Supplement of

First long-term and near real-time measurement of atmospheric trace elements in Shanghai, China

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Table S1. Average background values of blank filters and inter-comparison of trace metals by different filters (x, cellulose acetate filter; y, glass filter) and different monitoring (x, glass filter; y, cellulose acetate filter).

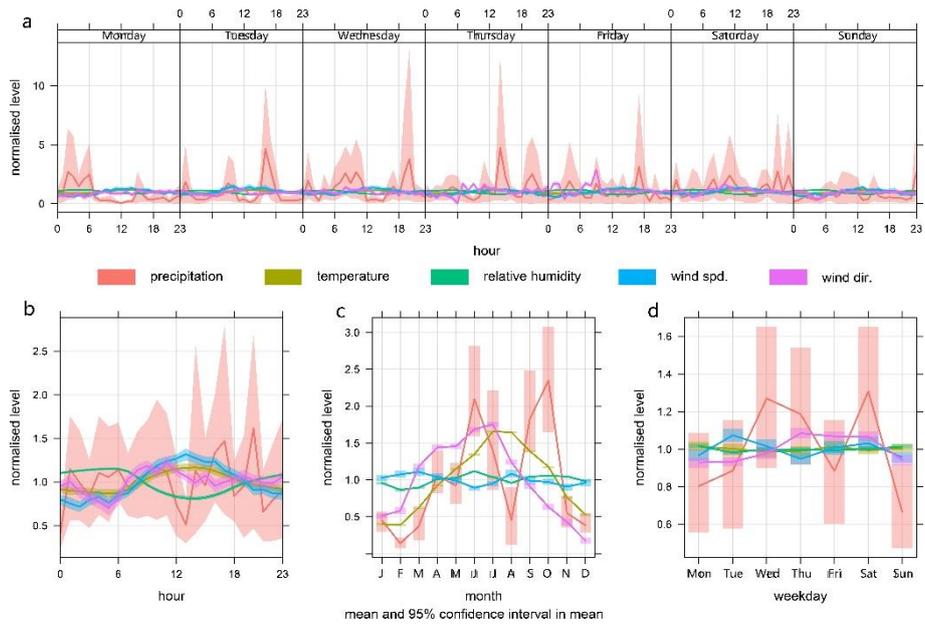| Species	Average background value (ng m^{-3})		Inter-comparison of cellulose acetate and glass filters (n=8)	Inter-comparison of Xact and filters (n=40)
	Cellulose acetate (n=3)	Glass (n=3)		
K	`24.76	40.98	y=0.87x+21.88; R^2=0.87	y=1.09x+106.15; R^2=0.87
Cr	4.0	21.45	y=0.81x+1.86; R^2=0.92	y=1.94x-2.75; R^2=0.56
Mn	0.58	0.87	y=0.77x+19.00; R^2=0.86	y=0.91x+8.85; R^2=0.59
Fe	28.35	51.36	y=0.80x+1.04; R^2=0.72	y=0.91x+20.7; R^2=0.72
Ni	0.46	1.22	y=0.65x+4.75; R^2=0.94	y=1.31x+0.57; R^2=0.52
Cu	1.07	1.64	y=0.79x+14.52; R^2=0.92	y=1.07x+5.25; R^2=0.57
As	51.41	57.13	y=0.89x+0.10; R^2=0.93	y=1.63x+2.12; R^2=0.50
Cd	0.01	0.02	y=0.91x+1.98; R^2=0.96	y=1.89x+9.41; R^2=0.72
Ba	1.36	2.09	y=0.83x+0.10; R^2=0.97	y=2.61x+0.24; R^2=0.81
Zn	3.80	5.93	y=0.84x+0.21; R^2=0.88	y=1.14x+1.71; R^2=0.80
Pb	1.81	2.31	y=0.75x+0.05; R^2=0.89	y=1.61x+0.11; R^2=0.57

Figure S1. Variations of normalized meteorological parameters at PEMC at multiple time scales.
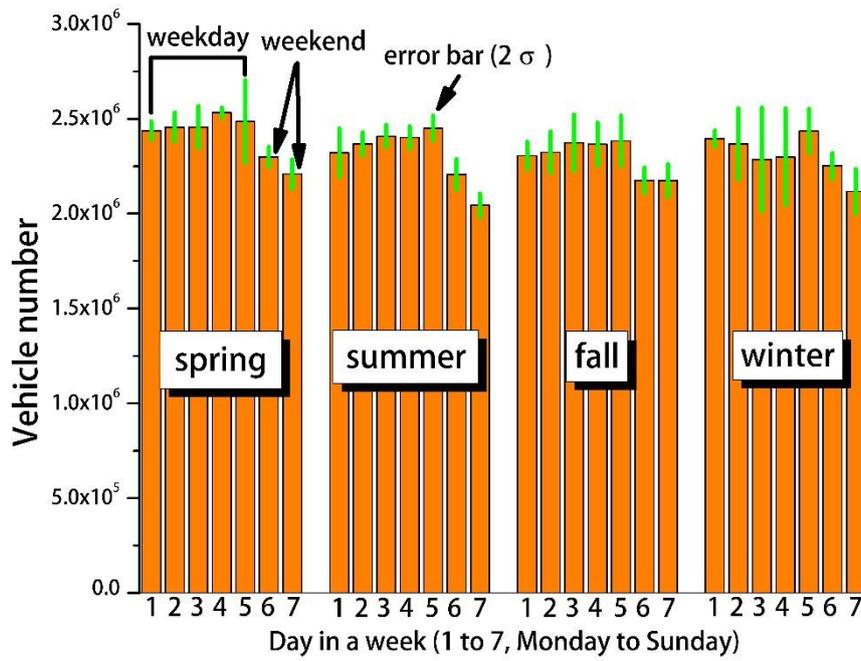
Figure S2. Daily traffic flow during four seasons in Shanghai main streets. The original data was collected by Shanghai Traffic Administration Bureau, and provided by Prof. Yan Zhang at Fudan University.
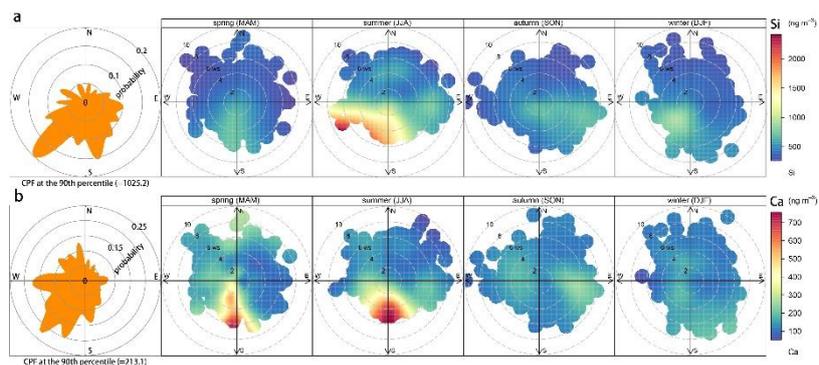
Figure S3. Conditional probability function analysis (left) and bivariate polar plots (right) of seasonal concentrations (ng m^{-3}) of Si (**a**) and Ca (**b**) in Shanghai between March 2016 and February 2017. The center of each plot (centered at the sampling site) represents a wind speed of zero, which increases radially outward. The concentrations of Si and Ca are shown by the color scale.
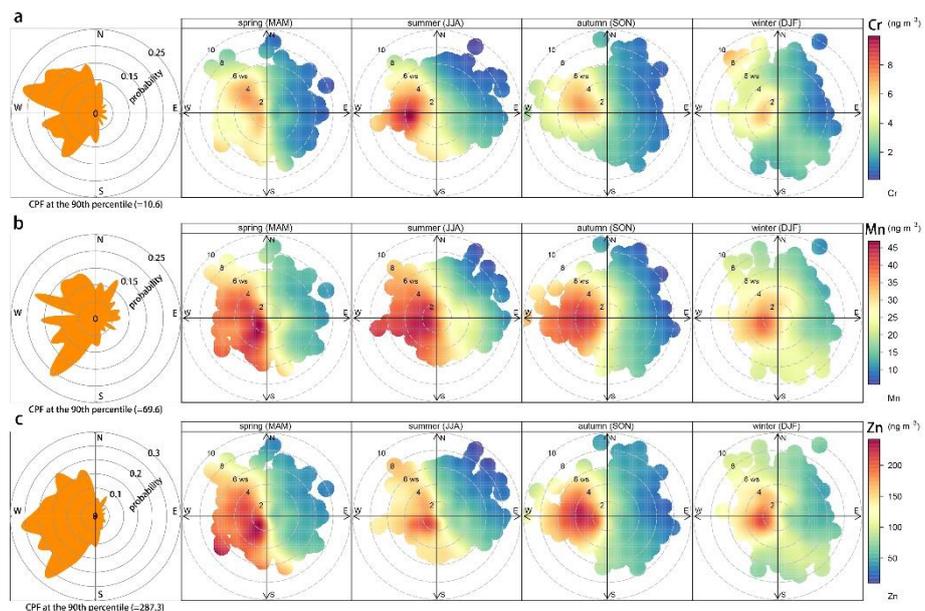
Figure S4. Conditional probability function analysis (left) and bivariate polar plots (right) of seasonal concentrations (ng m^{-3}) of Cr (**a**), Mn (**b**), and Zn (**c**) in Shanghai between March 2016 and February 2017. The center of each plot (centered at the sampling site) represents a wind speed of zero, which increases radially outward. The concentrations of Cr, Mn, and Zn are shown by the color scale.