

Electronic Supplementary Information

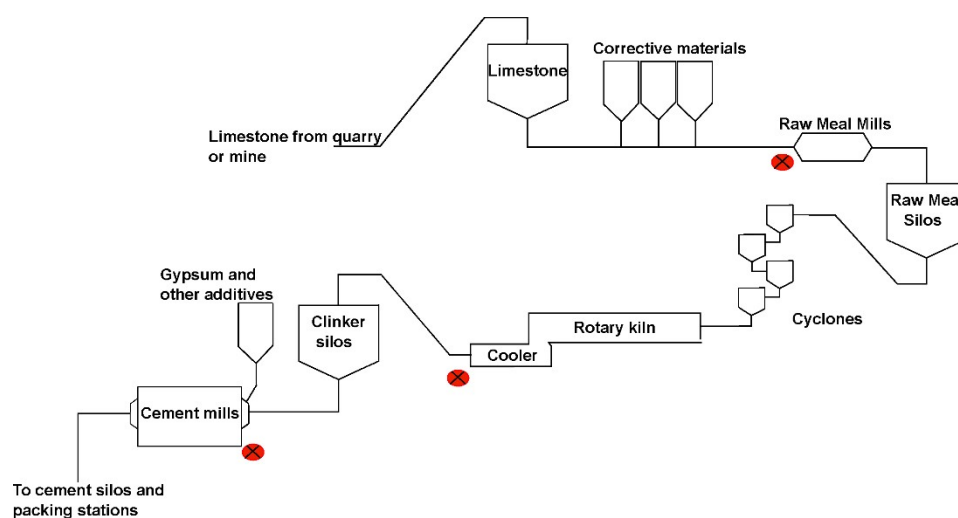


Figure S1: Main processes in the cement production and location of sampling equipment (red dots).

Table S1: Overview of samples collected during the two sampling campaigns.

Location	Campaign 1, Spring 2017 (30.05.2017-01.06.2017)	Campaign 2, Fall 2018 (14.11.2018-16.11.2018)
Raw meal mill	<p>NanoMOUDI PVC substrates (Mass - Gravimetric and elemental analysis - contaminated)</p> <p>NanoMOUDI, TEM grids (SEM on all impactor stages)</p>	<p>SMPS (model 3938) Number -size distribution (17-542 nm d_{me})</p> <p>APS (model 3321) Number -size distribution (0.542-17.15 $\mu\text{m } d_{ae}$)</p>
Clinker conveyor belt	<p>NanoMOUDI, PVC substrates (Mass - Gravimetric and elemental analysis)</p> <p>NanoMOUDI, TEM grids (SEM on all impactor stages, TEM on stage 6)</p>	<p>SMPS (model 3938) Number -size distribution (17-542 nm d_{me})</p> <p>APS (model 3321) Number -size distribution (0.542-17.15 $\mu\text{m } d_{ae}$)</p>
Cement mill	<p>NanoMOUDI, PVC substrates (Mass-Gravimetric and elemental analysis)</p> <p>NanoMOUDI, TEM grids (SEM on all impactor stages)</p>	<p>SMPS (model 3938) Number -size distribution (17-542 nm d_{me})</p> <p>APS (model 3321) Number -size distribution (0.542-17.15 $\mu\text{m } d_{ae}$)</p>
Personal air sampling (not specific location)	<p>Personal Sioutas impactors, Teflon filters (Mass - Gravimetric analysis)</p> <p>Personal respirable cyclones, PVC filters (Mass - Gravimetric analysis)</p> <p>Personal thoracic cyclones, PVC filters (Mass - Gravimetric analysis)</p>	

Table S2: Recoveries of Portland Cement

Oxide	Recovery (%)
Na ₂ O	87
MgO	100
Al ₂ O ₃	100
SiO ₂	113
P ₂ O ₅	86
SO ₃	77
K ₂ O	86
CaO	102
TiO ₂	102
Cr ₂ O ₃	72
Mn ₂ O ₃	83
Fe ₂ O ₃	82
ZnO	85

Table S3: Calculated thoracic and respirable fractions from the Sioutas impactor

Thoracic cyclone (mg/m³)	Calculated thoracic (mg/m³)	Respirable cyclone (mg/m³)	Calculated respirable (mg/m³)
0.37	0.25	0.14	0.25
9.5	24	10	16
2.5	1.1	0.60	5.5
0.89	0.83	0.28	0.47
0.53	0.48	0.23	0.44
4.5	5.1	1.8	2.6
3.3	14	-	8.4
1.8	0.46	0.50	0.29
1.8	4.4	1.0	2.6
4.5	5.9	1.7	3.4