Article

Sources and Temporal Variations of Coarse Particulate Matter (PM) in Central Tehran, Iran

Ehsan Soleimanian [1], Sina Taghvaee [1], Amirhosein Mousavi [1], Mohammad H. Sowlat [1], Mohammad Sadegh Hassanvand [2], Masud Yunesian [3,4], Kazem Naddafi [2,3] and Constantinos Sioutas [1,*]

[1] Department of Civil and Environmental Engineering, University of Southern California, Los Angeles, CA 90089, USA; ehsansol@usc.edu (E.S.); taghvaee@usc.edu (S.T.); amousavi@usc.edu (A.M.); sowlat@usc.edu (M.H.S.)

[2] Center for Air Pollution Research (CAPR), Institute for Environmental Research (IER), Tehran University of Medical Sciences, Tehran 1416753955, Iran; hassanvand@tums.ac.ir (M.S.H.); knadafi@tums.ac.ir (K.N.)

[3] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran 1416753955, Iran; yunesian@tums.ac.ir

[4] Department of Research Methodology and Data Analysis, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran 1416753955, Iran

* Correspondence: sioutas@usc.edu

**Table S1.** Metrological parameters for central Tehran.

| Season	Average temperature (°C)	Average wind speed (m/s)	Average humidity (%)
Fall	12.6±6.8	2.5±0.3	50±10
Winter	9.5±3.6	2.6±0.4	60±11
Spring	23.0±5.6	3.8±0.4	30±7
Summer	29.3±2.8	3.1±0.3	20±5

Table S2. Concentration of species not used in PMF analysis.

Species	Tohid retirement home		School dormitory	
	Average	**SD**	**Average**	**SD**
NH_4^+ (µg/m3)	0.76	0.30	0.58	0.36
K^+	0.39	0.15	0.20	0.09
Co (ng/m3)	0.94	1.00	1.43	2.31
Sr	6.84	4.99	4.43	2.45
Ni	0.44	0.21	0.79	0.47
Cd	0.03	0.03	0.11	0.11
Sn	0.46	0.17	0.26	0.16
Cr	1.30	0.67	1.48	0.75
Pb	7.39	7.23	14.30	14.09

Cold season
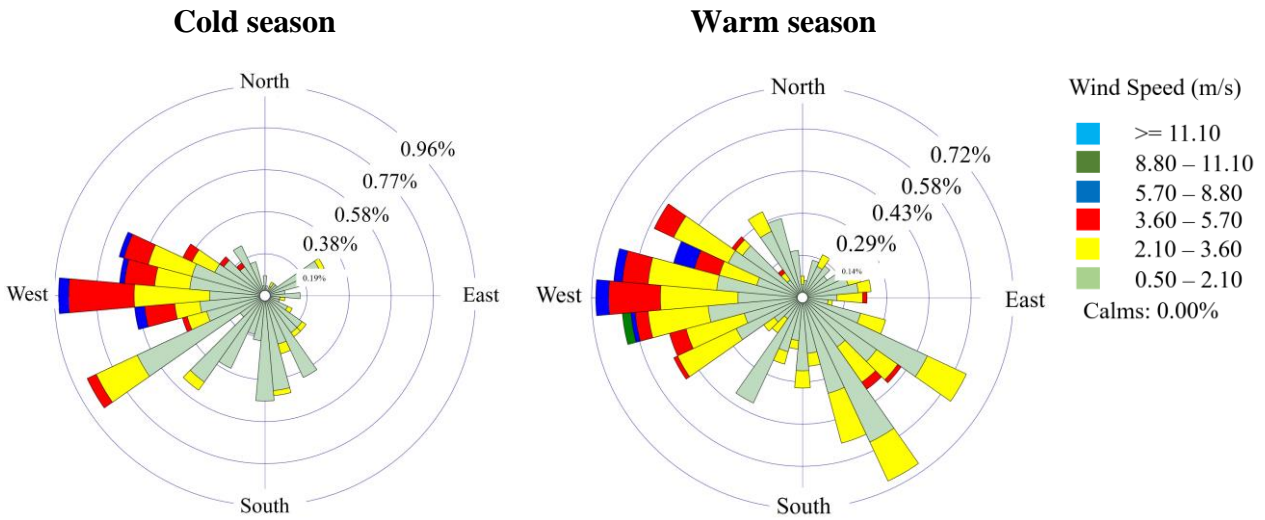
Warm season

Figure S1. Seasonal wind rose plots for cold and warm seasons.
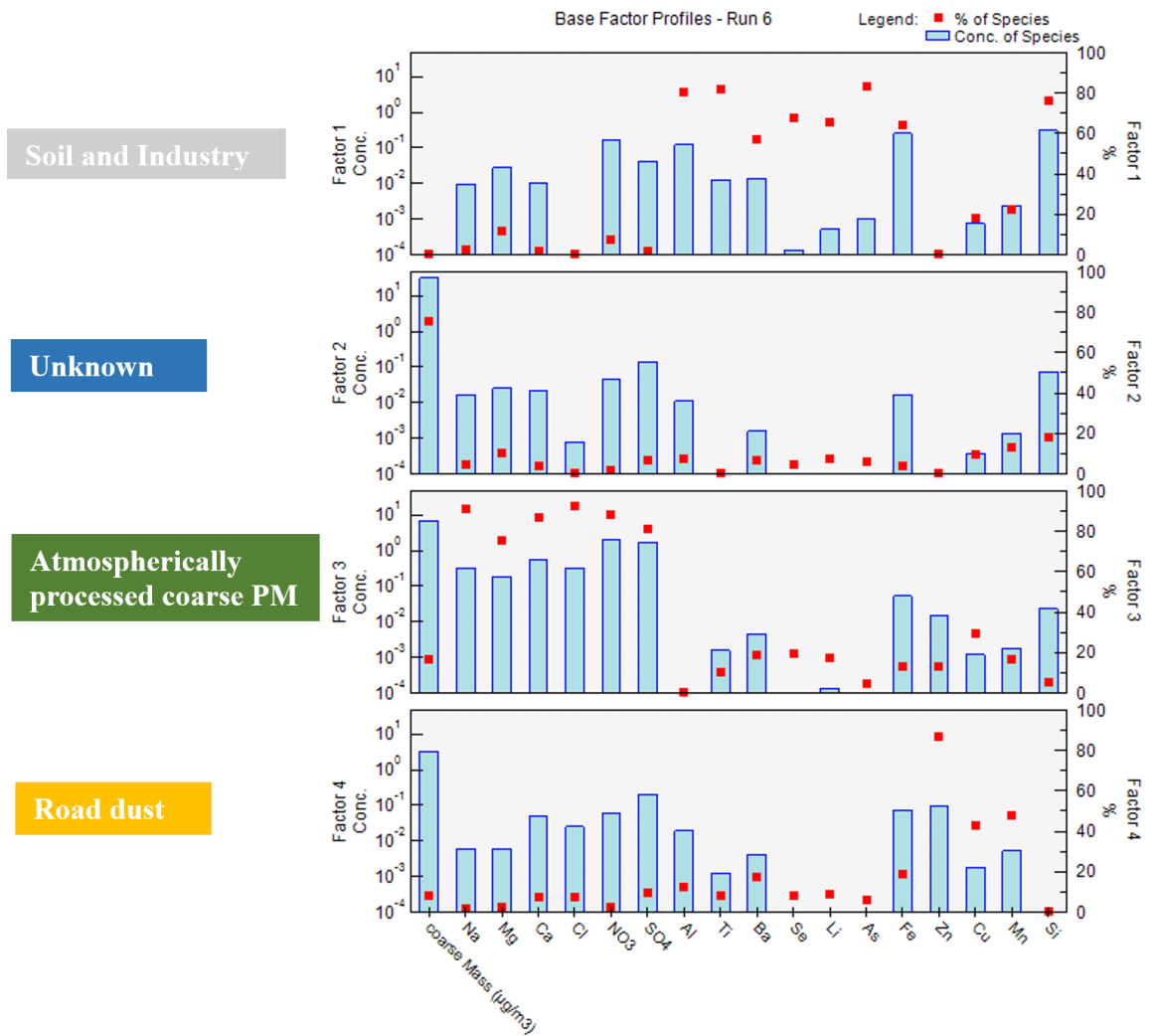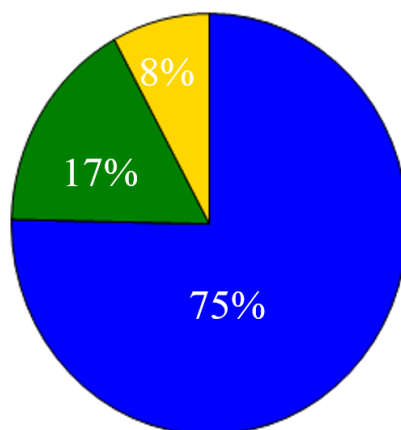
Figure S2. 4-factor PMF resolved profiles and their corresponding contributions to coarse PM.

As can be seen in the above results, PMF identified soil and industry, atmospherically processed coarse PM, road dust and an unknown factor, which was not characterized by high loading of any specific source tracers. Moreover, this unknown factor was the dominant contributing source (75%) to total coarse PM, which is also not physically interpretable. In addition, the contribution of soil and industry factor to total coarse PM was zero, which is not meaningful. Therefore, we selected the original three factors solution in which soil and industry was represented in a single factor profile.