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11 **Table S1.** Mass fraction (mg per g) of soluble cations for the mineral dust samples investigated in  
 12 this work (n. d.: not detected).

sample	Na <sup>+</sup>	NH <sub>4</sub> <sup>+</sup>	K <sup>+</sup>	Ca <sup>2+</sup>	Mg <sup>2+</sup>	cations *
SiO <sub>2</sub>	n. d.	n. d.	0.04	n. d.	0.06	0.11
TiO <sub>2</sub>	n. d.	n. d.	n. d.	n. d.	n. d.	n. d.
hematite	0.36	0.32	n. d.	n. d.	n. d.	0.68
goethite	0.08	n. d.	0.07	0.63	0.91	1.69
magnetite	0.15	n. d.	n. d.	n. d.	n. d.	0.15
potassium feldspar	0.30	n. d.	0.79	0.06	0.58	1.73
albite	1.48	n. d.	n. d.	n. d.	n. d.	1.48
microcline	0.24	n. d.	1.03	0.29	0.47	2.02
CaCO <sub>3</sub>	n. d.	n. d.	n. d.	n. d.	6.73	6.73
dolomite	0.01	n. d.	n. d.	3.03	8.81	11.85
illite	0.08	n. d.	0.72	0.29	0.80	1.89
kaolinite	0.01	n. d.	0.08	n. d.	0.02	0.10
montmorillonite	0.06	n. d.	0.05	n. d.	0.37	0.48
chlorite	n. d.	n. d.	0.05	0.47	0.08	0.60
ATD	1.01	n. d.	1.20	0.38	6.10	8.69
China loess	0.35	n. d.	0.39	0.27	3.47	4.47
QH dust	0.64	n. d.	0.51	0.38	3.97	5.51
TLF dust	0.78	0.02	0.49	0.32	6.46	8.07
Bordj dust	1.60	n. d.	0.29	0.09	3.58	5.56
M'Bour dust	n. d.	n. d.	0.18	0.09	0.62	0.89
Saharan dust						

13 \*: Total mass fractions of all the cations.

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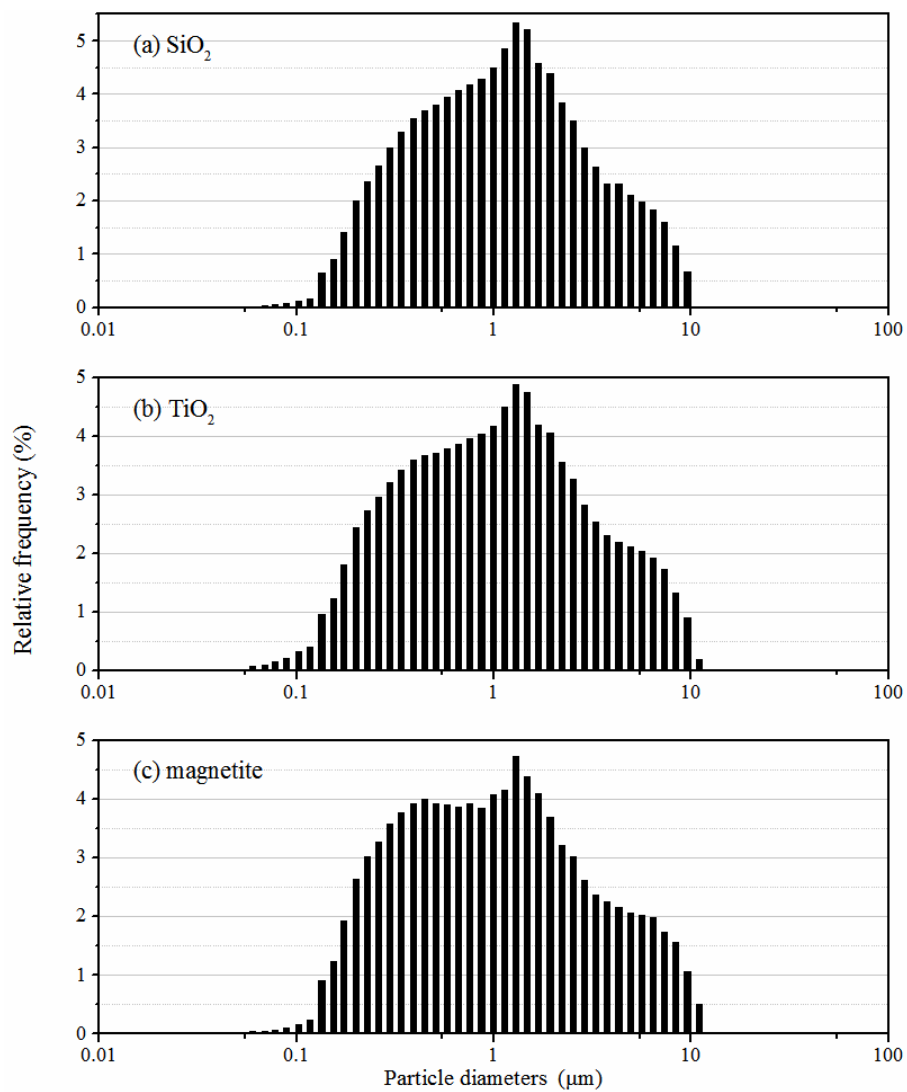
16 **Table S2.** Mass fraction (mg per g) of soluble anions for the mineral dust samples investigated in  
 17 this work (n. d.: not detected).

sample	F <sup>-</sup>	Cl <sup>-</sup>	NO <sub>3</sub> <sup>-</sup>	SO <sub>4</sub> <sup>2-</sup>	anions <sup>*</sup>	total #
SiO <sub>2</sub>	n. d.	0.06	n. d.	n. d.	0.06	0.16
TiO <sub>2</sub>	0.10	1.26	n. d.	n. d.	1.37	1.37
hematite	0.10	0.06	0.08	2.37	2.62	3.30
goethite	0.11	0.08	0.07	2.74	3.00	4.69
magnetite	n. d.	0.08	n. d.	0.41	0.49	0.64
potassium feldspar	0.05	0.11	0.02	0.08	0.27	2.00
albite	0.10	0.13	0.01	n. d.	0.24	1.72
microcline	n. d.	0.38	n. d.	n. d.	0.38	2.39
CaCO <sub>3</sub>	n. d.	0.07	n. d.	n. d.	0.07	6.80
dolomite	0.10	0.17	n. d.	n. d.	0.27	12.12
illite	0.09	0.09	n. d.	0.84	1.03	2.91
kaolinite	0.06	0.08	n. d.	0.21	0.35	0.45
montmorillonite	0.11	0.21	n. d.	0.30	0.61	1.09
chlorite	0.11	0.06	n. d.	n. d.	0.17	0.77
ATD	0.11	1.35	0.08	0.62	2.15	10.84
China loess	n. d.	n. d.	n. d.	n. d.	n. d.	4.47
QH dust	n. d.	0.16	n. d.	2.07	2.23	7.74
TLF dust	0.10	0.51	0.13	0.94	1.68	9.75
Bordj dust	0.05	1.72	0.09	5.12	6.98	12.55
M'Bour dust	n. d.	0.11	0.31	0.13	0.55	1.44
Saharan dust						

18 <sup>\*</sup>: Total mass fractions of all the anions; total mass fractions of all the ions.

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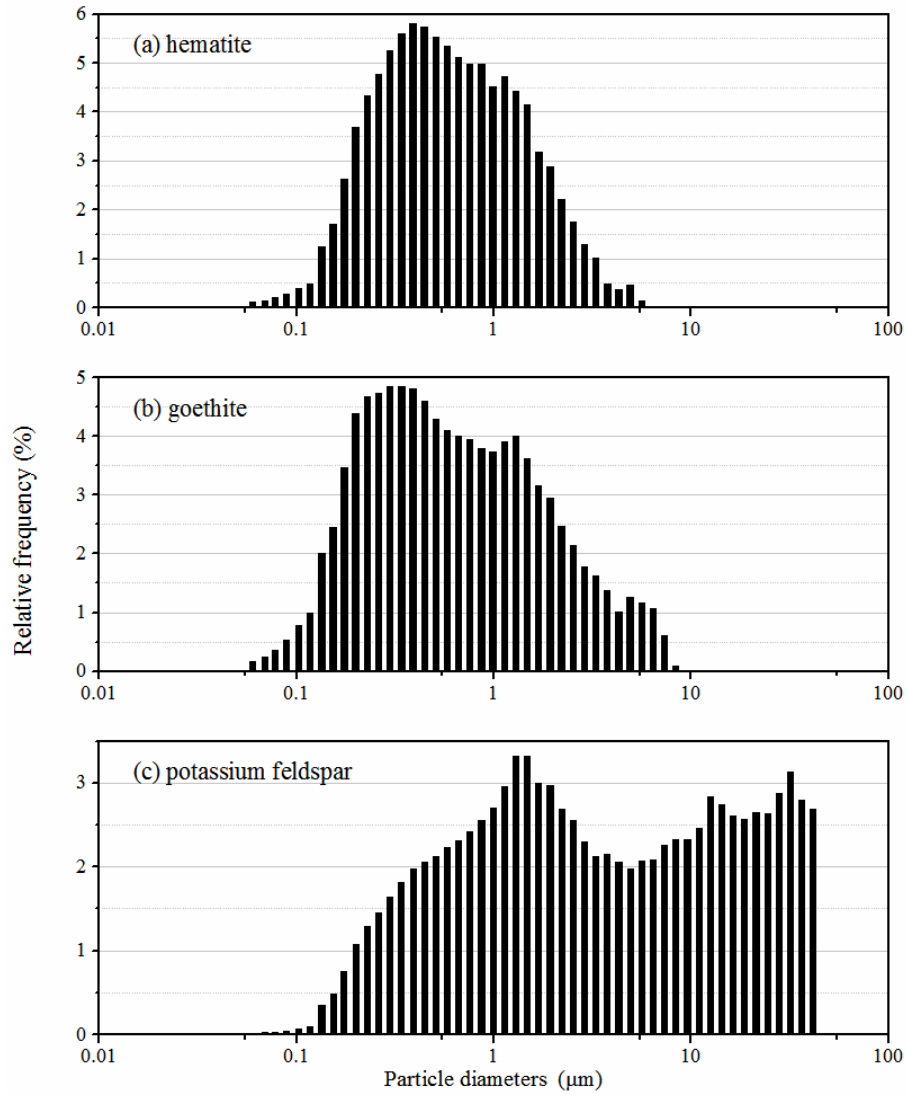


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23 **Figure S1.** Particle size distribution of (a) SiO<sub>2</sub>, (b) TiO<sub>2</sub> and (c) magnetite.

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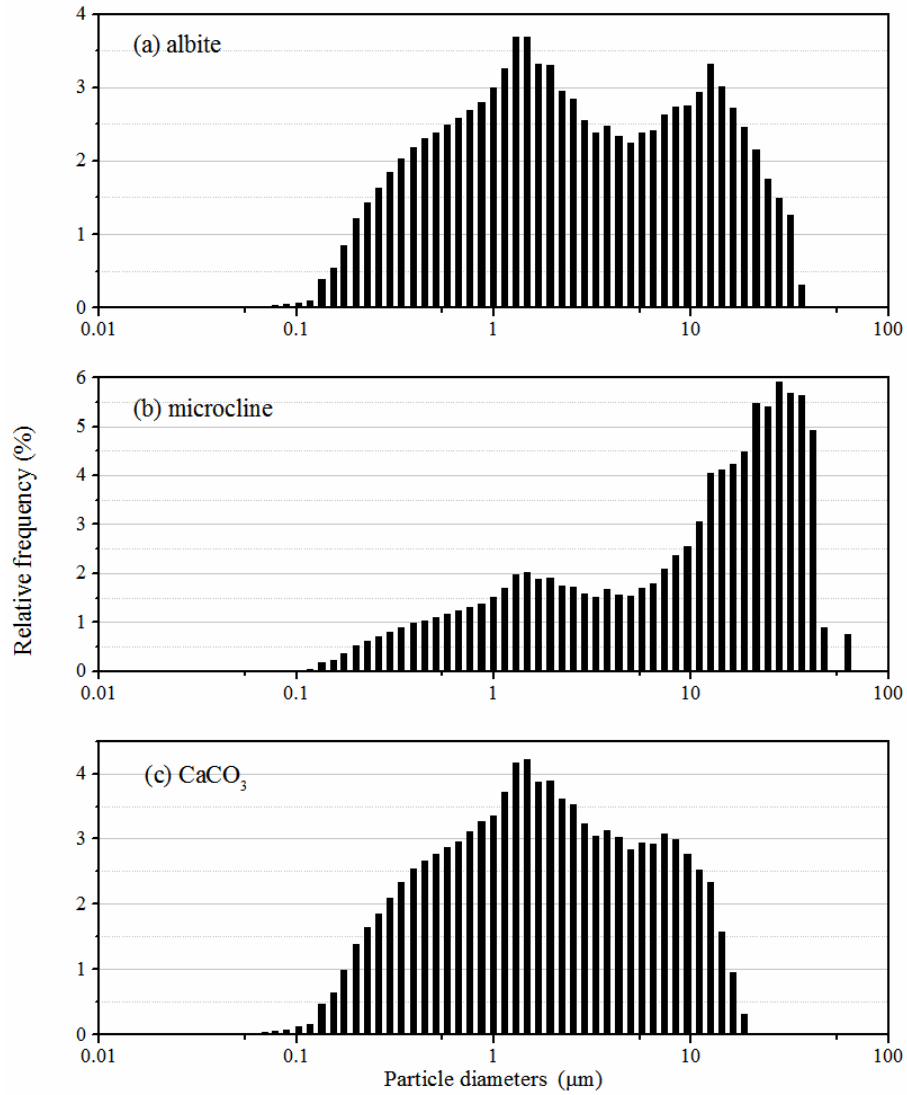


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27 **Figure S2.** Particle size distribution of (a) hematite, (b) goethite and (c) potassium feldspar.

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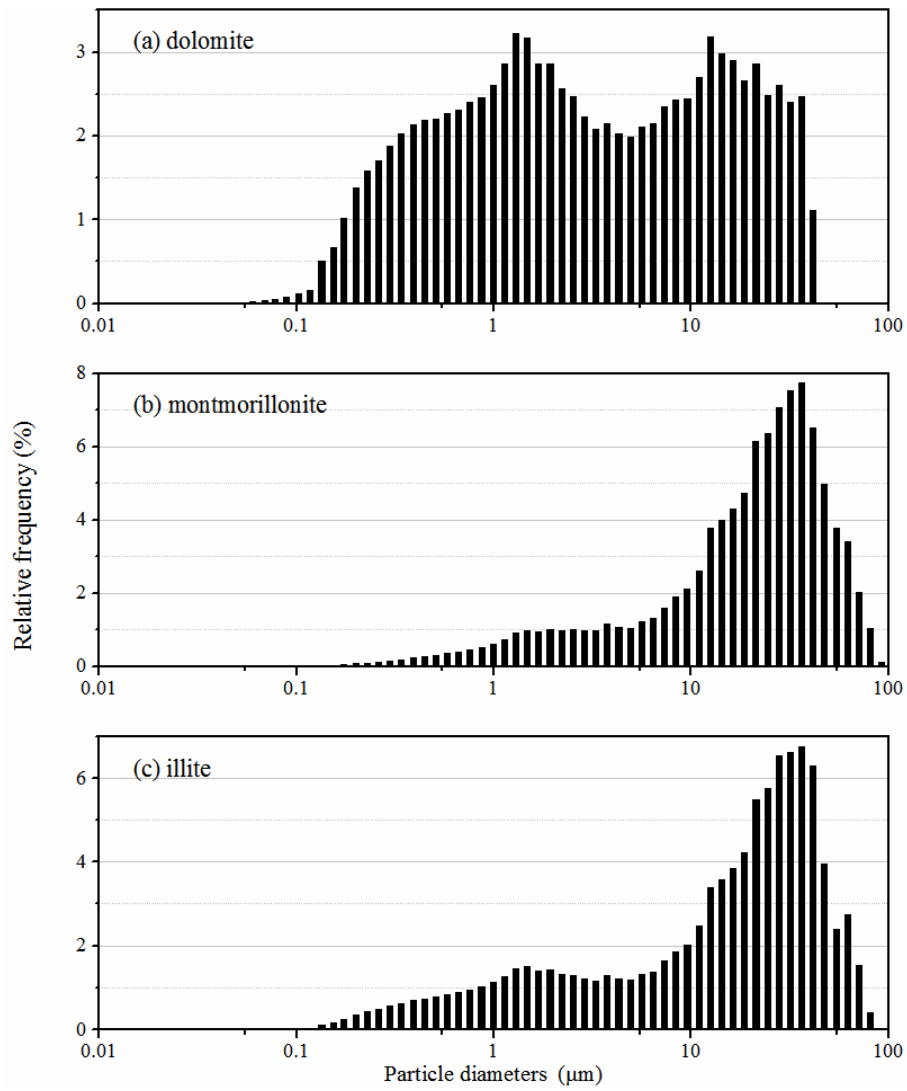


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31 **Figure S3.** Particle size distribution of (a) albite, (b) microcline and (c) CaCO<sub>3</sub>.

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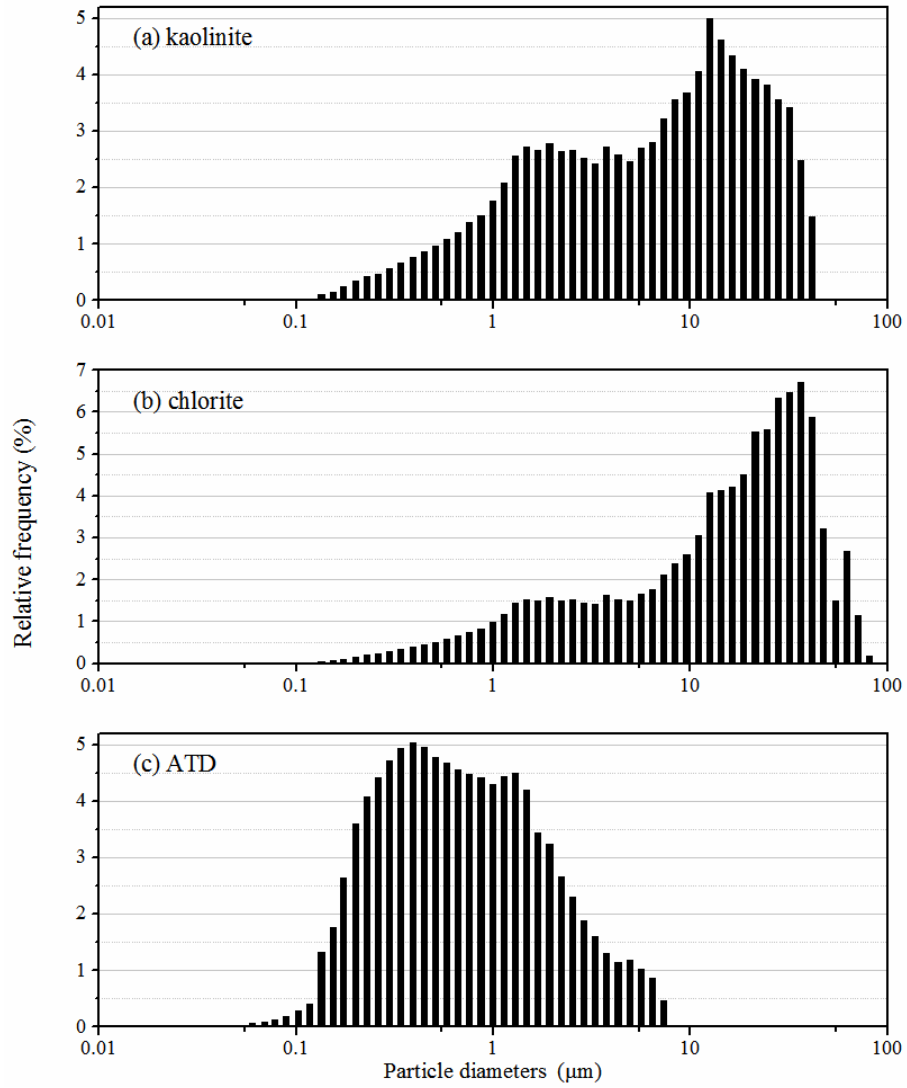


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35 **Figure S4.** Particle size distribution of (a) dolomite, (b) montmorillonite and (c) illite.

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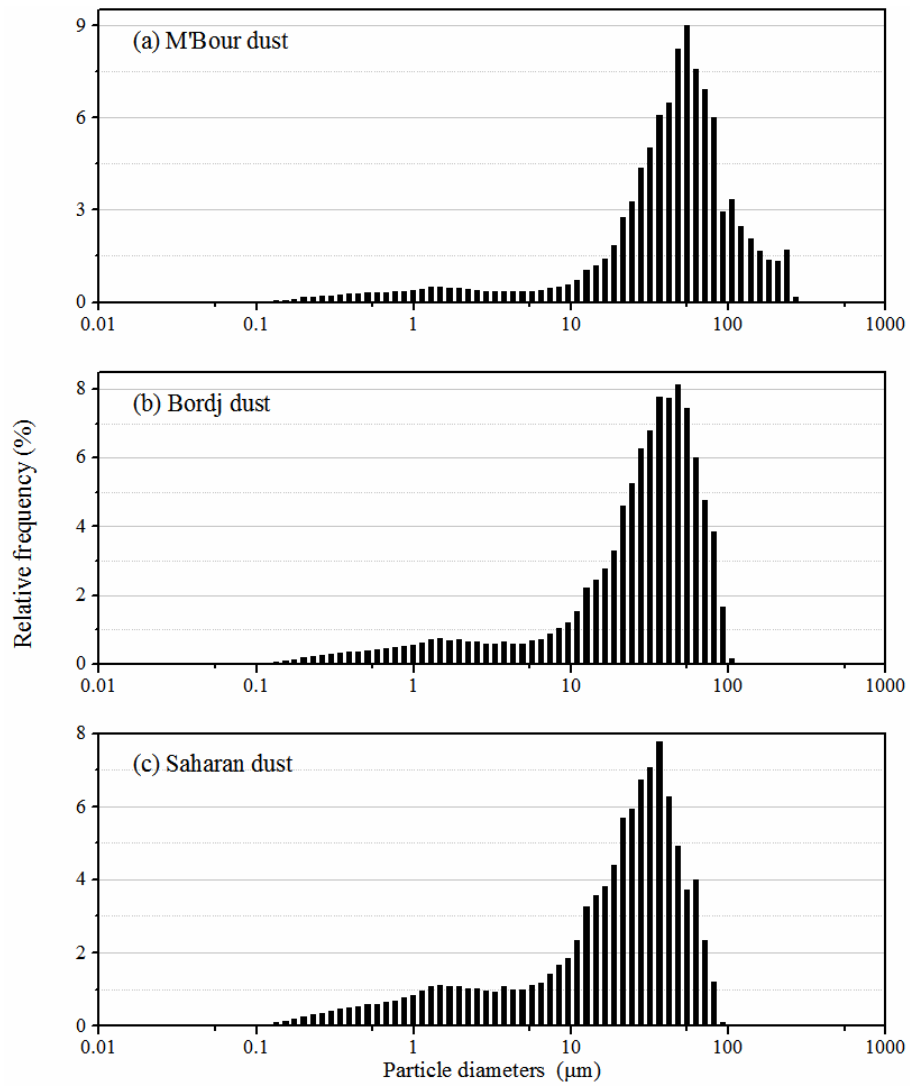
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39 **Figure S5.** Particle size distribution of (a) kaolinite, (b) chlorite and (c) ATD.

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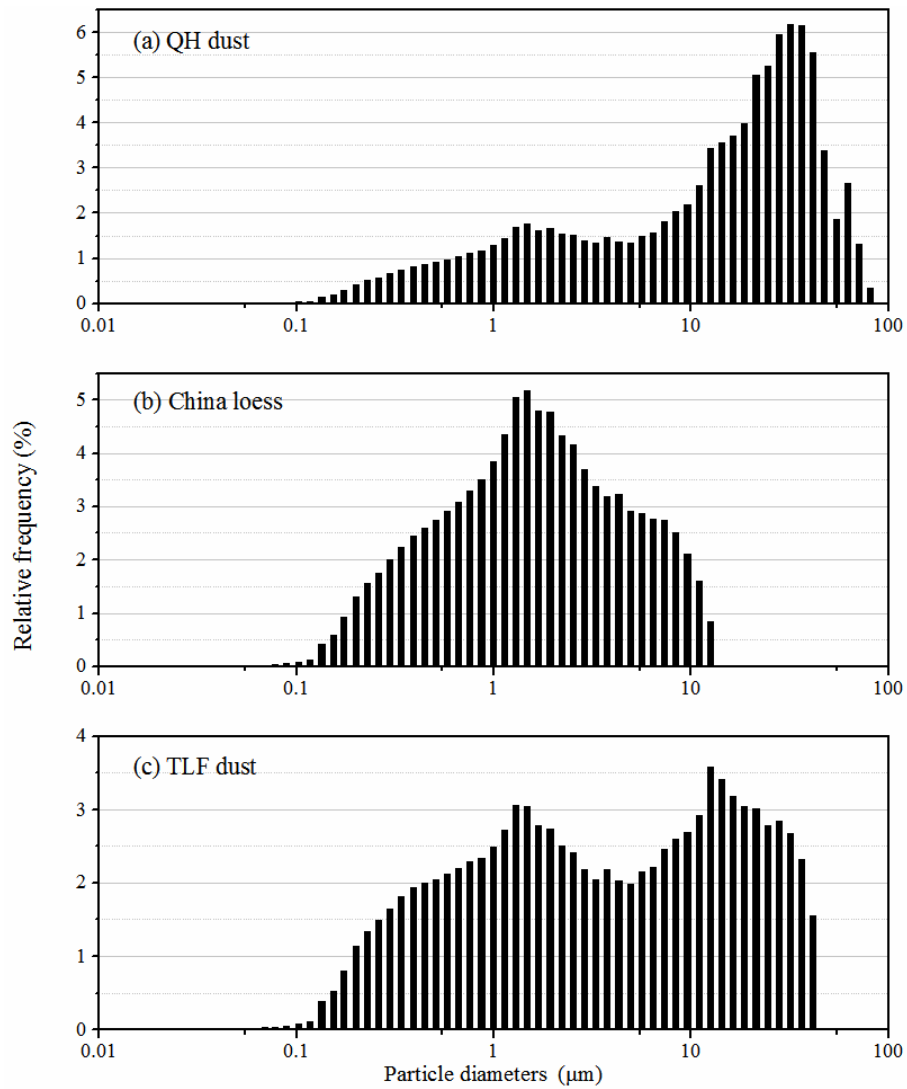


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43 **Figure S6.** Particle size distribution of (a) M'Bour dust, (b) Bordj dust and (c) Saharan dust.

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47 **Figure S7.** Particle size distribution of (a) QH dust, (b) China loess and (c) TLF dust.

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