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*Supplement of*

## **Optimized procedure for the determination of alkylamines in airborne particulate matter of anthropized areas**

**Davide Spolaor et al.**

*Correspondence to:* Andrea Tapparo ([andrea.tapparo@unipd.it](mailto:andrea.tapparo@unipd.it))

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**Table S1** Data acquired during the sampling campaign.

		PM10	NOx	NO	NO2	NH3	H2S	Temperature	Relative humidity
		µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	ppb	µg/m <sup>3</sup>	°C	%
18/09/2020	Montebello	31,9	55	16	31	9	23	24	52
19/09/2020		23,5	24	5	17	10	14	21	54
20/09/2020		22,2	17	2	15	10	14	21	59
21/09/2020		28,1	48	13	29	13	16	23	58
22/09/2020		22,7	46	13	26	12	9	20	86
23/09/2020		20,3	41	14	20	4	21	20	80
24/09/2020		23,8	46	14	24	0	9	20	82
25/09/2020		14,7	n/a	n/a	n/a	n/a	15	19	76
26/09/2020		13,3	19	4	13	1	17	16	57
28/09/2020		21,8	66	25	27	2	11	14	75
29/09/2020		31,3	69	27	28	5	19	16	69
30/09/2020		39,9	53	15	29	13	15	17	71
01/10/2020		49,2	57	18	29	14	9	18	73
02/10/2020		24,5	49	15	26	13	7	17	95
03/10/2020		12,4	16	3	11	8	20	18	81
04/10/2020	9,9	15	3	11	3	16	15	81	
05/10/2020		20,7	57	21	25	5	18	16	79
06/10/2020		23,2	74	32	25	5	34	16	74
07/10/2020		26,1	n/a	n/a	n/a	n/a	16	17	75
14/10/2020	Montorso	17,2	75	30	29	6	7	10	72
15/10/2020		16,7	56	11	39	7	12	11	94
16/10/2020		20	52	13	32	7	8	12	82
17/10/2020		55,1	40	11	23	5	8	11	88
18/10/2020		86,3	16	3	12	1	6	11	88
19/10/2020		73,3	35	11	19	1	6	12	86
20/10/2020		63,2	35	11	18	1	7	12	85
21/10/2020		73,6	40	12	21	4	7	12	88
22/10/2020		80,3	57	21	24	6	10	11	93
23/10/2020		66,1	39	10	24	5	7	13	97
24/10/2020		47,5	26	6	17	4	7	14	99
25/10/2020		16,6	17	3	12	4	5	15	84
26/10/2020		31,9	35	8	23	8	8	14	96
27/10/2020		16,4	25	5	17	3	7	12	94
28/10/2020		25,8	49	19	20	2	9	11	89

30/10/2020	Trissino	48,6	48	16	23	5	37	12	90
31/10/2020		52,9	37	11	21	3	42	11	91
01/11/2020		60,9	39	14	17	3	47	10	100
02/11/2020		64,9	25	4	18	4	5	12	93
03/11/2020		50,5	24	4	17	4	42	14	82
05/11/2020		n/a	35	9	22	4	147	15	80
06/11/2020		27,3	41	11	24	3	113	13	77
07/11/2020		31,5	33	8	22	2	88	12	78
08/11/2020		28,9	27	6	19	3	102	11	84
09/11/2020		39,9	55	18	27	3	52	11	85
10/11/2020		37,1	53	15	31	4	127	11	81
11/11/2020		26,8	38	8	26	4	104	10	72
12/11/2020		47,3	55	15	31	4	58	9	79
13/11/2020		65,1	79	31	32	6	50	8	90
14/11/2020		51,2	33	9	20	5	36	10	88
15/11/2020		51,5	24	5	16	3	31	9	86
16/11/2020		47,6	33	7	22	5	32	10	98
17/11/2020		23,4	54	17	28	3	79	10	86
18/11/2020	39,2	79	33	29	3	73	8	89	

**Table S2** Concentrations (determined by IC) of the principal cations and anions contained in PM10 samples. Concentrations below LOD (sulfate) were taken as they are (without empirical correction) in the statistical analysis.

		Sodium	Ammonium	Potassium	Magnesium	Calcium	Chloride	Nitrate	Sulfate
		µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>
LOD		0.04	0.07	0.04	0.03	0.06	0.28	0.20	0.91
18/09		0.80	0.93	0.14	0.10	1.03	0.36	1.62	2.75
19/09		0.84	0.70	0.14	0.09	0.73	0.34	1.51	2.04
20/09		0.85	0.95	0.14	0.09	0.57	0.32	1.96	2.17
21/09		0.86	0.85	0.15	0.10	0.95	0.34	1.93	2.39
22/09		0.67	1.01	0.16	0.10	0.60	0.35	2.93	1.97
23/09		0.59	0.67	0.10	0.07	0.75	0.31	2.26	1.82
24/09		0.61	1.59	0.18	0.10	0.68	0.32	5.88	1.81
25/09		0.73	0.36	0.12	0.08	0.47	0.37	1.64	1.27
26/09		0.65	0.07	0.12	0.06	0.26	0.37	1.02	0.74
28/09		0.64	0.20	0.06	0.07	0.53	0.32	1.45	0.81
29/09		0.76	1.16	0.16	0.08	0.62	0.33	5.01	1.00
30/09		0.74	3.49	0.30	0.09	0.78	0.37	12.68	1.48
01/10		0.79	4.53	0.37	0.11	0.91	0.40	16.97	1.96
02/10		0.87	2.37	0.24	0.11	0.45	0.52	7.48	1.75
03/10		1.61	0.13	0.10	0.16	0.33	0.75	1.89	1.62
04/10		0.93	0.22	0.07	0.08	0.22	0.50	1.54	0.90
05/10		0.87	0.20	0.07	0.09	0.52	0.49	1.42	1.10
06/10		1.14	0.46	0.14	0.13	0.64	0.66	2.76	1.28
07/10		1.03	0.55	0.13	0.12	0.59	0.39	3.15	1.25
14/10		0.63	0.93	0.21	0.07	0.50	0.29	3.90	0.83
15/10		0.66	0.31	0.09	0.05	0.21	0.31	1.63	0.70
16/10		0.67	0.49	0.18	0.05	0.26	0.34	1.95	0.83
17/10		0.62	2.94	0.24	0.07	0.35	0.33	8.83	1.17
18/10		1.12	3.52	0.41	0.35	2.13	1.40	11.85	2.44
19/10		1.02	4.75	0.41	0.28	2.04	1.26	15.07	2.71
20/10		0.68	7.21	0.25	0.09	0.67	0.41	21.92	2.13
21/10		0.67	8.30	0.30	0.10	0.68	0.50	25.07	2.29
22/10		0.70	10.53	0.32	0.11	0.65	0.58	31.52	3.05
23/10		0.65	8.50	0.24	0.08	0.46	0.48	24.53	2.96
24/10		0.62	5.60	0.24	0.05	0.26	0.48	14.94	2.21
25/10		0.74	1.47	0.21	0.05	0.23	0.36	4.72	1.04

26/10		0.86	3.20	0.22	0.08	0.30	0.52	8.65	1.63
27/10		0.66	0.34	0.18	0.05	0.23	0.37	1.47	0.75
28/10		0.73	0.81	0.29	0.07	0.39	0.42	3.22	0.92
30/10	Trissino	0.59	3.45	0.39	0.10	0.63	0.40	12.89	1.19
31/10		0.61	4.13	0.56	0.08	0.42	0.46	14.68	1.56
01/11		0.61	4.65	0.75	0.05	0.23	0.50	14.86	2.09
02/11		0.62	4.25	0.68	0.07	0.34	0.45	13.45	2.05
03/11		0.68	4.22	0.56	0.09	0.47	0.35	14.30	2.07
05/11		1.56	0.23	0.61	0.55	3.85	2.60	2.83	3.46
06/11		0.70	1.13	0.30	0.09	0.76	0.32	4.36	1.27
07/11		0.70	1.14	0.31	0.07	0.42	0.30	4.16	1.11
08/11		0.70	2.02	0.43	0.06	0.30	0.32	6.19	1.41
09/11		0.75	2.76	0.46	0.10	0.78	0.36	9.83	1.44
10/11		0.80	2.08	0.43	0.10	1.09	0.33	7.54	1.52
11/11		0.77	1.56	0.35	0.08	0.79	0.31	4.34	2.23
12/11		0.71	3.05	0.56	0.09	1.20	0.42	10.03	2.57
13/11		0.75	5.19	0.86	0.11	1.03	0.49	18.93	2.69
14/11		0.62	4.43	0.73	0.11	0.58	0.39	15.25	2.23
15/11		0.80	5.28	0.89	0.08	0.45	0.43	17.81	2.32
16/11		0.77	4.46	0.71	0.08	0.37	0.37	14.82	1.96
17/11		0.83	0.40	0.24	0.09	0.61	0.43	2.06	0.89
18/11	0.75	1.49	0.50	0.10	0.79	0.47	5.56	1.33	

**Table S3** Measured concentration in PM10 samples of organic and elemental carbon.

		Organic carbon	Elemental carbon	Total carbon	
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	
18/09/2020	Montebello	6.15	1.87	8.01	
19/09/2020		5.37	1.15	6.52	
20/09/2020		5.08	0.91	6.00	
21/09/2020		5.81	1.68	7.49	
22/09/2020		4.93	1.48	6.42	
23/09/2020		4.58	1.38	5.96	
24/09/2020		4.89	1.55	6.44	
25/09/2020		4.97	1.21	6.19	
26/09/2020		5.74	0.84	6.58	
28/09/2020		3.81	1.64	5.45	
29/09/2020		4.96	1.56	6.51	
30/09/2020		5.74	1.54	7.28	
01/10/2020		6.34	1.58	7.91	
02/10/2020		4.51	1.49	6.00	
03/10/2020		2.98	0.52	3.50	
04/10/2020		2.67	0.56	3.23	
05/10/2020		3.40	1.43	4.83	
06/10/2020		4.97	1.82	6.79	
07/10/2020		4.65	1.47	6.12	
14/10/2020		Montorso	5.83	1.32	7.16
15/10/2020	3.54		0.75	4.29	
16/10/2020	3.90		0.97	4.87	
17/10/2020	6.07		1.35	7.42	
18/10/2020	16.03		0.93	16.95	
19/10/2020	11.78		1.41	13.19	
20/10/2020	8.10		1.46	9.56	
21/10/2020	10.82		1.63	12.44	
22/10/2020	10.85		1.60	12.45	
23/10/2020	9.01		1.37	10.39	
24/10/2020	7.26		1.28	8.54	
25/10/2020	4.18		0.76	4.94	
26/10/2020	6.33		1.31	7.65	
27/10/2020	4.76		1.04	5.81	
28/10/2020	7.00		1.67	8.67	
30/10/2020	Trissino		7.42	1.59	9.02
31/10/2020			8.38	1.63	10.01
01/11/2020			9.51	1.61	11.12
02/11/2020		8.91	1.64	10.55	
03/11/2020		8.78	1.45	10.23	
05/11/2020		21.85	0.86	22.71	
06/11/2020		6.66	1.59	8.25	
07/11/2020		6.86	1.63	8.50	
08/11/2020	6.79	1.38	8.17		

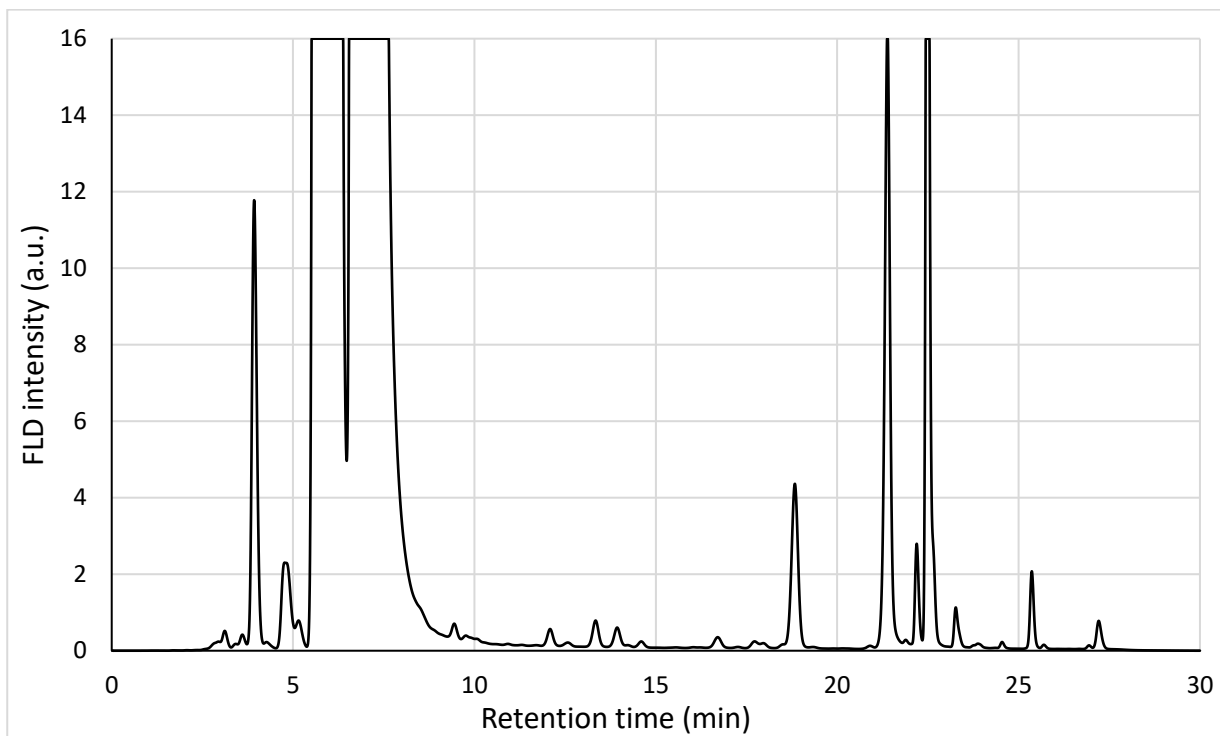
09/11/2020	Trissino	8.61	1.79	10.41
10/11/2020		8.23	1.88	10.12
11/11/2020		6.36	1.56	7.92
12/11/2020		9.17	1.78	10.95
13/11/2020		11.07	1.94	13.01
14/11/2020		9.34	1.64	10.98
15/11/2020		9.95	1.51	11.46
16/11/2020		8.39	1.48	9.86
17/11/2020		5.65	1.62	7.28
18/11/2020		8.51	2.28	10.79

**Table S4** Measured concentrations of the amines contained in PM10.

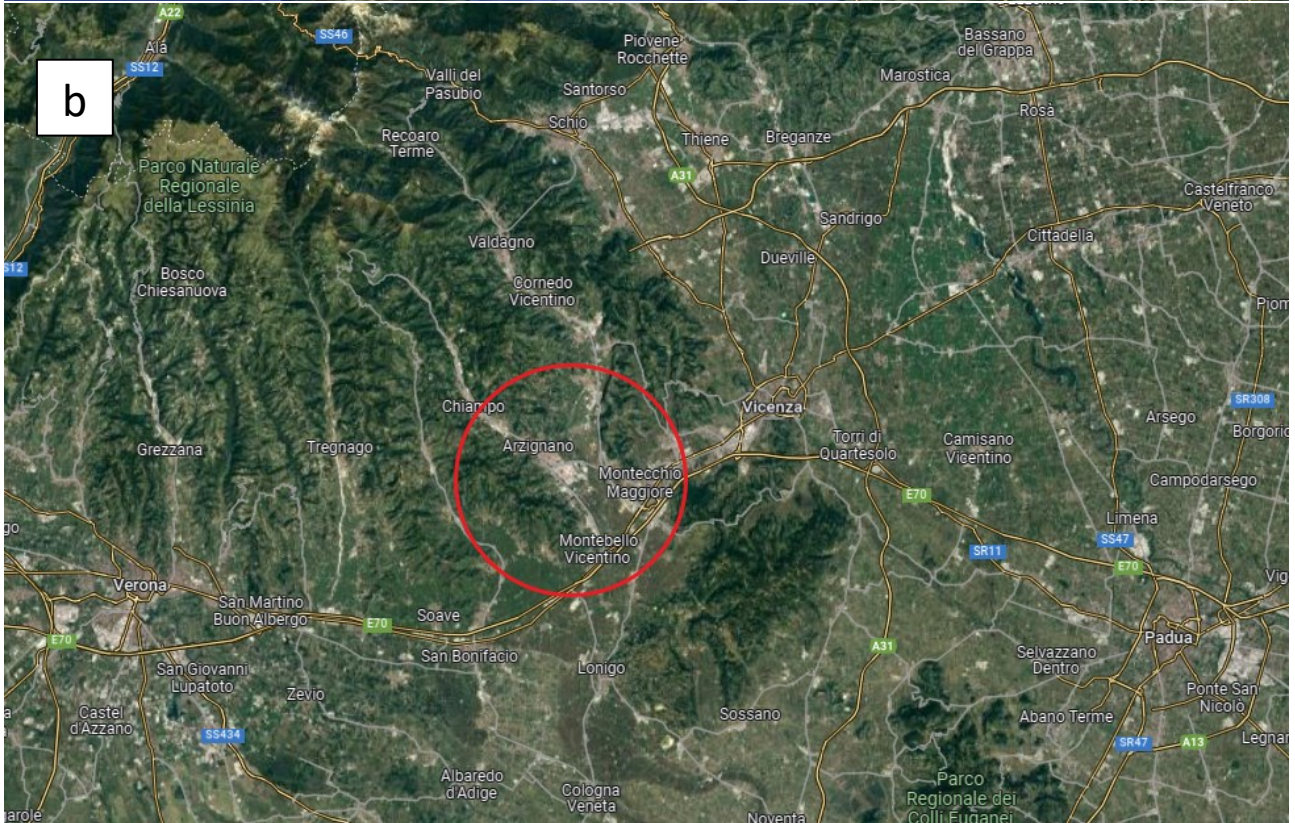
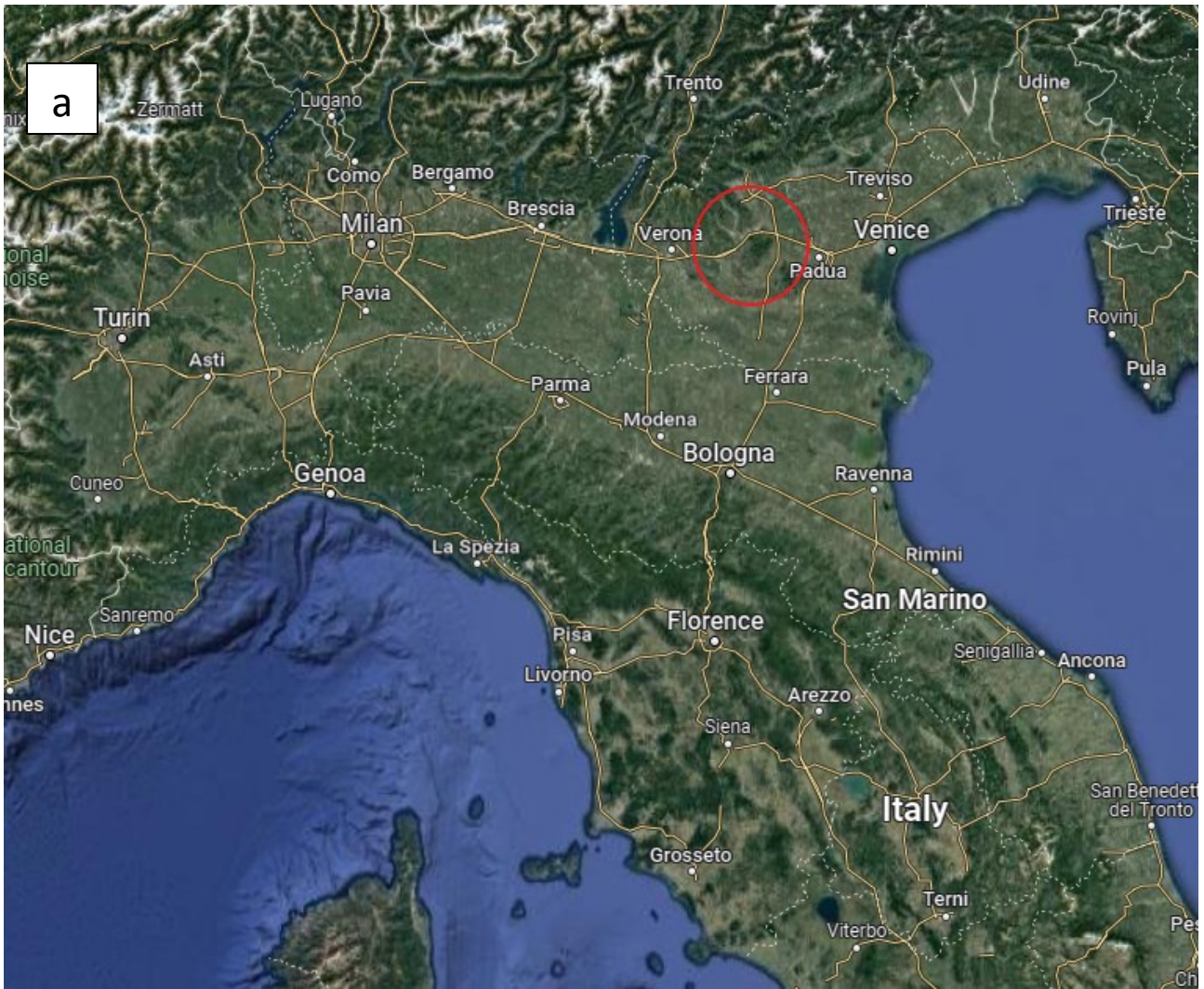
		MA (ng/m <sup>3</sup> )		EA (ng/m <sup>3</sup> )		DMA (ng/m <sup>3</sup> )		PA (ng/m <sup>3</sup> )		DEA (ng/m <sup>3</sup> )	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
18/9	Montebello	6.15	0.015	2.255	0.000	12.647	0.027	1.114	0.000	4.579	0.043
19/9		4.700	0.086	2.175	0.004	12.268	0.001	0.803	0.000	3.258	0.032
20/9		6.254	0.014	2.531	0.014	12.587	0.009	1.102	0.000	3.572	0.017
21/9		6.827	0.013	2.819	0.007	14.522	0.015	1.206	0.005	4.37	0.12
22/9		10.283	0.014	2.882	0.007	16.570	0.018	1.090	0.006	5.255	0.021
23/9		8.537	0.012	2.918	0.019	15.541	0.061	1.051	0.002	5.081	0.022
24/9		13.677	0.000	2.661	0.008	20.035	0.029	0.980	0.018	6.065	0.028
25/9		5.930	0.056	1.444	0.005	9.996	0.027	0.448	0.005	2.549	0.003
26/9		0.924	0.006	0.566	0.000	5.449	0.007	0.297	0.004	1.350	0.021
27/9		1.172	0.019	0.490	0.001	5.101	0.004	0.398	0.002	1.332	0.002
28/9		4.486	0.002	1.570	0.004	9.257	0.005	0.744	0.000	3.001	0.012
29/9		10.120	0.018	3.542	0.040	22.001	0.080	1.886	0.014	6.405	0.090
30/9		18.267	0.052	4.883	0.000	25.202	0.038	3.838	0.000	8.395	0.000
1/10		20.495	0.006	4.382	0.016	23.702	0.034	4.433	0.001	8.842	0.086
2/10		14.771	0.019	2.873	0.005	16.538	0.032	1.587	0.004	5.366	0.094
3/10		2.703	0.019	0.749	0.007	6.018	0.006	0.463	0.008	1.757	0.047
4/10		4.316	0.011	3.440	0.035	9.053	0.021	1.248	0.005	2.006	0.081
5/10		4.249	0.008	3.509	0.001	10.019	0.028	1.689	0.004	2.219	0.018
6/10		6.610	0.025	4.651	0.009	15.406	0.021	2.283	0.006	4.897	0.003
7/10		7.975	0.065	4.230	0.011	12.426	0.046	2.822	0.028	3.532	0.061
13/10	Montorso	2.422	0.016	1.571	0.008	8.610	0.002	0.410	0.008	1.938	0.004
14/10		4.756	0.002	2.364	0.087	10.131	0.019	1.256	0.007	3.964	0.060
15/10		2.988	0.061	1.320	0.032	13.057	0.030	0.512	0.003	5.075	0.149
16/10		3.626	0.046	0.783	0.003	8.986	0.002	0.405	0.004	3.522	0.023
17/10		10.262	0.068	1.611	0.002	16.026	0.053	1.010	0.024	4.638	0.003
18/10		11.737	0.013	1.451	0.015	31.261	0.780	1.185	0.003	3.688	0.010
19/10		14.944	0.011	2.706	0.012	36.749	0.219	1.578	0.007	6.340	0.030
20/10		13.820	0.052	5.056	0.012	25.155	0.062	3.000	0.003	9.412	0.054
21/10		18.053	0.053	4.847	0.003	23.72	0.16	4.519	0.011	9.078	0.052
22/10		19.337	0.062	4.263	0.003	27.23	0.14	4.410	0.004	7.614	0.048
23/10		14.582	0.040	3.658	0.063	25.952	0.032	3.340	0.059	7.940	0.017
24/10		19.665	0.028	2.778	0.023	26.877	0.176	3.053	0.009	5.168	0.011
25/10		6.254	0.022	1.483	0.009	9.253	0.004	1.014	0.001	3.057	0.015
26/10		12.297	0.016	2.228	0.001	15.927	0.022	1.271	0.012	5.624	0.008
27/10		3.305	0.014	0.743	0.004	7.143	0.000	0.287	0.002	2.535	0.010
28/10		7.241	0.013	1.882	0.001	13.071	0.021	0.462	0.004	5.500	0.023
30/10		Trissino	8.462	0.048	1.463	0.099	23.216	0.002	1.290	0.010	3.633
31/10	15.160		0.025	2.119	0.024	26.001	0.011	3.031	0.004	3.508	0.023
1/11	17.26		0.21	2.111	0.010	28.439	0.053	3.592	0.002	3.460	0.009
2/11	15.694		0.109	2.917	0.036	26.936	0.080	2.357	0.009	3.977	0.032
3/11	15.462		0.026	2.784	0.015	26.443	0.034	1.793	0.004	4.988	0.027
5/11	3.165		0.003	0.457	0.015	16.344	0.019	0.288	0.026	0.899	0.014
6/11	6.872		0.012	1.558	0.004	16.831	0.025	1.105	0.008	3.087	0.003

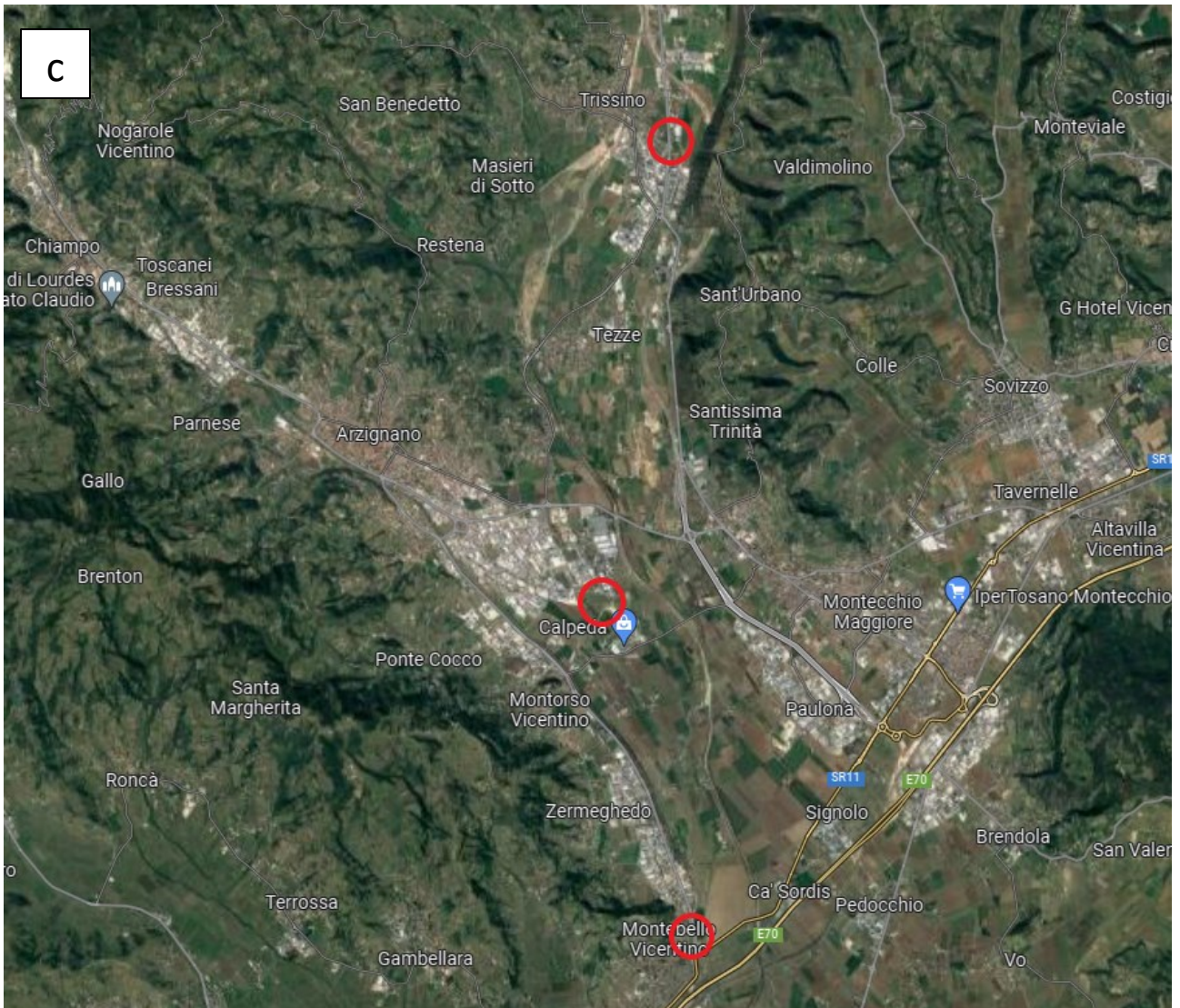


7/11	Trissino	6.124	0.002	1.417	0.005	13.033	0.012	1.578	0.007	2.357	0.001
8/11		6.962	0.053	1.120	0.007	25.823	0.002	1.682	0.007	3.447	0.051
9/11		10.361	0.031	1.815	0.010	35.623	0.119	2.433	0.019	6.059	0.031
10/11		8.953	0.015	1.694	0.009	33.630	0.051	2.120	0.004	4.919	0.057
11/11		5.944	0.009	1.418	0.002	21.316	0.023	0.671	0.009	3.211	0.027
12/11		9.670	0.006	2.130	0.001	34.460	0.030	2.549	0.002	6.400	0.044
13/11		18.226	0.048	3.147	0.003	35.848	0.088	5.036	0.012	7.568	0.014
14/11		13.188	0.023	2.453	0.007	24.486	0.017	2.411	0.008	3.890	0.008
15/11		18.409	0.011	3.416	0.009	28.152	0.040	3.304	0.024	3.699	0.016
16/11		16.390	0.007	2.331	0.007	24.147	0.049	1.878	0.005	4.375	0.046
17/11		3.648	0.011	1.209	0.001	11.413	0.010	0.566	0.000	3.730	0.032
18/11		8.510	0.038	1.528	0.001	21.694	0.030	1.443	0.006	3.557	0.028

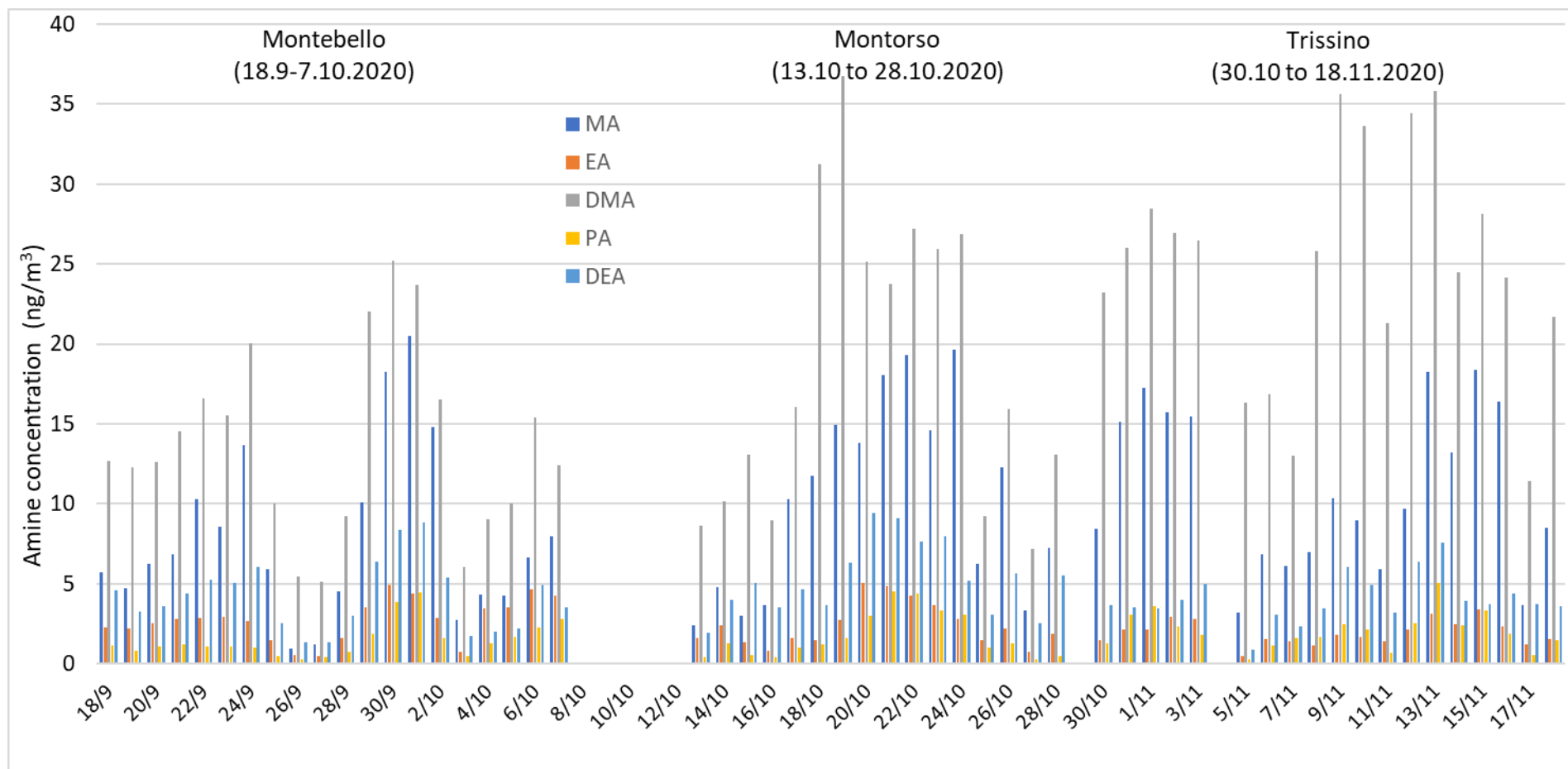


**Figure S1** UHPLC-FLD chromatogram of a blank sample.

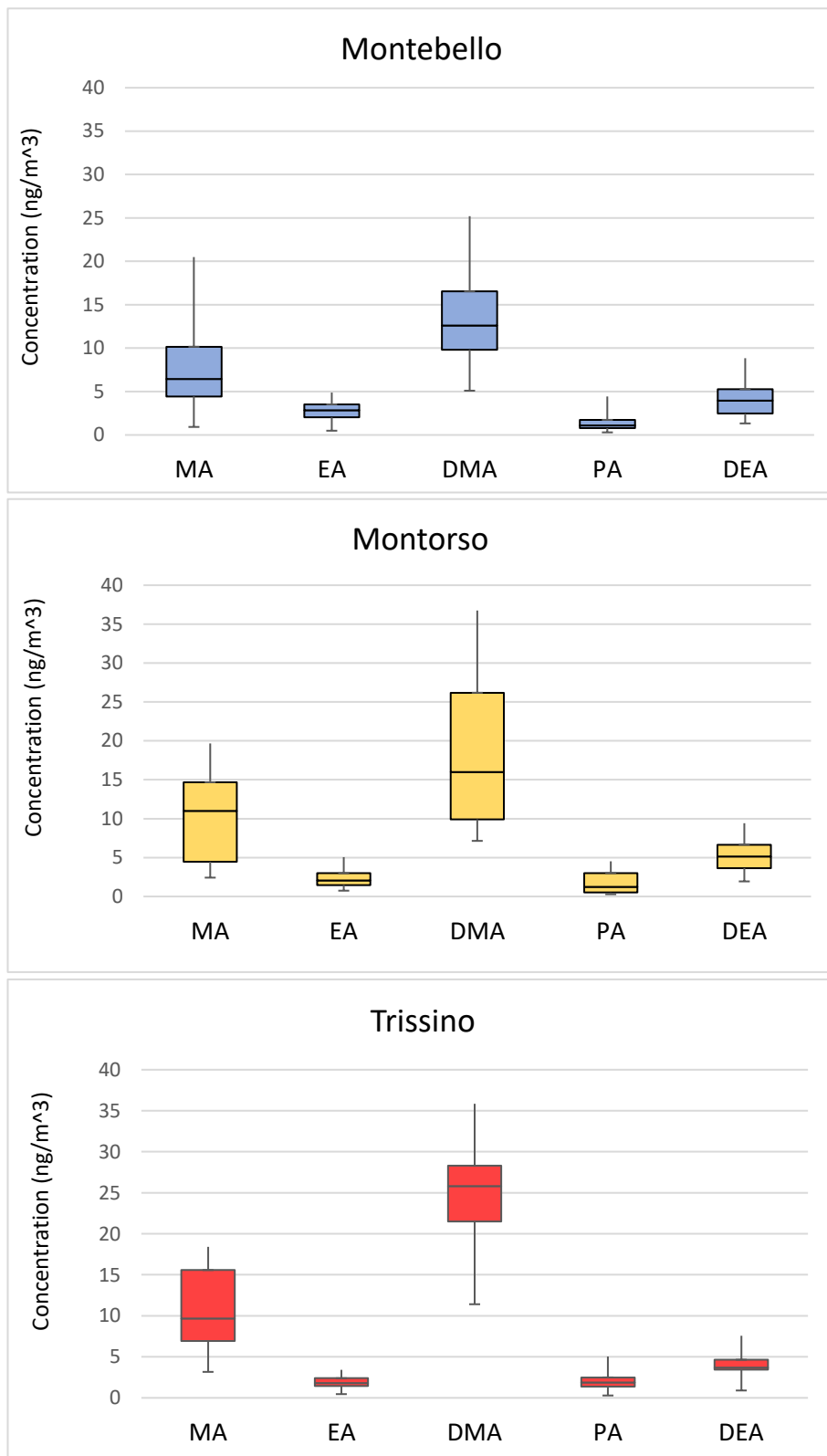




**Figure S2** (a) Map of northern Italy; (b) Map of the province of Vicenza; (c) Map of the industrial area of the Chiampo Valley. The red circles indicate the three sampling sites. Images from “[Google Maps](https://www.google.com/maps/)” in accordance with the Fair Use guidelines for publications (<https://about.google/brand-resource-center/products-and-services/geo-guidelines/>).



**Figure S3:** Amine concentrations during the sampling campaign in the three different sites (Montebello, Montorso, Trissino).



**Figure S4:** Box-plot of amines concentrations in the sites of Montebello, Montorso e Trissino.

**Table S5:** Comparison of amines signals (UHPLC-FLD) of solutions obtained from a real PM10 sample (two halves of the same filter) extracted with different extraction times.

Sample	Extraction time (minutes)	MA (area)	DMA (area)	EA (area)	PA (area)	DEA (area)
1	10	10543111	11680168	2032522	893767	2920727
2	20	11358177	12326303	1915332	904079	2880272

**Table S6:** Comparison of amines signals (UHPLC-FLD) of a real PM10 extract derivatized using different reaction temperatures or times.

Sample	T (°C)	Reaction time (minutes)	MA (area)	EA* (area)	DMA (area)	PA (area)	DEA (area)
1	25	20	6974869	16058949	8248452	437072	1382010
2	50	5	7268735	32517224	8727659	367248	1417684
3	50	10	7174802	1470186	8978536	416980	1365358
4	50	15	7038745	1455189	8892331	419176	1357084

\* The higher EA signals observed for sample 1 and 2 are due to the interfering unreacted Fmoc.

**Table S7** Comparison between the results obtained with FLD and MS analysis of the solutions extracted from three different samples of PM10.

		sample 1		sample 2		sample 3	
		FLD	Q-TOF	FLD	Q-TOF	FLD	Q-TOF
<b>MA (µg/L)</b> Quantitation ion: 179.0861 Qualifier ion: 254.1175	Conc.	81.05	83.94	81.42	82.55	74.88	79.92
	Dev Std	1.09	1.82	0.22	1.67	0.57	0.68
	P-value	0.078		0.36		0.0006	
<b>EA (µg/L)</b> Quantitation ion: 179.0861 Qualifier ion: 268.1332	Conc.	72.30	71.23	64.70	59.87	62.00	62.09
	Dev Std	0.32	0.11	0.08	4.57	0.42	1.38
	P-value	0.005		0.21		0.92	
<b>DMA (µg/L)</b> Quantitation ion: 179.0861 Qualifier ion: 268.1332	Conc.	85.59	84.40	86.92	85.50	83.43	84.26
	Dev Std	0.10	1.44	0.40	0.22	0.13	0.24
	P-value	0.29		0.006		0.006	
<b>PA (µg/L)</b> Quantitation ion: 179.0861 Qualifier ion: 282.1488	Conc.	67.01	65.56	63.31	62.66	61.14	60.88
	Dev Std	0.47	1.22	0.05	0.71	0.33	0.54
	P-value	0.13		0.26		0.51	
<b>DEA (µg/L)</b> Quantitation ion: 179.0861 Qualifier ion: 296.1645	Conc.)	77.04	77.98	69.94	70.50	72.01	72.23
	Dev Std	0.41	1.24	0.78	0.85	0.20	0.38
	P-value	0.28		0.45		0.42	

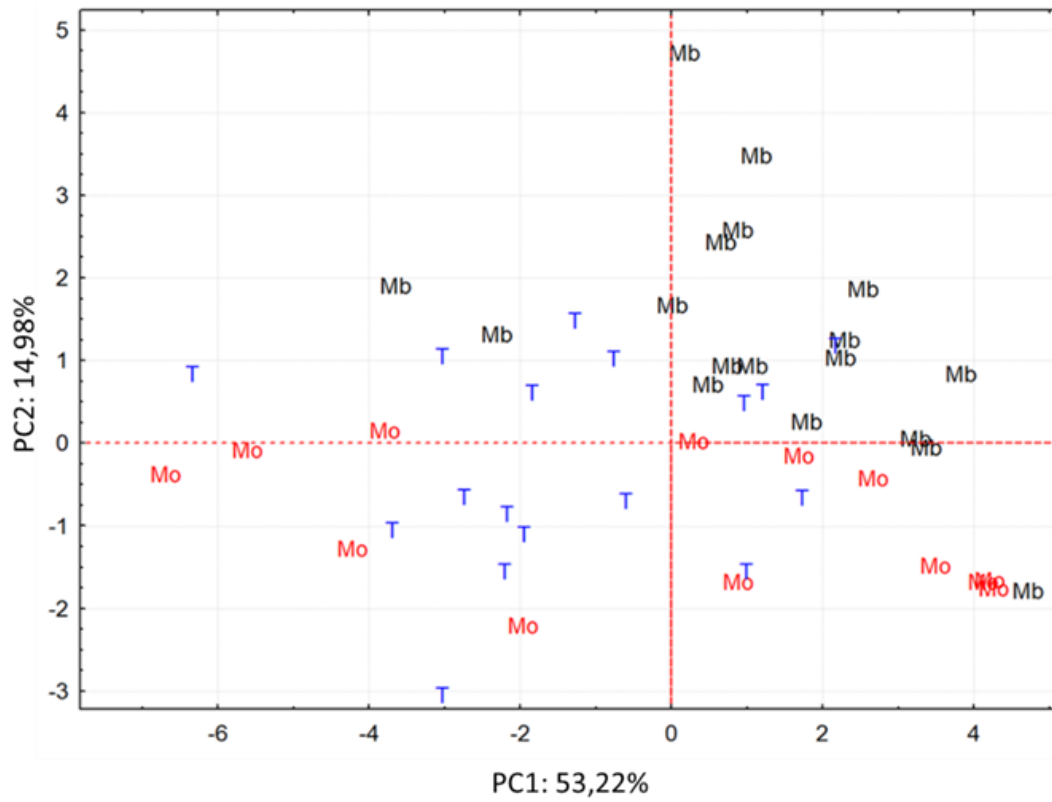


**Table S8** Comparison of amine concentration in different urbanized sites.

Reference	Akyüz, 2008				Cheng et al., 2020			Feng et al., 2020	Choi et al., 2020	This study
Location	Zonguldak, Turkey				Yangzhou, China			Shanghai, China	Seoul, Korea	Vicenza, Italy
Characteristics	Industrial area				Urban area			Urban site	Urban site	Industrial area
Period	2006-2007				2016/04/06-2016/11/02			2018/10-2018/11	2018/01-2018/12	2020/09/18-2020/11/18
Season	winter		summer		spring	summer	autumn	\	\	\
PM	PM10	PM2.5	PM10	PM2.5	PM2.5			PM2.5	PM2.5	PM10
Unit	ng m <sup>-3</sup>				ng m <sup>-3</sup>			ng m <sup>-3</sup>	ng m <sup>-3</sup>	ng m <sup>-3</sup>
MA	7.13 ± 3.17	4.48 ± 1.75	3.93 ± 2.41	2.33 ± 1.30	1.65 ± 1.88	1.41 ± 1.30	1.24 ± 0.74	19.8 ± 15.9	\	9.7 ± 5.5
EA	6.87 ± 3.51	4.37 ± 2.27	3.82 ± 1.89	2.19 ± 1.13	20.04 ± 13.79	14.25 ± 7.43	3.02 ± 1.81	\	0.27 ± 0.97	2.4 ± 1.2
DMA	6.84 ± 3.20	4.58 ± 2.28	4.58 ± 2.45	2.79 ± 1.55	4.04 ± 4.35	3.99 ± 4.36	2.56 ± 2.29	18.7 ± 13.4	2.72 ± 1.49	19.0 ± 8.7
PA	8.58 ± 3.54	5.66 ± 2.20	4.74 ± 3.10	2.98 ± 2.19	\	\	\	\	0.43 ± 0.79	1.8 ± 1.2
BA	9.46 ± 3.66	6.65 ± 2.37	6.14 ± 5.10	4.24 ± 3.59	\	\	\	\	0.83 ± 1.08	\
DEA	6.20 ± 2.93	4.11 ± 1.75	4.34 ± 2.41	2.82 ± 1.76	\	\	\	\	1.31 ± 0.49	4.5 ± 2.0

**Table S9** Pearson's correlation matrix of all the considered variables.

	PM10	OC	EC	Na	NH4	K	Mg	Ca	Cl	NO3	SO4	MA	EA	DMA	PA	DEA	T	U	H2S	NO	NO2	NOx	NH3	Rain
PM10	1,00	0,90	0,36	-0,13	0,87	0,62	0,44	0,46	0,56	0,88	0,68	0,77	0,38	0,80	0,68	0,55	-0,45	0,44	-0,06	-0,01	-0,09	-0,04	-0,22	-0,22
OC	0,90	1,00	0,37	-0,08	0,71	0,70	0,54	0,58	0,65	0,72	0,64	0,61	0,14	0,80	0,52	0,37	-0,53	0,36	0,14	-0,03	-0,13	-0,07	-0,35	-0,26
EC	0,36	0,37	1,00	-0,30	0,26	0,45	-0,03	0,29	-0,05	0,29	0,28	0,38	0,27	0,50	0,43	0,38	-0,23	0,06	0,42	0,63	0,51	0,64	-0,05	-0,26
Na	-0,13	-0,08	-0,30	1,00	-0,24	-0,21	0,60	0,29	0,52	-0,22	0,06	-0,21	0,03	-0,15	-0,13	-0,19	0,23	-0,18	-0,05	-0,08	-0,24	-0,14	0,18	-0,10
NH4	0,87	0,71	0,26	-0,24	1,00	0,51	0,15	0,15	0,29	0,99	0,69	0,84	0,51	0,69	0,78	0,67	-0,38	0,49	-0,13	-0,05	-0,10	-0,07	-0,11	-0,14
K	0,62	0,70	0,45	-0,21	0,51	1,00	0,09	0,15	0,30	0,57	0,42	0,61	0,04	0,73	0,53	0,16	-0,62	0,43	0,34	-0,01	-0,05	-0,03	-0,24	-0,20
Mg	0,44	0,54	-0,03	0,60	0,15	0,09	1,00	0,83	0,89	0,18	0,38	0,17	0,09	0,35	0,05	0,12	0,00	0,01	-0,10	-0,03	-0,19	-0,10	-0,07	-0,12
Ca	0,46	0,58	0,29	0,29	0,15	0,15	0,83	1,00	0,66	0,17	0,49	0,19	0,13	0,51	0,14	0,30	0,00	-0,19	0,10	0,16	0,14	0,16	-0,05	-0,20
Cl	0,56	0,65	-0,05	0,52	0,29	0,30	0,89	0,66	1,00	0,31	0,37	0,26	-0,01	0,45	0,13	0,03	-0,29	0,31	-0,04	-0,10	-0,32	-0,20	-0,29	-0,15
NO3	0,88	0,72	0,29	-0,22	0,99	0,57	0,18	0,17	0,31	1,00	0,65	0,86	0,52	0,72	0,82	0,67	-0,42	0,50	-0,10	0,00	-0,08	-0,03	-0,12	-0,14
SO4	0,68	0,64	0,28	0,06	0,69	0,42	0,38	0,49	0,37	0,65	1,00	0,63	0,41	0,62	0,54	0,49	0,06	0,07	-0,07	-0,13	-0,07	-0,13	0,14	-0,16
MA	0,77	0,61	0,38	-0,21	0,84	0,61	0,17	0,19	0,26	0,86	0,63	1,00	0,59	0,74	0,82	0,68	-0,22	0,47	-0,15	0,03	-0,03	0,01	0,06	-0,08
EA	0,38	0,14	0,27	0,03	0,51	0,04	0,09	0,13	-0,01	0,52	0,41	0,59	1,00	0,30	0,71	0,68	0,19	-0,01	-0,33	0,26	0,07	0,23	0,25	-0,10
DMA	0,80	0,80	0,50	-0,15	0,69	0,73	0,35	0,51	0,45	0,72	0,62	0,74	0,30	1,00	0,66	0,56	-0,47	0,39	0,27	0,09	0,10	0,09	-0,22	-0,13
PA	0,68	0,52	0,43	-0,13	0,78	0,53	0,05	0,14	0,13	0,82	0,54	0,82	0,71	0,66	1,00	0,66	-0,26	0,28	-0,01	0,24	0,11	0,22	0,09	-0,22
DEA	0,55	0,37	0,38	-0,19	0,67	0,16	0,12	0,30	0,03	0,67	0,49	0,68	0,68	0,56	0,66	1,00	-0,06	0,20	-0,22	0,30	0,35	0,34	0,17	0,08
T	-0,45	-0,53	-0,23	0,23	-0,38	-0,62	0,00	0,00	-0,29	-0,42	0,06	-0,22	0,19	-0,47	-0,26	-0,06	1,00	-0,63	-0,38	-0,13	-0,06	-0,12	0,58	0,06
U	0,44	0,36	0,06	-0,18	0,49	0,43	0,01	-0,19	0,31	0,50	0,07	0,47	-0,01	0,39	0,28	0,20	-0,63	1,00	-0,03	-0,05	-0,08	-0,06	-0,32	0,24
H2S	-0,06	0,14	0,42	-0,05	-0,13	0,34	-0,10	0,10	-0,04	-0,10	-0,07	-0,15	-0,33	0,27	-0,01	-0,22	-0,38	-0,03	1,00	0,08	0,21	0,12	-0,27	-0,19
NO	-0,01	-0,03	0,63	-0,08	-0,05	-0,01	-0,03	0,16	-0,10	0,00	-0,13	0,03	0,26	0,09	0,24	0,30	-0,13	-0,05	0,08	1,00	0,66	0,96	0,07	-0,07
NO2	-0,09	-0,13	0,51	-0,24	-0,10	-0,05	-0,19	0,14	-0,32	-0,08	-0,07	-0,03	0,07	0,10	0,11	0,35	-0,06	-0,08	0,21	0,66	1,00	0,84	0,34	0,32
Nox	-0,04	-0,07	0,64	-0,14	-0,07	-0,03	-0,10	0,16	-0,20	-0,03	-0,13	0,01	0,23	0,09	0,22	0,34	-0,12	-0,06	0,12	0,96	0,84	1,00	0,18	0,07
NH3	-0,22	-0,35	-0,05	0,18	-0,11	-0,24	-0,07	-0,05	-0,29	-0,12	0,14	0,06	0,25	-0,22	0,09	0,17	0,58	-0,32	-0,27	0,07	0,34	0,18	1,00	0,07
Rain	-0,22	-0,26	-0,26	-0,10	-0,14	-0,20	-0,12	-0,20	-0,15	-0,14	-0,16	-0,08	-0,10	-0,13	-0,22	0,08	0,06	0,24	-0,19	-0,07	0,32	0,07	0,07	1,00



**Figure S5** Score plot (PCA), Mb corresponds to Montebello, Mo to Montorso and T to Trissino.