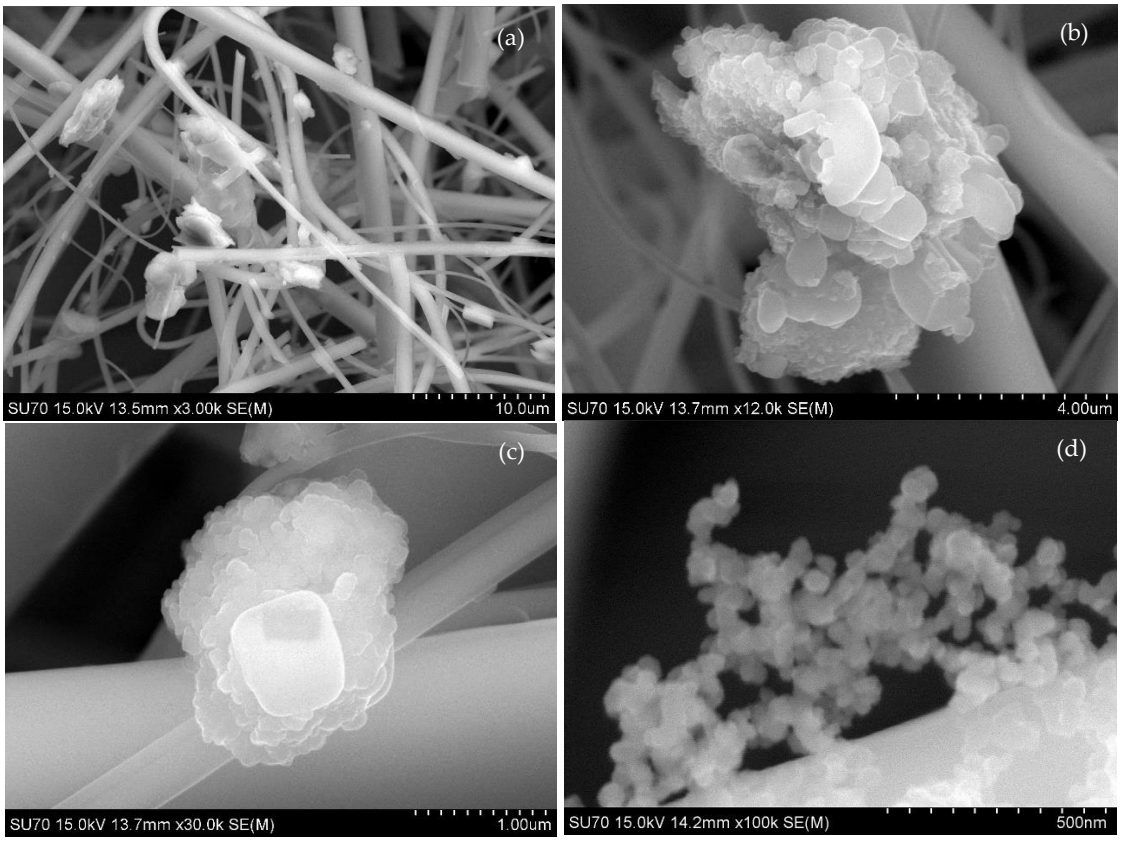


Figure. S9. SEM images of PM_{10} collected on quartz filters: (a) PM_{10} enriched in Fe, S and Ti; (b) Ca and S rich particles agglomerate (Bassanites?) with inhalable size; (c) salt [NaCl] on top of a Si, Fe, Ti enriched particle (Sahara?); (d) soot aggregate.

Table S2. Enrichment index (Ei), Geoaccumulation Index (Igeo), Enrichment Factor (EF), Contamination Factor (CF), Contamination Degree (CD), Pollution Load Index (PLI) and Potential Ecological Risk Index (PERI) for Al, Ca, Fe, K, Mg, Si, and Ti in outdoor dust samples sized < 63, 63-125 and 125-250 μm.

	Ø < 63 μm			**Ø 63 - 125 μm**			**Ø 125 - 250 μm**		
	mean	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**
Ei	1.0	1.0	1.1	1.2	1.1	1.3	1.2	1.0	1.5
CD	1.0	1.0	1.1	1.2	1.1	1.3	1.2	1.0	1.5
PLI	1.0	0.9	1.1	1.1	1.0	1.2	1.1	0.9	1.1
PERI	28	27	29	32	30	34	34	30	44
$Igeo_{Al}$	-0.4	-0.6	-0.2	-0.7	-1.1	-0.5	-0.7	-1.2	-0.5
$Igeo_{Ca}$	-0.3	-0.3	-0.2	-0.1	-0.3	0.1	-0.2	-0.3	0.0
$Igeo_{Fe}$	-0.2	-0.3	-0.1	0.0	-0.2	0.1	0.0	-0.3	0.4
$Igeo_{K}$	-0.8	-0.9	-0.6	-0.8	-1.7	-0.4	-1.2	-2.6	-0.5
$Igeo_{Mg}$	-0.1	-0.3	0.1	0.3	0.2	0.7	0.4	-0.5	0.9
$Igeo_{Si}$	-0.7	-0.8	-0.5	-0.5	-0.6	-0.3	-0.5	-0.8	-0.3
$Igeo_{Ti}$	-0.4	-0.5	-0.3	-0.2	-0.3	-0.1	-0.1	-0.3	0.3
CF_{Al}	1.0	0.8	1.2	0.8	0.3	1.0	0.7	0.5	0.9
CF_{Ca}	1.1	1.1	1.7	1.3	1.1	1.6	1.2	1.1	1.5
CF_{Fe}	1.3	1.2	1.4	1.4	1.3	1.7	1.5	1.2	2.3
CF_{K}	0.7	0.6	0.8	0.7	1.8	3.7	0.5	0.1	0.9
CF_{Mg}	1.4	1.1	1.7	2.1	1.8	3.1	2.5	0.9	3.7
CF_{Si}	0.8	0.7	0.9	0.9	0.7	1.1	0.9	0.7	1.1
CF_{Ti}	1.0	0.9	1.1	1.2	1.1	1.4	1.3	1.1	2.0

Table S3 Enrichment index (Ei), Geoaccumulation Index (Igeo), Contamination Factor (CF), Contamination Degree (CD), Pollution Load Index (PLI) and Potential Ecological Risk Index (PERI) for As, Cd, Co, Cr, Cu, Mn, Ni, Pb, and Zn in outdoor dust samples, fractions < 63, 63-125 and 125-250 μm.

	Ø < 63 μm			**Ø 63 - 125 μm**			**Ø 125 - 250 μm**		
	mean	**min**	**max**	**mean**	**min**	**max**	**mean**	**min**	**max**
Ei	2.5	2.2	2.6	2.1	1.2	4.2	2.4	1.1	4.9
CD	2.0	1.8	2.3	1.7	1.0	3.9	2.1	0.9	4.6
PLI	2.2	2.2	2.3	1.7	1.1	2.8	1.6	1.0	2.3
PERI	431	414	448	273	158	506	292	144	551
$Igeo_{As}$	1.1	0.6	1.5	-0.3	-0.4	0.8	-0.3	-0.4	0.6
$Igeo_{Cd}$	0.9	0.3	1.4	0.0	-0.5	1.3	-0.3	-0.8	0.0
$Igeo_{Co}$	-0.1	-0.1	-0.1	0.0	-0.2	0.5	0.2	-0.2	0.9
$Igeo_{Cr}$	0.3	0.3	0.4	0.3	-0.9	2.0	0.5	-2.0	2.4
$Igeo_{Cu}$	0.4	0.4	0.5	0.3	0.1	0.7	0.0	-0.2	0.2
$Igeo_{Mn}$	-0.4	-0.4	-0.3	-0.3	-0.4	-0.3	-0.4	-0.5	-0.3
$Igeo_{Ni}$	0.8	0.8	0.8	0.9	0.3	2.4	1.3	0.1	2.5
$Igeo_{Pb}$	0.6	0.4	0.8	-0.1	-0.5	1.1	-0.6	-1.3	0.2
$Igeo_{Zn}$	-0.1	-0.2	0.1	-0.1	-0.4	0.5	-0.2	-0.4	0.2
CF_{As}	3.9	3.9	3.9	1.3	1.0	3.4	1.2	1.0	2.7
CF_{Cd}	4.2	2.1	6.3	1.8	0.9	5.7	1.1	0.7	1.5
CF_{Co}	1.4	1.4	1.4	1.6	1.3	2.5	1.9	1.2	3.8
CF_{Cr}	2.1	2.0	2.2	3.0	0.6	11.1	5.1	0.2	15.9
CF_{Cu}	2.3	2.2	2.5	2.1	1.7	3.1	1.6	1.2	1.9
CF_{Mn}	1.0	1.0	1.1	1.1	1.0	1.2	1.0	0.9	1.1
CF_{Ni}	3.3	3.3	3.4	5.0	2.0	15.9	7.2	1.6	17.8
CF_{Pb}	2.7	2.2	3.2	1.7	0.9	4.6	0.9	0.4	1.8
CF_{Zn}	1.4	1.2	1.7	1.5	1.0	2.5	1.2	1.0	1.8