

Supporting Information

Table 1: Rank correlation values and p-values of Kruskal-Wallis tests of describing parameters of the sampling sites and soil analytical data^a

	Altitude	Annual mean temperature	Annual precipitation	Population density	Distance to main emission	pH	TOC
<i>Rank correlations</i>							
Altitude	1.00						
Annual mean temperature	-0.82	1.00					
Annual precipitation	0.27	-0.27	1.00				
Population density	-0.40	0.39	-0.17	1.00			
Distance to main emission	0.39	-0.36	-0.08	-0.21	1.00		
pH	-0.51	0.48	-0.39	0.09	-0.28	1.00	
TOC	0.50	-0.43	0.30	-0.26	0.37	-0.38	1.00
<i>Kruskal-Wallis tests</i>							
Inversion layer	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Humus type	0.01	0.11	0.22	0.93	0.01	0.00	0.00
Land use	0.00	0.00	0.00	0.07	0.05	0.00	0.00
Area type	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Main emission source	0.03	0.04	0.89	0.88	0.00	0.02	0.20

^a significant correlations (correlation values >0.2 or <-0.2 for rank correlation and p-values <0.05 for Kruskal-Wallis test) are marked bold.

Table 2: Rank correlation values among 16 EPA PAH, cPHE, cPYR, COR, RET and PER^a

	NAP	ACY	ACE	FLU	PHE	ANT	FLT	PYR	BaA	CHR	BbF	BkF	BaP	IPY	DBA	BPE	cPHE	RET	cPYR	PER	COR
NAP	1.00																				
ACY	0.17	1.00																			
ACE	0.61	0.17	1.00																		
FLU	0.69	0.42	0.85	1.00																	
PHE	0.52	0.44	0.44	0.66	1.00																
ANT	0.14	0.76	0.19	0.35	0.4	1.00															
FLT	0.19	0.81	0.21	0.4	0.55	0.91	1.00														
PYR	0.16	0.81	0.19	0.37	0.5	0.93	1.00	1.00													
BaA	0.11	0.77	0.13	0.29	0.44	0.92	0.97	0.98	1.00												
CHR	0.15	0.8	0.16	0.34	0.47	0.91	0.98	0.98	0.98	1.00											
BbF	0.14	0.81	0.16	0.34	0.45	0.88	0.96	0.97	0.96	0.99	1.00										
BkF	0.10	0.8	0.14	0.31	0.45	0.89	0.97	0.98	0.98	0.99	0.99	1.00									
BaP	0.09	0.81	0.1	0.27	0.41	0.89	0.95	0.97	0.97	0.98	0.98	0.98	1.00								
IPY	0.16	0.81	0.18	0.35	0.46	0.89	0.96	0.97	0.97	0.98	0.99	0.98	0.97	1.00							
DBA	0.10	0.78	0.15	0.31	0.46	0.89	0.95	0.96	0.96	0.97	0.97	0.97	0.96	0.96	1.00						
BPE	0.17	0.8	0.2	0.37	0.47	0.89	0.96	0.97	0.96	0.98	0.98	0.98	0.96	0.99	0.96	1.00					
cPHE	0.28	0.71	0.15	0.36	0.4	0.78	0.81	0.81	0.78	0.80	0.75	0.77	0.75	0.77	0.74	0.77	1.00				
RET	0.42	0.16	0.32	0.41	0.27	0.11	0.13	0.11	0.05	0.10	0.05	0.06	0.05	0.10	0.02	0.10	0.41	1.00			
cPYR	0.36	0.35	0.10	0.26	0.27	0.37	0.38	0.39	0.36	0.39	0.31	0.34	0.35	0.36	0.32	0.37	0.72	0.63	1.00		
PER	0.43	0.44	0.37	0.48	0.36	0.57	0.60	0.61	0.59	0.6	0.57	0.57	0.55	0.61	0.56	0.61	0.75	0.38	0.59	1.00	
COR	0.34	0.78	0.26	0.45	0.46	0.78	0.88	0.88	0.83	0.87	0.88	0.87	0.84	0.88	0.85	0.9	0.78	0.23	0.43	0.64	1.00

^a significant correlations (correlation values >0.2 or <-0.2) are marked bold.

Abbreviations: NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[a]anthracene, CHR: chrysene, BbF: benzo[b]fluoranthene, BkF: benzo[k]fluoranthene, BaP: benzo[a]pyrene, IPY: indeno[1,2,3-cd]pyrene, DBA: dibenzo[gh]perylene BPE: benzo[ghi]perylene, CPHE: 4-H-cyclopenta[def]PHE, RET: retene, CPYR: cyclopenta[cd]PYR, PER: perylene, COR: coronene

Table 3: Rank correlation values of individual PAH/Σ16 PAH ^a

	NAP/ Σ16PAH	ACY/ Σ16PAH	ACE/ Σ16PAH	FLU/ Σ16PAH	PHE/ Σ16PAH	ANT/ Σ16PAH	FLT/ Σ16PAH	PYR/ Σ16PAH	BaA/ Σ16PAH	CHR/ Σ16PAH	BbF/ Σ16PAH	BkF/ Σ16PAH	BaP/ Σ16PAH	IPY/ Σ16PAH	DBA/ Σ16PAH	BPE/ Σ16PAH	cPHE/ Σ16PAH	RET/ Σ16PAH	cPYR/ Σ16PAH	PER/ Σ16PAH	COR/ Σ16PAH
NAP/Σ16PAH	1.00																				
ACY/Σ16PAH	-0.27	1.00																			
ACE/Σ16PAH	0.76	-0.18	1.00																		
FLU/Σ16PAH	0.86	-0.19	0.93	1.00																	
PHE/Σ16PAH	0.75	-0.32	0.62	0.73	1.00																
ANT/Σ16PAH	-0.58	0.24	-0.43	-0.50	-0.69	1.00															
FLT/Σ16PAH	-0.80	0.28	-0.67	-0.75	-0.81	0.72	1.00														
PYR/Σ16PAH	-0.82	0.27	-0.68	-0.77	-0.89	0.76	0.97	1.00													
BaA/Σ16PAH	-0.80	0.22	-0.71	-0.8	-0.85	0.72	0.81	0.88	1.00												
CHR/Σ16PAH	-0.82	0.29	-0.69	-0.79	-0.91	0.66	0.85	0.89	0.87	1.00											
BbF/Σ16PAH	-0.71	0.34	-0.58	-0.68	-0.86	0.43	0.64	0.70	0.71	0.84	1.00										
BkF/Σ16PAH	-0.84	0.29	-0.67	-0.79	-0.90	0.55	0.75	0.81	0.80	0.90	0.89	1.00									
BaP/Σ16PAH	-0.81	0.36	-0.72	-0.81	-0.93	0.60	0.76	0.83	0.85	0.88	0.86	0.89	1.00								
IPY/Σ16PAH	-0.66	0.26	-0.56	-0.66	-0.83	0.44	0.57	0.65	0.70	0.77	0.87	0.86	0.81	1.00							
DBA/Σ16PAH	-0.78	0.28	-0.63	-0.75	-0.75	0.53	0.67	0.72	0.77	0.78	0.78	0.78	0.78	0.72	1.00						
BPE/Σ16PAH	-0.58	0.25	-0.42	-0.53	-0.76	0.40	0.46	0.56	0.60	0.67	0.81	0.76	0.74	0.89	0.64	1.00					
cPHE/Σ16PAH	0.17	-0.05	-0.01	0.08	-0.03	0.11	0.08	0.11	0.01	0.05	-0.21	-0.07	-0.05	-0.16	-0.2	-0.08	1.00				
RET/Σ16PAH	0.57	-0.23	0.34	0.47	0.39	-0.34	-0.43	-0.41	-0.42	-0.42	-0.48	-0.45	-0.41	-0.35	-0.56	-0.22	0.40	1.00			
cPYR/Σ16PAH	0.57	-0.23	0.34	0.47	0.39	-0.34	-0.43	-0.41	-0.42	-0.42	-0.48	-0.45	-0.41	-0.35	-0.56	-0.22	0.69	0.77	1.00		
PER/Σ16PAH	0.57	-0.23	0.34	0.47	0.39	-0.34	-0.43	-0.41	-0.42	-0.42	-0.48	-0.45	-0.41	-0.35	-0.56	-0.22	0.41	0.55	0.53	1.00	
COR/Σ16PAH	0.10	0.15	0.08	0.1	-0.14	-0.09	-0.04	0.03	-0.05	0.09	0.28	0.10	0.11	0.30	0.12	0.46	0.13	0.16	0.22	0.12	1.00

^a significant correlations (correlation values >0.2 or <-0.2) are marked bold, significant positive correlations in italic.

Abbreviations: NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[a]anthracene, CHR: chrysene, BbF: benzo[b]fluoranthene, BkF: benzo[k]fluoranthene, BaP: benzo[a]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, DBA: dibenzo[*gh*]perylene BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cylopenta[*cd*]PYR, PER: perylene, COR: coronene

Table 4: Rank correlation values and p-values of Kruskal-Wallis tests of PAH with describing and soil parameters^a

	Altitude	Annual mean temp	Annual precipitation	Population density	Distance to emission	pH	TOC	Inversion layer	Humus type	Land use	Area type	Main emission source
NAP	0.03	-0.08	0.21	-0.02	0.09	0.03	0.46	0.37	0.00	0.21	0.14	0.52
ACY	-0.36	0.29	-0.16	0.41	-0.09	-0.02	-0.06	0.00	0.34	0.00	0.00	0.84
ACE	0.04	-0.03	0.12	-0.11	0.14	-0.06	0.55	0.42	0.00	0.01	0.27	0.87
FLU	0.06	-0.04	0.09	-0.02	0.16	-0.10	0.49	0.41	0.00	0.02	0.26	0.96
PHE	-0.18	0.14	-0.11	0.14	0.00	0.20	0.02	0.07	0.13	0.01	0.07	0.79
ANT	-0.42	0.35	-0.20	0.48	-0.21	0.17	-0.12	0.00	0.42	0.06	0.00	0.80
FLT	-0.41	0.33	-0.20	0.48	-0.15	0.21	-0.11	0.00	0.35	0.01	0.00	0.63
PYR	-0.42	0.34	-0.19	0.48	-0.18	0.21	-0.12	0.00	0.39	0.02	0.00	0.69
BaA	-0.44	0.37	-0.19	0.50	-0.24	0.26	-0.18	0.00	0.53	0.04	0.00	0.51
CHR	-0.41	0.34	-0.16	0.50	-0.18	0.20	-0.14	0.00	0.47	0.02	0.00	0.49
BbF	-0.38	0.32	-0.14	0.50	-0.13	0.17	-0.11	0.00	0.48	0.03	0.00	0.49
BkF	-0.41	0.36	-0.17	0.52	-0.17	0.21	-0.15	0.00	0.74	0.03	0.00	0.43
BaP	-0.41	0.34	-0.15	0.53	-0.16	0.18	-0.17	0.00	0.68	0.05	0.00	0.45
IPY	-0.37	0.32	-0.13	0.49	-0.16	0.18	-0.08	0.00	0.46	0.03	0.00	0.54
DBA	-0.41	0.35	-0.19	0.50	-0.18	0.20	-0.13	0.00	0.50	0.05	0.00	0.78
BPE	-0.36	0.32	-0.12	0.47	-0.17	0.18	-0.07	0.00	0.38	0.04	0.00	0.55
cPHE	-0.33	0.28	-0.08	0.35	-0.24	0.13	-0.16	0.00	0.43	0.10	0.00	0.57
RET	0.22	-0.24	0.1	-0.12	0.10	-0.22	0.27	0.00	0.04	0.00	0.67	0.47
cPYR	-0.15	0.14	0.04	0.13	-0.20	0.03	-0.09	0.16	0.57	0.21	0.33	0.16
PER	-0.15	0.19	0.02	0.31	-0.13	0.14	0.07	0.18	0.01	0.42	0.02	0.80
COR	-0.28	0.25	-0.07	0.37	-0.12	0.15	0.05	0.00	0.19	0.11	0.01	0.70

^a significant correlations (correlation values >0.2 or <-0.2 for rank correlation, p-values <0.05 for Kruskal-Wallis test) are marked bold, significant positive correlations in italic.

Abbreviations: NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[a]anthracene, CHR: chrysene, BbF: benzo[b]fluoranthene, BkF: benzo[k]fluoranthene, BaP: benzo[a]pyrene, IPY: indeno[1,2,3-cd]pyrene, DBA: dibenzo[gh]perylene, BPE: benzo[ghi]perylene, CPHE: 4-H-cyclopenta[def]PHE, RET: retene, CPYR: cyclopenta[cd]PYR, PER: perylene, COR: coronene

Table 5: Rank correlation values and p-values of Kruskal-Wallis tests of PAH/ Σ 16 EPA PAH with describing and soil parameters^a

	Altitude	Annual mean temp	Annual precipitation	Population density	Distance to emission	pH	TOC	Inversion layer	Humus type	Land use	Area type	Main emission source
NAP/ Σ 16PAH	0.41	-0.34	0.19	-0.51	0.21	-0.18	0.41	0.00	0.40	0.02	0.00	0.07
ACY/ Σ 16PAH	-0.19	0.14	-0.01	0.27	-0.10	-0.22	-0.07	0.22	0.41	0.06	0.20	0.94
ACE/ Σ 16PAH	0.33	-0.23	0.19	-0.5	0.25	-0.22	0.56	0.00	0.02	0.00	0.00	0.50
FLU/ Σ 16PAH	0.43	-0.34	0.25	-0.55	0.26	-0.30	0.52	0.00	0.08	0.00	0.00	0.46
PHE/ Σ 16PAH	0.35	-0.29	0.08	-0.46	0.18	-0.06	0.20	0.01	0.69	0.12	0.00	0.69
ANT/ Σ 16PAH	-0.44	0.35	-0.15	0.46	-0.32	0.13	-0.28	0.00	0.80	0.20	0.00	0.49
FLT/ Σ 16PAH	-0.44	0.34	-0.19	0.47	-0.20	0.16	-0.32	0.00	0.69	0.16	0.00	0.31
PYR/ Σ 16PAH	-0.45	0.37	-0.17	0.50	-0.26	0.16	-0.33	0.00	0.58	0.12	0.00	0.49
BaA/ Σ 16PAH	-0.45	0.37	-0.19	0.48	-0.34	0.30	-0.41	0.00	0.17	0.02	0.00	0.41
CHR/ Σ 16PAH	-0.37	0.31	-0.12	0.50	-0.20	0.10	-0.29	0.00	0.39	0.45	0.00	0.11
BbF/ Σ 16PAH	-0.26	0.21	-0.02	0.47	-0.08	-0.02	-0.13	0.02	0.27	0.20	0.02	0.39
BkF/ Σ 16PAH	-0.38	0.34	-0.10	0.49	-0.19	0.14	-0.27	0.00	0.51	0.21	0.00	0.15
BaP/ Σ 16PAH	-0.38	0.31	-0.11	0.50	-0.20	0.08	-0.34	0.00	0.34	0.07	0.00	0.54
IPY/ Σ 16PAH	-0.24	0.20	0.06	0.38	-0.13	0.02	-0.11	0.11	0.53	0.11	0.02	0.74
DBA/ Σ 16PAH	-0.40	0.34	-0.18	0.49	-0.18	0.12	-0.23	0.00	0.73	0.48	0.00	1.00
BPE/ Σ 16PAH	-0.28	0.25	0.14	0.28	-0.16	0.02	-0.11	0.09	0.69	0.12	0.10	0.82
cPHE/ Σ 16PAH	0.02	0.01	0.08	-0.07	-0.17	-0.08	-0.21	0.91	0.52	0.47	0.65	0.30
RET/ Σ 16PAH	0.50	-0.45	0.20	-0.44	0.14	-0.41	0.31	0.00	0.22	0.01	0.00	0.58
cPYR/ Σ 16PAH	0.28	-0.23	0.21	-0.36	-0.02	-0.23	0.04	0.02	0.37	0.35	0.02	0.31
PER/ Σ 16PAH	0.33	-0.23	0.09	-0.20	0.14	-0.11	0.18	0.01	0.44	0.19	0.13	0.45
COR/ Σ 16PAH	0.11	-0.18	0.20	-0.04	0.07	-0.23	0.31	0.25	0.17	0.06	0.15	0.43

^a significant correlations (correlation values >0.2 or <-0.2 for rank correlation, p-values <0.05 for Kruskal-Wallis test) are marked bold, significant positive correlations in italic.

Abbreviations: NAP: naphthalene, ACY: acenaphthylene, ACE: acenaphthene, FLU: fluorene, PHE: phenanthrene, ANT: anthracene, FLT: fluoranthene, PYR: pyrene, BaA: benzo[a]anthracene, CHR: chrysene, BbF: benzo[b]fluoranthene, BkF: benzo[k]fluoranthene, BaP: benzo[a]pyrene, IPY: indeno[1,2,3-*cd*]pyrene, DBA: dibenzo[*gh*]perylene, BPE: benzo[*ghi*]perylene, CPHE: 4-H-cyclopenta[*def*]PHE, RET: retene, CPYR: cyclopenta[*cd*]PYR, PER: perylene, COR: coronene

Table 6: Rank correlation values of 7 PCB^a

	PCB 28	PCB 52	PCB 101	PCB 118	PCB 138	PCB 153	PCB 180
PCB 28	1.00						
PCB 52	0.74	1.00					
PCB 101	0.13	0.31	1.00				
PCB 118	0.07	0.19	0.65	1.00			
PCB 138	-0.06	0.09	0.80	0.58	1.00		
PCB 153	-0.02	0.11	0.61	0.62	0.72	1.00	
PCB 180	-0.05	0.07	0.61	0.54	0.73	0.95	1.00

^a significant correlations (correlation values >0.2 or <-0.2) are marked bold.

Table 7: Rank correlation values of single PCB/ Σ 7 PCB^a

	PCB 28/ Σ 7PCB	PCB 52/ Σ 7PCB	PCB 101/ Σ 7PCB	PCB 118/ Σ 7PCB	PCB 138/ Σ 7PCB	PCB 153/ Σ 7PCB	PCB 180/ Σ 7PCB
PCB 28/ Σ 7PCB	1.00						
PCB 52/ Σ 7PCB	0.65	1.00					
PCB 101/ Σ 7PCB	-0.21	-0.16	1.00				
PCB 118/ Σ 7PCB	-0.23	-0.28	0.53	1.00			
PCB 138/ Σ 7PCB	-0.37	-0.40	0.73	0.45	1.00		
PCB 153/ Σ 7PCB	-0.43	-0.50	0.37	0.47	0.53	1.00	
PCB 180/ Σ 7PCB	-0.45	-0.51	0.44	0.40	0.60	0.87	1.00

^a significant correlations (correlation values >0.2 or <-0.2) are marked bold, significant positive correlations in italic.

Table 8: Rank correlation values and p-values of Kruskal-Wallis tests of PCB with describing and soil parameters^a

	altitude	annual mean temp	annual precipita tion	populati on density	dist emission	pH	TOC	Inversio n layer	Humus type	Land use	Area type	Main emission source
PCB 28	-0.12	0.12	-0.02	0.03	-0.01	0.18	-0.05	0.34	0.13	0.20	0.35	0.43
PCB 52	0.03	-0.02	-0.05	-0.08	0.08	0.07	0.14	0.92	0.10	0.14	0.33	0.82
PCB 101	0.06	0.05	0.07	0.12	0.10	-0.26	0.25	0.11	0.00	0.01	0.14	0.50
PCB 118	-0.10	0.12	0.02	0.10	0.09	-0.20	0.32	0.37	0.00	0.00	0.47	0.31
PCB 138	0.05	0.05	0.14	0.27	0.08	-0.37	0.20	0.21	0.00	0.01	0.21	0.89
PCB 153	-0.17	0.20	0.12	0.25	-0.04	-0.28	0.23	0.09	0.00	0.00	0.05	0.80
PCB 180	-0.13	0.19	0.14	0.19	-0.01	-0.30	0.22	0.11	0.00	0.00	0.14	0.98

^a significant correlations (correlation values >0.2 or <-0.2 for rank correlation, p-values <0.05 for Kruskal-Wallis test) are marked bold, significant positive correlations in italic.

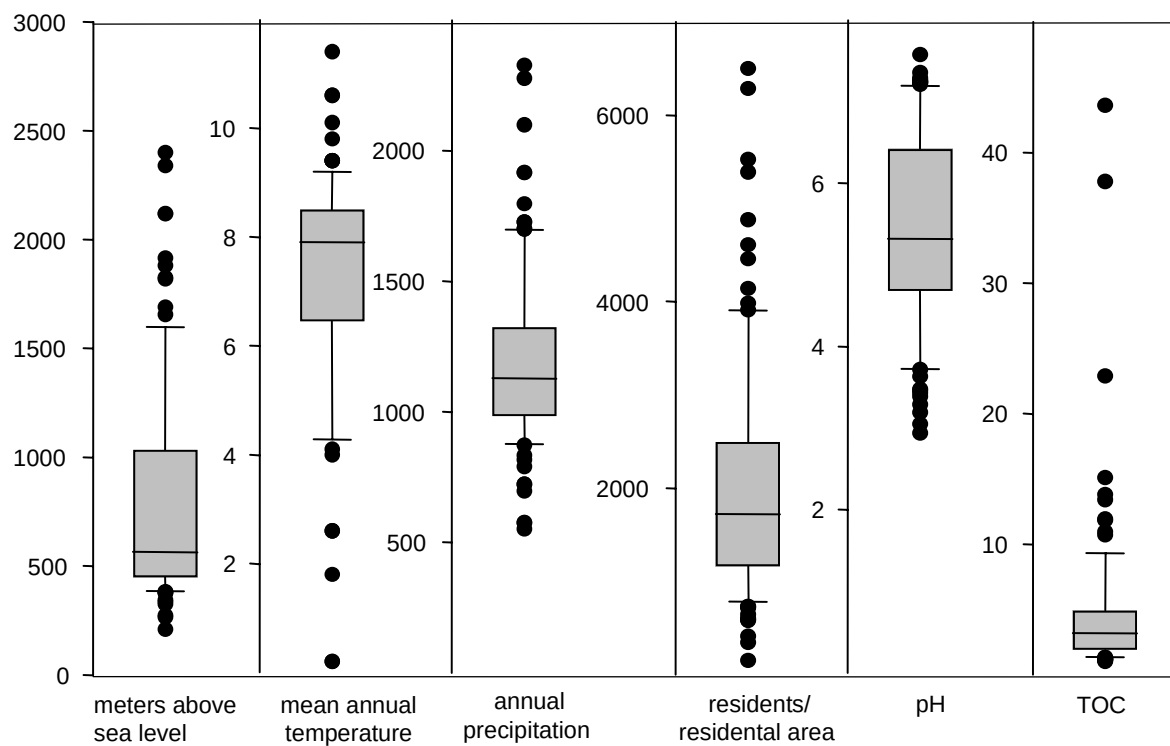
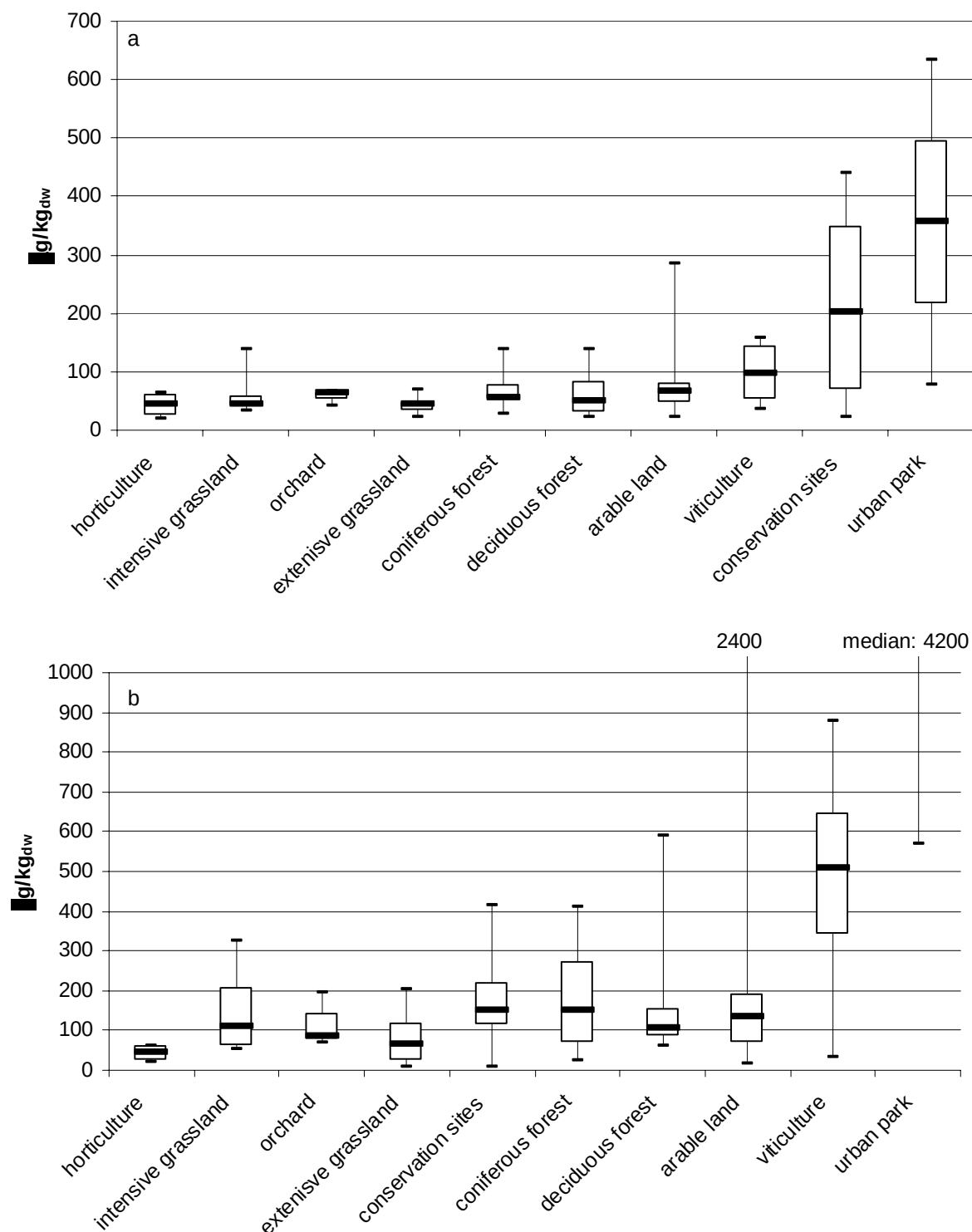


Figure 1: Describing parameters of the sampling sites, units: elevation: meters, temperature: °C, precipitation: millimetres, residents/residential area: persons/km², TOC: total organic carbon content: % dry weight



a) sum of the light PAH (NAP-PHE) for different land uses, b) sum of the heavy PAH (ANT-BPE) for different land uses (in increasing order according to the multi regression model), values outside the scale are indicated with numbers.

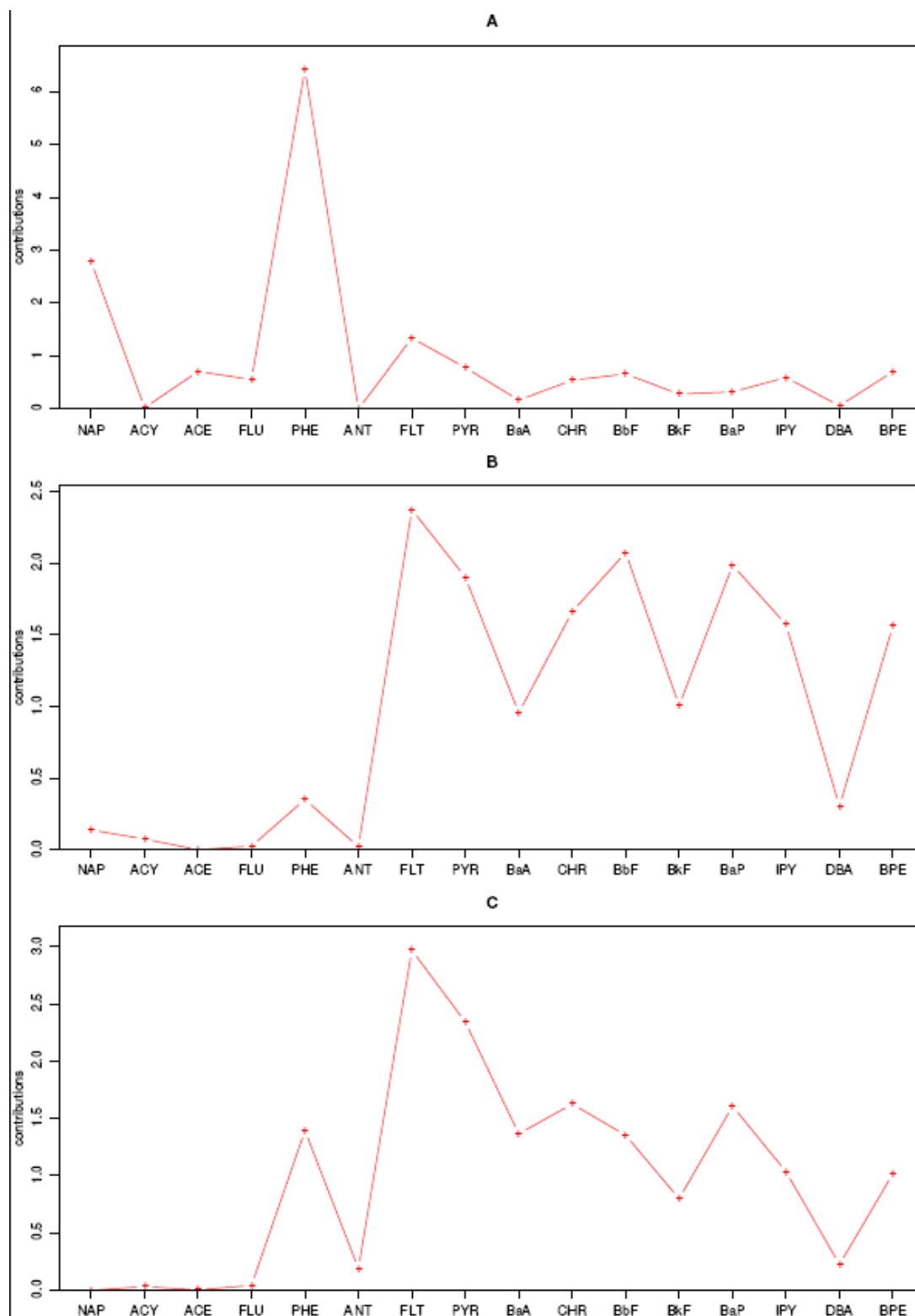
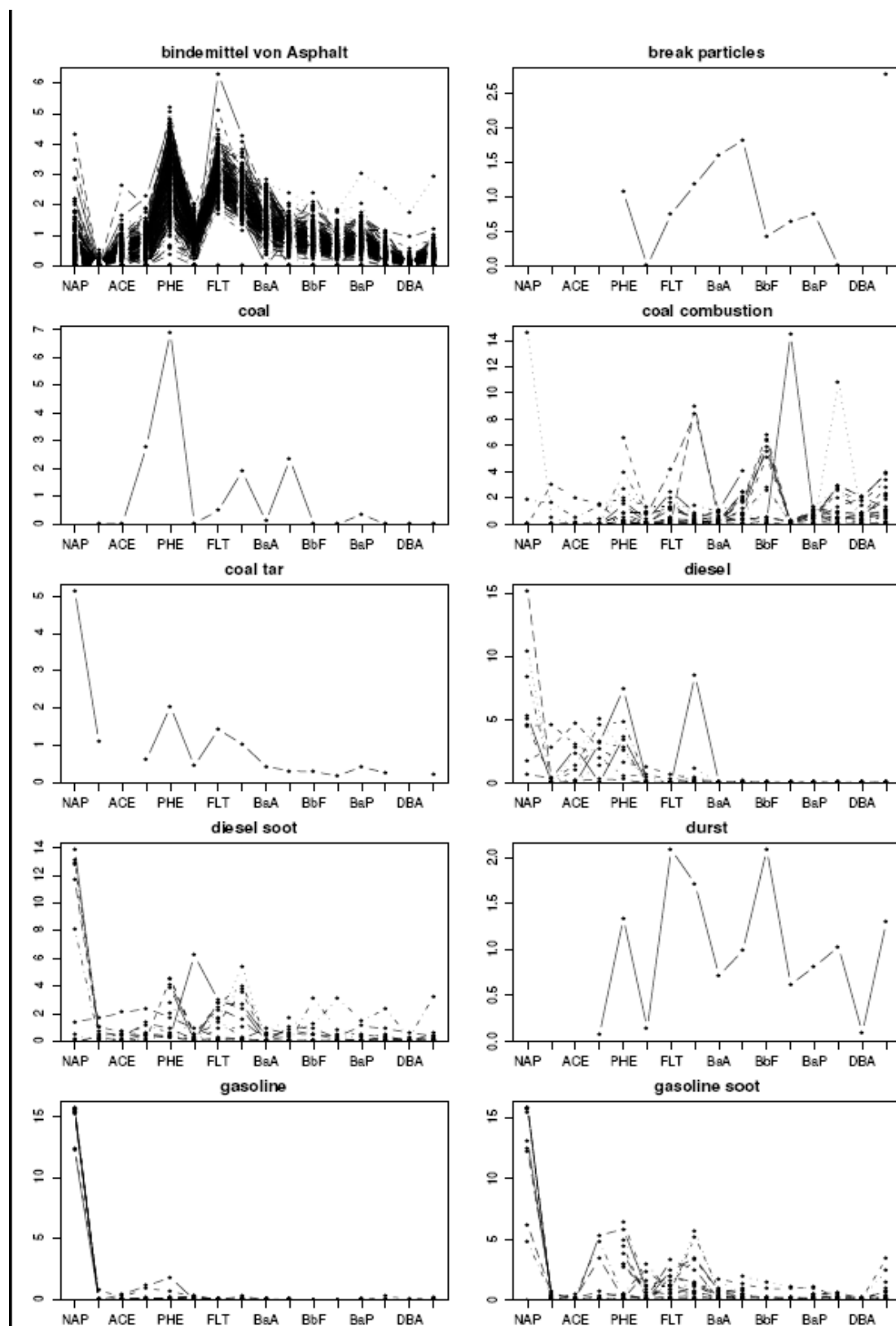
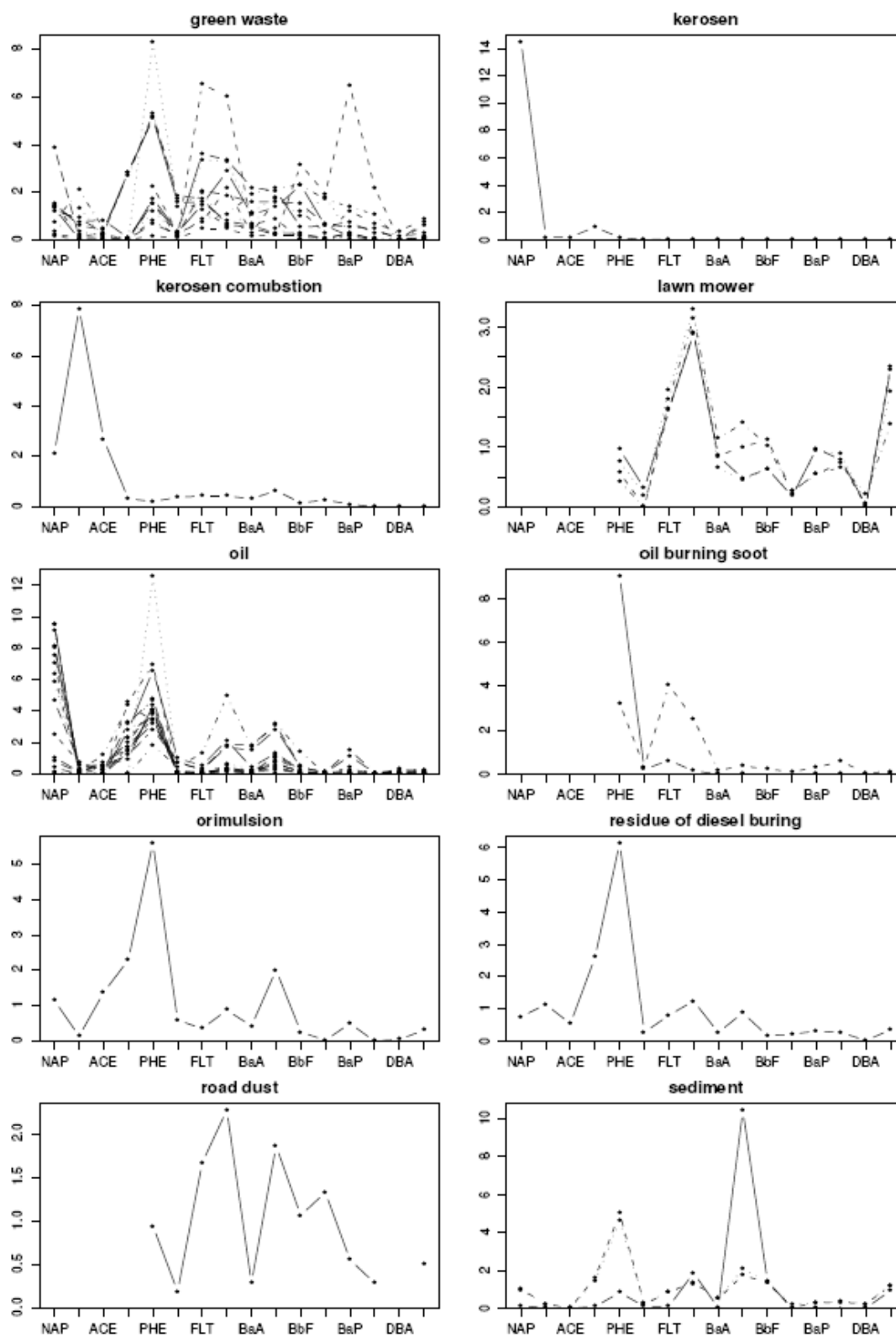


Figure 3: Characteristic profiles identified by the linear mixing model in original units A) light profile, B) heavy profile with emphasis on the most heavy compounds, C) heavy profile with emphasis on the lower end of the heavy compounds.





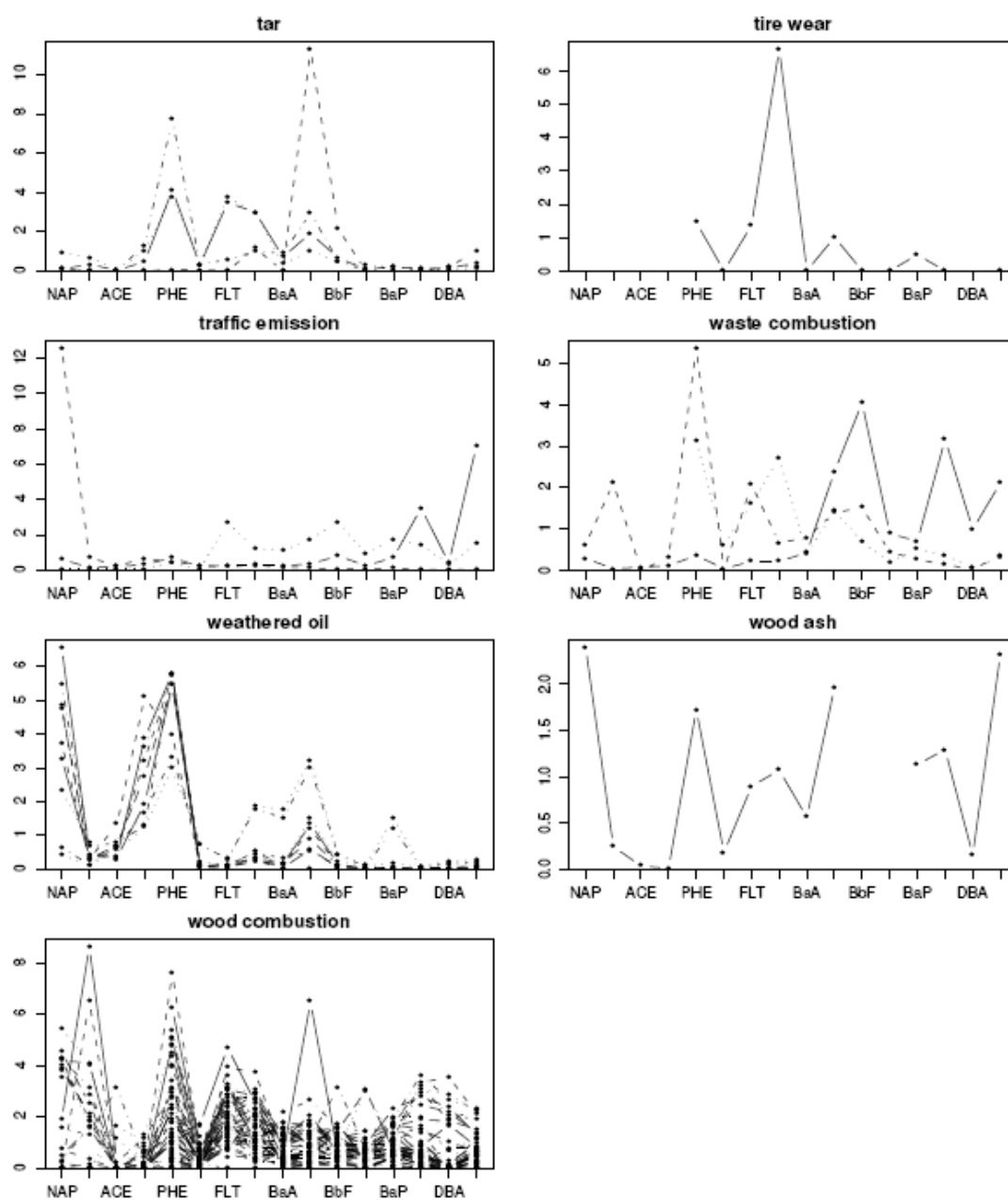


Figure 4: Emission profiles collected from the literature ¹

- 1 R.C. Brändli, T.D. Bucheli, T. Kupper, R. Furrer, W. Stahel, F.X. Stadelmann and J. Tarradellas, *J. Environ. Monit.*, 2007, 456-464.