Supplementary materials

Seasonal variability of PM10 chemical composition including 1,3,5-triphenylbenzene, marker of plastic combustion and toxicity in Wadowice, South Poland

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Table S1. Monthly averages, minimal and maximal values of meteorological conditions in sampling period in Wadowice.

Month	Temperature [°C] (min – max)	Precipitation [mm] (min – max)	Pressure [hPa] (min – max)	Wind speed [m/s] (min – max)	Prevailing wind direction
February	1.5-7	0.0-0.0	969-984	3.4-5	SW
March	3-12.5	0.0-0.0	966-991	1.7-6.7	W/SW
April	1-15.5	0.2-22.3	973-991	1.3-6.5	W/N
May	4.5-21.5	0.2-30.6	971-992	1.5-4.1	N
June	14.5-19.5	1.9-7.4	977-986	1.7-4.7	W/N
August	13.5-31.5	0.2-29.3	970-982	0.0-4.1	W
September	9-19.5	1.0-57.8	972-988	1.3-5.6	W/E
October	7.5-16	0.1-11.8	961-986	1.0-8.1	W

Table S2. Chromatographic and mass spectrometric characterization of target analytes: retention time, mass of characteristic ions and correlation coefficients – R^2.

Compound	Retention time [min]	Precursor – products ions m/z	R^2	MQL [ng/m³]
Naphthalene	7.08	128 – 102,	0.9990	6.25
Acenaphthylene	10.15	152 – 150, 126	0.9999	0.26
Acenaphthene	10.43	153 – 150, 126	0.9998	0.02
Fluorene	11.50	165 – 163, 139	0.9997	0.14
Phenathrene	14.03	178 – 152, 176	0.9991	0.29
Anthracene	14.11	178 – 152, 176	0.9996	6.25
Fluoranthene	17.08	202 – 200, 174	0.9989	0.30
Pyrene	17.82	202 – 200, 174	0.9998	0.12
Benzo(a)anthracene	20.81	228 – 226, 202	0.9977	0.38
Chrysene	21.03	228 – 226, 202	0.9995	0.17
Benzo(b)fluoranthene	24.23	252 – 250, 226	0.9945	0.56
Benzo(k)fluoranthene	24.32	252 – 250, 226	0.9984	0.17
Benzo(a)pyrene	26.05	252 – 250, 226	0.9960	0.45
Indeno(1,2,3-cd)pyrene	32.83	276 – 274, 248	0.9943	0.80
Dibenz(a,h)anthracene	32.84	278 – 276, 252	0.9941	0.78
Benzo(g,h,i)perylene	35.69	276 – 274, 248	0.9962	0.50
1,3,5- triphenylbenzene	25.02	306 – 289, 228	0,9991	0,18
Benzo[a]pyrene-d_{12}	25.88	264 – 262, 216	-	-

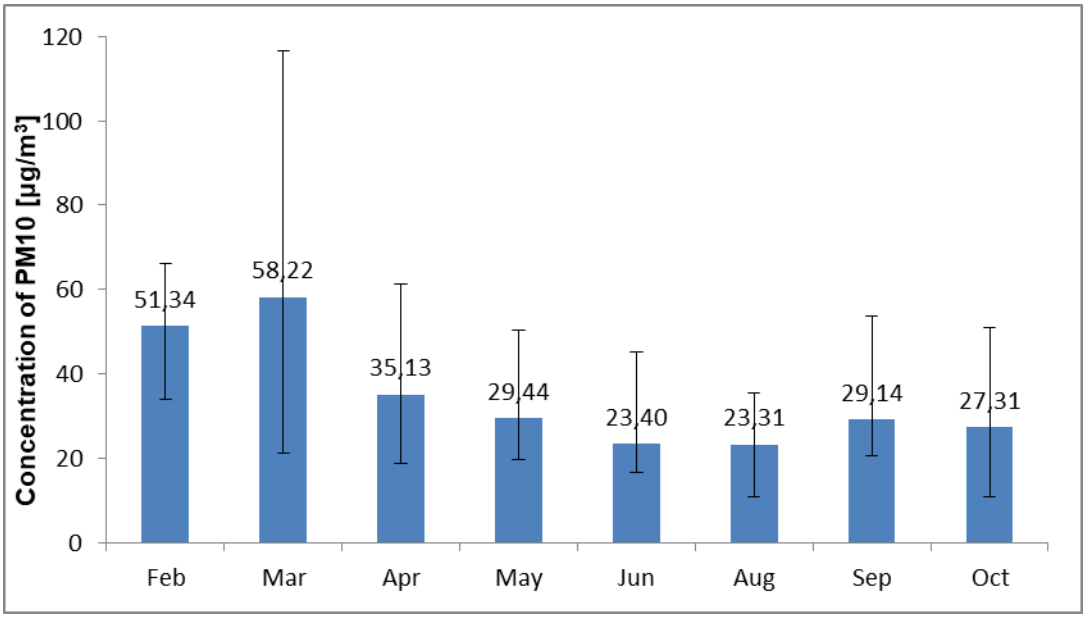

Figure S1. Time series of monthly average PM10 concentrations during the sampling period.

Table S3. Concentrations of analyzed components constituting to mass closure, collected during the heating and non-heating seasons

Concentration	Heating season			Non-heating season		
μg/m³	min	max	average	min	max	average
PM10	10.94	116.77	43.30	10.80	53.70	27.12
OC	5.90	39.32	14.46	3.84	20.75	7.66
EC	1.48	6.93	3.70	1.08	4.64	2.11
Na^+	0.00	3.94	2.07	1.15	2.68	1.78
NH_4^+	0.00	5.01	1.40	0.26	2.45	0.92
Mg^{2+}	0.00	1.07	0.37	0.02	1.29	0.21
K^+	0.33	1.00	0.50	0.34	0.88	0.49
Ca^{2+}	0.00	3.20	0.72	0.02	2.63	0.81
NO_3^-	0.62	12.04	2.52	0.53	4.03	1.45
SO_4^{2-}	2.19	13.26	5.58	2.24	11.81	5.35
Cl^-	0.15	9.91	1.86	0.15	11.92	0.57
PAHs [ng/m³]						
Naphthalene	<MQL	<MQL	<MQL	<MQL	<MQL	<MQL
Acenaphthylene	0.26	1.88	0.57	0.27	0.90	0.54
Acenaphthene	0.02	0.11	0.02	0.02	0.03	0.02
Fluorene	0.14	1.23	0.51	0.15	0.57	0.16
Phenathrene	0.42	4.17	1.44	0.30	0.86	0.36
Anthracene	<MQL	<MQL	<MQL	<MQL	<MQL	<MQL
Fluoranthene	1.07	5.52	1.60	0.47	2.19	0.71
Pyrene	0.89	20.49	4.68	0.41	2.24	0.71
Benzo(a)anthracene	1.60	24.73	6.98	0.61	3.43	1.16
Chrysene	1.16	21.52	6.10	0.50	3.23	1.08
Benzo(b)fluoranthene	1.88	19.99	6.90	0.95	3.72	1.63
Benzo(k)fluoranthene	1.32	10.16	3.68	0.54	2.15	0.89
Benzo(a)pyrene	0.49	20.93	4.98	0.64	3.66	1.10
Indeno(1,2,3-cd)pyrene	2.50	14.18	5.86	1.02	3.52	1.61
Dibenz(a,h)anthracene	1.60	20.00	6.24	1.17	3.59	1.43
Benzo(g,h,i)perylene	0.51	9.25	1.82	0.50	3.24	1.27
1,3,5-triphenylbenzene	0.39	2.56	0.83	0.26	0.90	0.30

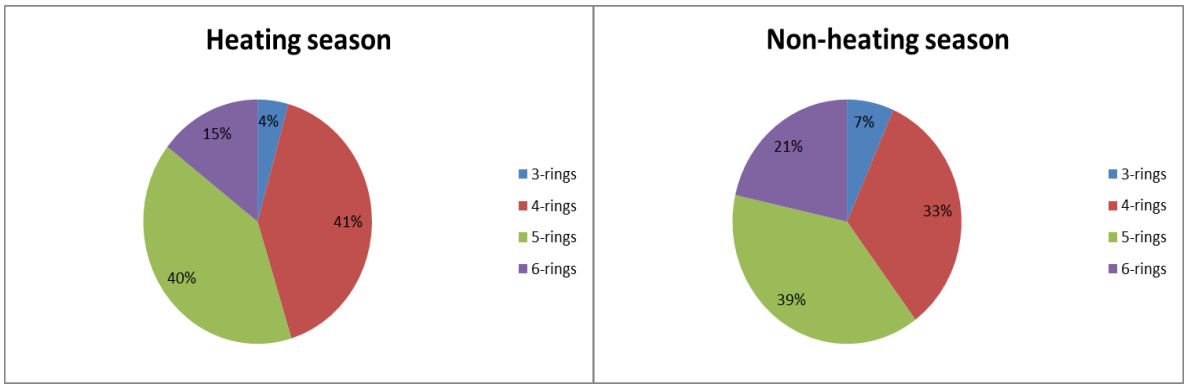

Figure S2. Ring number distribution of PM_{10} associated PAHs during heating and non-heating seasons.

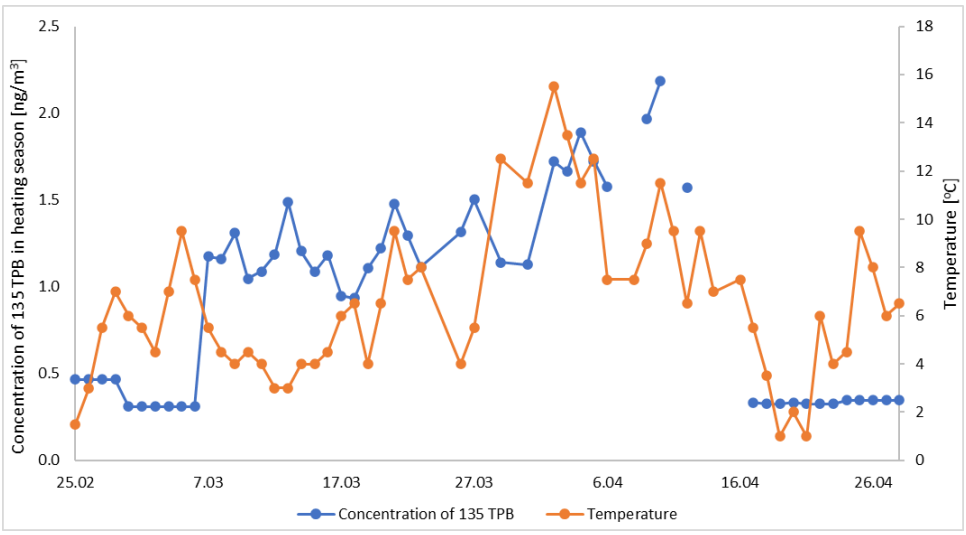

Figure S3. Correlation between concentration of 135TPB and temperature through the heating season.

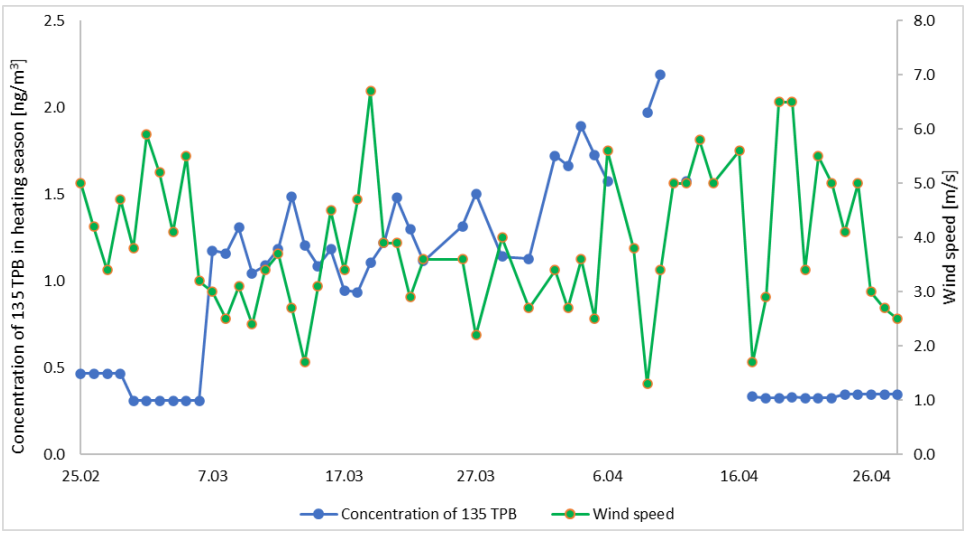

Figure S4. Correlation between concentration of 135TPB and wind speed through the heating season.

Table S4. Characteristic Pearson coefficient.

PAHs	Pearson	Relationship
Acenaphthylene	0.76	Strong relationship
Benzo[a]anthracene	0.72	Strong relationship
Benzo[a]pyrene	0.67	Moderate relationship
Benzo[b]fluoranthene	0.78	Strong relationship
Bnzo[ghi]perylene	0.55	Moderate relationship
Benzo[k]fluoranthene	0.86	Strong relationship
Chrysene	0.73	Strong relationship
Dibenzo[a,h]anthracene	0.76	Strong relationship
Fluoranthene	0.38	Weak relationship
Fluorene	**0.96**	**Very strong relationship**
Indeno[1,2,3-cd]pyrene	0.89	Strong relationship
Phenanthrene	0.82	Strong relationship
Pyrene	0.66	Moderate relationship

TableS5. Characteristic diagnostic indicators from different sources (Yunker et al., 2002; Finardi et al., 2017; Kulshrestha et al., 2019; Manoli et al., 2004; Célia A. Alves et al. 2017; Khalili, Scheff and Holsen, 1995; Simoneit, 2015)

Ratio	Value range	Source
FLU/(FLU+PYR)	< 0.5	Petrol emission
	> 0.5	Diesel emission
ANT/(ANT+PHE)	< 0.1	Petrogenic emission
	> 0.1	Fuel combustion
FLT/(FLT+PYR)	< 0.4	Petrogenic emission
	0.4 – 0.5	Fuel combustion
	> 0.5	Coal and wood burning
BbF/BkF	0.92	Wood burning
	1.26	Vehicles
	2.5 – 2.9	Smelters
	3.5 – 3.9	Coal/coke
PYR/BaP	0.9 ± 0.4	Gasoline exhaust
	0.8 ± 0.9	Diesel exhaust
	0.70	Wood combustion
BaP/(BaP+CH)	0.08 – 0.39	Wood burning
	< 0.50	House heating
	> 0.50	Mobile sources
IcdP/(IcdP+BghiP)	0.18	Car
	0.37	Diesel exhaust
	0.56	Coal
	0.64	Wood burning
BaA/(BaA+CH)	0.50	Vehicles
	0.73	Gasoline and diesel exhausts