atmosphere

Supplementary Materials

The calculated PMF factors with listed sources, separately for Katowice and Wrocław sites, are presented in Tables S1 and S2. The similarity is defined as $s(i,j) = \frac{\Sigma v_i v_j}{\|v_i\|\|v_j\|}$ and hence 0.95 is a cosine, the higher similarity the lower angle between vectors. In tables S1 and S2 profiles with distance lower than 0.32 radians are presented which corresponds to $s(i,j) > 0.95$ (since cos(0.32)=0.95).

Table S1. PMF factors for Katowice sites.

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
Mn-T	3.18E-04	1.27E-04	3.33E-04	8.40E-04
Ni-T	1.64E-05	6.86E-06	3.02E-06	9.64E-06
Cu-T	2.16E-06	6.57E-05	6.75E-05	2.66E-05
Zn-T	7.48E-05	1.46E-03	1.04E-03	1.19E-04
As-T	5.83E-07	6.28E-05	5.20E-05	3.93E-07
Rb-T	2.79E-06	1.24E-06	1.78E-06	2.78E-06
Ba-T	2.78E-05	2.77E-05	2.31E-05	5.95E-05
Cr-T	1.18E-05	8.18E-08	2.38E-05	4.80E-05
Mg-T	1.02E-02	5.69E-03	7.59E-04	4.32E-03
Al-T	1.08E-04	1.82E-02	3.64E-04	3.74E-03
Profiles (https://source-apportionment.jrc.ec.europa.eu/Speci europe/index.aspx) with cosine similarity >0.95	Marine Aerosol Steel Plant	Poor state of pavement Petrochemistry SoilCa Cement kiln (coal fired) Crustal Dust Ore terminal Wall tile Floor tile Industrial roads Power plant Industrial, coke gas (and coal) combustion Boiler coal Fired <5MW Porcelain tile Metallurgical coke fired plant Coke plant fugitive emissions	Pellets type I Cast iron converter complex	Blast furnace slag storage area Ore iron converter complex Urban roads Near by works

Table S2. PMF factors for Wrocław sites.

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
Mn-T	5.69E-05	1.28E-04	4.89E-05	2.43E-05
Ni-T	0.00E+00	2.46E-05	6.57E-07	2.38E-05
Cu-T	1.34E-06	6.44E-09	9.80E-05	2.64E-05
Zn-T	4.32E-05	4.57E-05	5.00E-05	1.11E-05
As-T	4.92E-07	1.37E-06	5.37E-07	9.32E-07
Rb-T	2.60E-06	5.02E-06	2.16E-06	0.00E+00
Ba-T	2.76E-05	2.20E-05	1.57E-05	1.43E-05
Cr-T	2.93E-05	1.36E-05	6.80E-06	1.96E-05
Mg-T	1.32E-03	2.07E-03	9.92E-05	3.21E-03
Al-T	2.25E-03	1.24E-03	6.70E-04	9.76E-04
Profiles (https://source-apportionment.jrc.ec.europa.eu/Specieurope/index.aspx)with cosine similarity >0.95	Industrial roads Near by works Metallurgical coke fired plant Urban roads Poor state of pavement Ore iron converter complex	Blast furnace slag storage area Urban roads Ore iron converter complex	Cement kiln (coal fired) Poor state of pavement SoilCa Ore terminal Wall tile Floor tile Boiler coal Fired <5MW Porcelain tile Crustal Dust Petrochemistry Power plant Industial, coke gas (and coal) combustion Closed fireplace coal combustion	Steel Plant Marine Aerosol