

**AEROSOL CHARACTERISATION AT THE FEBUKO UPWIND STATION GOLDLAUTER (I):  
PARTICLE MASS, MAIN IONIC COMPONENTS, OCEC, AND MASS CLOSURE**

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**ELECTRONIC SUPPLEMENTAL MATERIAL (ESM)**

Brief discussion of trace gas time series during event I, II, and III (part of section 3.1.)

Table I: Trace gas mixing ratios (ppbV) at upwind site

Table II: Concentration of components of particles at the downwind station Goldlauter in  $\mu\text{g m}^{-3}$  (\*: in  $\text{ng m}^{-3}$ , n.d.: not detectable)

*Brief discussion of trace gas time series during event I, II, and III (part of section 3.1.)*

*Event I: 26 Oct 22:00 - 27 Oct 13:00 UTC (2001)*

SO<sub>2</sub> values were generally between 0.5 and 1 ppb, with a maximum of 2 ppb after 23:00. NO was near zero during night, increasing to 2 ppb at 8:30. NO<sub>2</sub> was in the range of 3 to 13 ppb. O<sub>3</sub> was in the range of 10 to 25 ppb, decreasing from a baseline value of 25 ppb down to 13 ppb at 4:00, followed by an increase up to 25 ppb, decreasing down to 10 ppb between 7:00 and 8:00, slowly increasing to >20 ppb after 10:00.

HCl decreased from 11 ppt at midnight to 6 ppt at 4:00. A local maximum of 9 ppt can be seen between 6:00 and 7:00, followed by daily minimum of 5 ppt. HONO slowly increased from 0.08 to 0.13 ppb at 4:00, followed by a decrease to 0.09 ppb, a subsequent increase to 0.14 ppb at 9:00 and a decrease to 0.07 ppb at noon. HNO<sub>3</sub> remained nearly stable between 0.19 and 0.15 ppb, at 5:00 a fast decrease to 0.11 ppb can be seen. After 11:00 a maximum of 0.16 ppb was observed.

CO slightly decreased from 0.3 to 0.2 ppm at midnight, later the 0.2 ppm level remained stable except a 0.5 ppm peak at 9:50.

All of these observations imply the existence of an aged air mass (originating from the Mid-Atlantic and a long residence time over Spain and France influenced by local emissions in the upwind site valley. After 4:00 an intrusion of fresh air with higher O<sub>3</sub> and lower NO<sub>2</sub> content must have occurred and at the same time changes in HONO and HNO<sub>3</sub> mixing ratios were evident. HCl increased later caused probably by local emissions. A slow photochemical formation accompanied by NO<sub>2</sub> decrease could later contribute to the increase of O<sub>3</sub>.

*Event II: Part 1: 06 Oct 10:30 - 14:15 UTC (2001), Part 2: 07 Oct 13:15 - 15:15 UTC (2001), Part 3: 07 Oct 18:00 - 08 Oct 11:15 UTC (2001)*

Part 1:

SO<sub>2</sub> decreased from 1 to 0.5 ppb, as did NO also from 2.3 to 0.1 ppb. NO<sub>2</sub> varied between 4 and 8 ppb, decreasing to a minimum of 1 ppb at 14:00. HCl strongly increased from 10 to 15 ppt probably by local emission. HONO decreased from 0.15 to 0.10 ppb, HNO<sub>3</sub> moves between 0.18 and 0.15 ppb. CO remained stable in the range of 0.3 ppm. O<sub>3</sub> increased from 20 to a max. of 38 ppb at 14:00. This indicates to photochemical O<sub>3</sub> formation driven by changing solar radiation intensity ( $J_{\text{NO}_2}$  between 0.5 and  $3 \cdot 10^{-3} \text{ s}^{-1}$ ) because of dissolving clouds (Tilgner et al. (a), 2005).

Part 2:

SO<sub>2</sub> was in the range of 0.2 - 0.4 ppb, NO near zero, NO<sub>2</sub> decreasing from 4 to 2 ppb, HCl at 9 ppt, HONO and HNO<sub>3</sub> were in the range of 0.03 to 0.05 ppb. CO moved near 0.25 ppm, O<sub>3</sub> ranged from 25 to 30 ppb. These values indicate remote clean air with minor photochemical activity.

Part 3:

SO<sub>2</sub> was nearly constant at 0.3 ppb, NO near zero, increasing up to 1.3 ppb at 9:00. NO<sub>2</sub> was in the range of 2 to 5 ppb. HONO and HNO<sub>3</sub> were in the range of 0.02 ppb until 20:00, later HONO slowly increased to 0.07 ppb at 9:00, HNO<sub>3</sub> faster increasing to 0.07 ppb at 1:00. CO moved between 0.2 and 0.25 ppm, only two peaks exceeded 0.4 ppm. O<sub>3</sub> was in the range of 10 to 32 ppb, with a jump of 20 ppb to the maximum at 20:00. Remote clean air was mixed with O<sub>3</sub> rich air in the evening, in the morning slowly photochemical activity began to be observed.

*Event III: 16 Oct 21:00 - 17 Oct 4:10 (2002)*

SO<sub>2</sub> was between 0.5 and 0.7 ppb, NO near zero, NO<sub>2</sub> decreasing from 5 ppb to <1 ppb. O<sub>3</sub> slowly increased from 28 up to 36 ppb at midnight, followed by slowly decrease to 30 ppb. For HCl, HONO and HNO<sub>3</sub> only one 30 min value (21:15-21:45) is available and amounts to 0.05, 0.03 and 0.12 ppb, respectively. In comparison to E I and E II HCl is quite high (4 to 8 fold) and could be explained not only by local sources, but also by the exchange of chloride by nitrate in the marine aerosol by nitric acid causing the release of gaseous HCl (Pio and Lopes, 1998). The transported air mass came from Mid-Atlantic and moved only a quarter of time (from 96 h) over land (Tilgner et al. (a), 2005). H<sub>2</sub>O<sub>2</sub> decreased to one half to about 50 at 3:00 followed by an increase to 65 ppt at 5:00. CO remained nearly constant at 0.2 ppm.

Table I

Trace gas mixing ratios (ppbV) at upwind site (the data are calculated half hour average values and do not represent measurement values)

		O <sub>3</sub>	SO <sub>2</sub>	CO	NO	NO <sub>2</sub>
		ppbV	ppbV	ppbV	ppbV	ppbV
Event I						
26.10.01	22:30	22.69	0.50	221.21	0.03	5.19
26.10.01	23:00	24.31	0.64	233.88	0.01	4.18
26.10.01	23:30	23.23	1.21	211.44	0.01	4.56
26.10.01	0:00	21.51	1.13	214.47	0.00	5.19
27.10.01	0:30	19.97	0.83	211.60	0.02	6.05
27.10.01	1:00	18.43	0.78	222.46	0.01	6.85
27.10.01	1:30	17.44	0.70	228.60	0.01	7.15
27.10.01	2:00	15.89	0.62	225.37	0.01	7.21
27.10.01	2:30	14.58	0.53	225.98	0.01	7.44
27.10.01	3:00	14.43	0.45	229.92	0.03	7.49
27.10.01	3:30	13.36	0.56	235.73	0.04	8.29
27.10.01	4:00	13.43	0.49	235.53	0.04	8.49
27.10.01	4:30	19.25	0.47	206.76	0.02	6.25
27.10.01	5:00	24.24	0.60	185.68	0.01	4.95
27.10.01	5:30	23.34	0.58	198.71	0.02	4.63
27.10.01	6:00	21.05	0.61	218.11	0.01	4.83
27.10.01	6:30	20.14	0.79	224.60	0.15	7.06
27.10.01	7:00	15.26	0.73	239.87	0.33	8.19
27.10.01	7:30	11.48	0.77	250.92	1.04	9.86
27.10.01	8:00	11.35	0.64	243.22	1.00	10.10
27.10.01	8:30	13.12	0.63	264.35	1.08	9.23
27.10.01	9:00	15.52	0.75	252.45	1.30	8.84
27.10.01	9:30	16.60	0.71	229.47	0.90	8.92
27.10.01	10:00	17.39	0.69	230.46	1.12	8.18
27.10.01	10:30	20.13	0.73	215.36	1.05	7.10
27.10.01	11:00	25.15	0.85	259.28	0.96	5.29
27.10.01	11:30	23.16	0.80	423.43	0.43	5.85
27.10.01	12:00	21.77	0.91	302.12	0.36	6.13
27.10.01	12:30	22.91	0.96	261.49	0.36	5.79
27.10.01	13:00	23.63	0.86	243.99	0.37	5.86

Table I  
(continued)

		O <sub>3</sub>	SO <sub>2</sub>	CO	NO	NO <sub>2</sub>
		ppbV	ppbV	ppbV	ppbV	ppbV
Event II						
6.10.01	11:01	22.00	0.75	279.46	1.50	6.25
6.10.01	11:31	23.02	0.89	276.33	1.66	6.09
6.10.01	12:01	24.44	0.74	282.16	1.29	6.16
6.10.01	12:31	24.72	0.68	300.06	0.98	5.70
6.10.01	13:01	25.98	0.76	299.31	1.08	5.24
6.10.01	13:31	25.45	0.65	291.85	0.49	5.67
6.10.01	14:01	29.04	0.63	282.59	0.57	
6.10.01	14:31	34.24	0.51	254.76	0.28	2.34
6.10.01	15:01	32.38	0.52	294.34	0.16	3.50
7.10.01	14:00	24.77	0.27	246.08	0.05	3.09
7.10.01	14:30	25.19	0.28	241.02	0.05	3.33
7.10.01	15:00	27.94	0.24	254.51	0.13	2.39
7.10.01	15:30	27.35	0.18	230.57	0.05	1.59
7.10.01	18:30	11.45	0.25	199.85	0.16	2.05
7.10.01	19:00	14.00	0.23	225.60	0.09	1.70
7.10.01	19:30	17.16	0.19	212.89	0.03	1.53
7.10.01	20:00	19.37	0.21	205.54	0.05	1.49
7.10.01	20:30	29.92	0.22	224.17	0.03	1.52
7.10.01	21:00	29.54	0.19	229.55	0.01	1.71
7.10.01	21:30	27.56	0.19	253.81	0.00	2.14
7.10.01	22:00	27.83	0.19	263.30	0.00	2.35
7.10.01	22:30	27.02	0.25	247.70	0.01	2.76
7.10.01	23:00	27.08	0.25	230.86	0.00	2.74
7.10.01	23:30	27.30	0.24	237.31	0.00	2.78
7.10.01	0:00	26.56	0.25	238.46	0.01	3.16
8.10.01	0:30	27.09	0.28	248.06	0.00	3.09
8.10.01	1:00	25.16	0.28	237.09	0.01	3.21
8.10.01	1:30	25.31	0.23	230.40	0.00	2.87
8.10.01	2:00	25.32	0.26	227.64	0.00	2.88
8.10.01	2:30	25.68	0.30	243.45	0.00	2.47
8.10.01	3:00	23.82	0.35	233.68	0.01	2.53
8.10.01	3:30	22.46	0.32	210.76	0.04	2.79
8.10.01	4:00	22.23	0.35	233.90	0.01	3.10
8.10.01	4:30	20.82	0.34	239.98	0.03	3.38
8.10.01	5:00	22.37	0.32	255.59	0.03	3.58

Table I  
(continued)

		O <sub>3</sub>	SO <sub>2</sub>	CO	NO	NO <sub>2</sub>
		ppbV	ppbV	ppbV	ppbV	ppbV
<b>Event II (continued)</b>						
8.10.01	5:30	20.71	0.27	232.63	0.03	4.14
8.10.01	6:00	19.98	0.30	259.75	0.09	4.75
8.10.01	6:30	21.04	0.32	222.91	0.21	4.68
8.10.01	7:00	18.98	0.33	227.92	0.40	5.29
8.10.01	7:30	19.70	0.31	219.26	0.54	5.08
8.10.01	8:00	21.20	0.31	212.46	0.51	5.21
8.10.01	8:30	20.81	0.28	212.92	0.59	5.29
8.10.01	9:00	22.40	0.30	213.65	0.76	4.87
8.10.01	9:30	23.78	0.25	207.64	0.82	4.56
8.10.01	10:00	25.01	0.31	205.37	0.68	4.73
8.10.01	10:30	25.31	0.33	202.77	0.58	4.83
8.10.01	11:00	25.55	0.29	205.08	0.40	4.68
8.10.01	11:30	28.53	0.34	200.35	0.57	4.50
<b>Event III</b>						
16.10.02	22:01	28.92	0.62	190.77	0.00	4.00
16.10.02	22:31	29.70	0.60	184.80	0.00	3.54
16.10.02	23:01	31.80	0.58	190.11	0.00	2.76
16.10.02	23:31	33.50	0.59	187.47	0.00	2.16
16.10.02	0:00	34.14	0.53	186.83	0.00	1.75
17.10.02	0:31	34.12	0.52	184.81	0.00	1.62
17.10.02	1:01	32.82	0.55	183.33	0.00	1.74
17.10.02	1:31	32.74	0.63	182.89	0.00	1.71
17.10.02	2:01	32.20	0.65	183.42	0.00	1.73
17.10.02	2:31	33.04	0.62	179.01	0.00	1.64
17.10.02	3:01	32.44	0.59	182.24	0.00	1.63
17.10.02	3:31	33.13	0.57	172.47	0.00	1.54
17.10.02	4:01	32.93	0.57	174.00	0.00	1.63
17.10.02	4:31	32.04	0.46	177.47	0.00	1.78
17.10.02	5:01	32.03	0.51	178.33	0.00	1.73
17.10.02	5:31	30.63	0.48	174.86	0.00	2.49
17.10.02	6:01	30.13	0.47	162.36	0.00	2.67

Table I  
(continued)

Event I	HCl $\mu\text{g m}^{-3}$	HONO $\mu\text{g m}^{-3}$	HNO <sub>3</sub> $\mu\text{g m}^{-3}$	H <sub>2</sub> O <sub>2</sub> $\mu\text{g m}^{-3}$
26.10.01 22:30		0.1646	0.4899	
26.10.01 23:00	0.0149	0.1548	0.4244	
26.10.01 23:30		0.1529	0.4533	
27.10.01 00:00	0.0160	0.1666	0.4035	
27.10.01 00:30		0.1823	0.4428	
27.10.01 01:00	0.0139	0.1960	0.4506	
27.10.01 01:30		0.2097	0.4559	
27.10.01 02:00	0.0116	0.2176	0.4375	
27.10.01 02:30		0.2254	0.4061	
27.10.01 03:00	0.0090	0.2372	0.4166	
27.10.01 03:30		0.2528	0.4218	
27.10.01 04:00	0.0086	0.2646	0.4035	
27.10.01 04:30		0.2411	0.2934	
27.10.01 05:00	0.0097	0.1999	0.3196	
27.10.01 05:30		0.1784	0.3327	
27.10.01 06:00	0.0100	0.1784	0.2908	
27.10.01 06:30		0.2195	0.3720	
27.10.01 07:00	0.0140	0.2430	0.3642	
27.10.01 07:30		0.2646	0.3380	
27.10.01 08:00	0.0093	0.2842	0.2934	
27.10.01 08:30		0.2822	0.2699	
27.10.01 09:00	0.0074	0.2470	0.2961	
27.10.01 09:30		0.2117	0.2934	
27.10.01 10:00	0.0075	0.1901	0.2882	
27.10.01 10:30		0.1803	0.3065	
27.10.01 11:00	0.0109	0.1568	0.4271	
27.10.01 11:30		0.1470	0.4009	
27.10.01 12:00	0.0148	0.1725	0.3563	
27.10.01 12:30		0.1607	0.3563	
27.10.01 13:00	0.0145	0.1548	0.3773	

Table I  
(continued)

Event II	HCL $\mu\text{g m}^{-3}$	HONO $\mu\text{g m}^{-3}$	HNO <sub>3</sub> $\mu\text{g m}^{-3}$	H <sub>2</sub> O <sub>2</sub> $\mu\text{g m}^{-3}$
06.10.01 10:15		0.2960	0.4454	
06.10.01 10:45		0.2842	0.3904	
06.10.01 11:15	0.0156	0.3038	0.4244	
06.10.01 11:45		0.2626	0.4349	
06.10.01 12:15		0.2254	0.3904	
06.10.01 12:45		0.2470	0.4716	
06.10.01 13:15	0.0231	0.2058	0.4637	
06.10.01 13:45		0.1940	0.4166	
06.10.01 14:15	0.0143	0.2058	0.3511	
07.10.01 13:15		0.0882	0.1022	
07.10.01 13:45		0.0745	0.1127	
07.10.01 14:15		0.0764	0.1179	
07.10.01 14:45		0.0823	0.0786	
07.10.01 15:15		0.0686	0.0472	
07.10.01 17:45		0.0451	0.0393	
07.10.01 18:15		0.0608	0.0393	
07.10.01 18:45		0.0392	0.0445	
07.10.01 19:15	0.0143	0.0353	0.0445	
07.10.01 19:45		0.0333	0.0445	
07.10.01 20:15	0.0142	0.0412	0.0734	
07.10.01 20:45		0.0451	0.1022	
07.10.01 21:15	0.0148	0.0549	0.1336	
07.10.01 21:45		0.0529	0.1415	
07.10.01 22:15	0.0153	0.0627	0.1546	
07.10.01 22:45		0.0627	0.1284	
07.10.01 23:15	0.0155	0.0666	0.1546	
07.10.01 23:45		0.0725	0.1677	
08.10.01 00:15	0.0157	0.0764	0.1834	
08.10.01 00:45		0.0725	0.1939	
08.10.01 01:15	0.0157	0.0745	0.1729	
08.10.01 01:45		0.0764	0.0000	
08.10.01 02:15	0.0193	0.0745	0.1677	
08.10.01 02:45		0.0745	0.1624	
08.10.01 03:15	0.0149	0.0725	0.1362	
08.10.01 03:45		0.0784	0.1520	
08.10.01 04:15	0.0150	0.0804	0.1546	
08.10.01 04:45		0.0980	0.1651	
08.10.01 05:15	0.0147	0.0921	0.1598	
08.10.01 05:45		0.1078	0.1808	
08.10.01 06:15	0.0145	0.1137	0.1860	

Table I  
(continued)

	HCL $\mu\text{g m}^{-3}$	HONO $\mu\text{g m}^{-3}$	HNO <sub>3</sub> $\mu\text{g m}^{-3}$	H <sub>2</sub> O <sub>2</sub> $\mu\text{g m}^{-3}$
<b>Event II (continued)</b>				
08.10.01 06:45		0.1196	0.1520	
08.10.01 07:15	0.0120	0.1294	0.1310	
08.10.01 07:45		0.1235	0.1467	
08.10.01 08:15	0.0131	0.1274	0.1415	
08.10.01 08:45		0.1313	0.1572	
08.10.01 09:15	0.0137	0.1372	0.1651	
08.10.01 09:45		0.1352	0.1755	
08.10.01 10:15	0.0199	0.1274	0.1860	
08.10.01 10:45		0.1176	0.1729	
08.10.01 11:15	0.0170	0.1254	0.2017	
<b>Event III</b>				
16.10.02 21:45	0.0750	0.0650	0.3230	
16.10.02 23:00				0.1506
16.10.02 01:00				0.1265
17.10.02 03:00				0.0745
17.10.02 04:00				0.0963
17.10.02 11:00	0.1090	0.0450	0.1860	

Table II  
Concentration of components of particles at the upwind station Goldlauter in  $\mu\text{g m}^{-3}$

Event I Date	Component	BERNER impactor (BI)					BI <sub>sum</sub>	HVAndersen	Steam Jet
		0.05-0.14 $\mu\text{m}$ $\mu\text{g m}^{-3}$	0.14-0.42 $\mu\text{m}$ $\mu\text{g m}^{-3}$	0.42-1.2 $\mu\text{m}$ $\mu\text{g m}^{-3}$	1.2-3.5 $\mu\text{m}$ $\mu\text{g m}^{-3}$	3.5-10 $\mu\text{m}$ $\mu\text{g m}^{-3}$	PM <sub>10</sub> $\mu\text{g m}^{-3}$	PM <sub>10</sub> $\mu\text{g m}^{-3}$	total $\mu\text{g m}^{-3}$
26./27.10.2001	mass	0.9289	3.6000	9.5274	2.2074	0.5956	16.8593	21.5720	
	Cl <sup>-</sup>	n.d.	0.0013	0.0062	0.0011	n.d.	0.0085	0.0885	0.1292
	NO <sub>3</sub> <sup>-</sup>	0.0041	0.4582	2.1451	0.2623	0.0449	2.9146	5.3175	7.1809
	SO <sub>4</sub> <sup>2-</sup>	0.0466	0.4894	1.4757	0.0752	0.0134	2.1002	2.0514	2.8806
	Na <sup>+</sup>	n.d.	0.0012	0.0048	0.0666	0.0227	0.0953	0.0483	
	NH <sub>4</sub> <sup>+</sup>	0.0259	0.3264	0.8110	0.1178	0.0095	1.2905	2.4295	
	K <sup>+</sup>	0.0031	0.0196	0.0365	0.0102	0.0031	0.0725	0.0402	
	Mg <sup>2+</sup>	n.d.	n.d.	0.0012	0.0106	0.0057	0.0175	0.0241	
	Ca <sup>2+</sup>	n.d.	n.d.	0.0018	0.0270	0.0205	0.0493	0.0563	
	OC	0.0760	0.2490	0.5630	0.1280	0.0690	1.0850		
	EC	0.0750	0.3630	0.4340	0.1010	0.0260	0.9990		
	Fe							3.74*	
	Cu							2.99*	
	Mn							0.75*	
	Zn							8.23*	

\*: in  $\text{ng m}^{-3}$ , n.d.: not detectable

Table II  
(continued)

Event II Date	Component	BERNER impactor (BI)					BI <sub>sum</sub>	HVAndersen	Steam Jet
		0.05-0.14 $\mu\text{m}$ $\mu\text{g m}^{-3}$	0.14-0.42 $\mu\text{m}$ $\mu\text{g m}^{-3}$	0.42-1.2 $\mu\text{m}$ $\mu\text{g m}^{-3}$	1.2-3.5 $\mu\text{m}$ $\mu\text{g m}^{-3}$	3.5-10 $\mu\text{m}$ $\mu\text{g m}^{-3}$	PM <sub>10</sub> $\mu\text{g m}^{-3}$	PM <sub>10</sub> $\mu\text{g m}^{-3}$	total $\mu\text{g m}^{-3}$
06.-08.10.2001	mass	0.5024	2.5845	3.4841	0.7807	0.6966	8.0483	10.0680	
	Cl <sup>-</sup>	n.d.	n.d.	n.d.	n.d.	0.0006	0.0006	0.0296	0.0566
	NO <sub>3</sub> <sup>-</sup>	0.0006	0.1398	0.3948	0.0354	0.0133	0.5839	1.2795	1.7476
	SO <sub>4</sub> <sup>2-</sup>	0.0456	0.4905	0.7772	0.0428	0.0105	1.3667	1.3636	1.5221
	Na <sup>+</sup>	n.d.	0.0030	0.0058	0.0196	0.0054	0.0338	0.0572	
	NH <sub>4</sub> <sup>+</sup>	0.0207	0.2198	0.3360	0.0176	0.0046	0.5988	0.9275	
	K <sup>+</sup>	0.0024	0.0167	0.0226	0.0076	0.0039	0.0532	0.0370	
	Mg <sup>2+</sup>	n.d.	n.d.	0.0006	0.0034	0.0019	0.0058	n.d.	
	Ca <sup>2+</sup>	0.0006	0.0038	0.0037	0.0108	0.0080	0.0269	0.1688	
	OC	0.0627	0.3874	0.3738	0.1139	0.1270	1.0648		
	EC	0.0767	0.1368	0.1730	0.0258	0.0347	0.4469		
	Fe							5.36*	
	Cu							2.44*	
	Mn							0.98*	
	Zn							5.36*	

\*: in  $\text{ng m}^{-3}$ , n.d.: not detectable

Table II  
(continued)

Event III Date	Component	BERNER impactor (BI)					BI <sub>sum</sub>	HVAndersen	Steam Jet
		0.05-0.14 $\mu\text{m}$ $\mu\text{g m}^{-3}$	0.14-0.42 $\mu\text{m}$ $\mu\text{g m}^{-3}$	0.42-1.2 $\mu\text{m}$ $\mu\text{g m}^{-3}$	1.2-3.5 $\mu\text{m}$ $\mu\text{g m}^{-3}$	3.5-10 $\mu\text{m}$ $\mu\text{g m}^{-3}$	PM <sub>10</sub> $\mu\text{g m}^{-3}$	PM <sub>10</sub> $\mu\text{g m}^{-3}$	total $\mu\text{g m}^{-3}$
16./17.10.2002	mass	0.5271	2.8434	2.1891	1.5845	0.9643	8.1085	30.8263	
	Cl <sup>-</sup>	n.d.	0.0021	n.d.	0.0261	0.0168	0.0450	0.1852	0.0720
	NO <sub>3</sub> <sup>-</sup>	0.0021	0.1706	0.1440	0.2285	0.0404	0.5855	0.9934	1.0150
	SO <sub>4</sub> <sup>2-</sup>	0.0225	0.5006	0.4799	0.0503	0.0166	1.0699	1.3217	1.3990
	Na <sup>+</sup>	n.d.	n.d.	0.0162	0.1021	0.0286	0.1468	0.2357	
	NH <sub>4</sub> <sup>+</sup>	0.0096	0.2776	0.2515	0.0212	0.0019	0.5618	0.6567	
	K <sup>+</sup>	n.d.	0.0121	0.0115	0.0095	0.0053	0.0385	0.0505	
	Mg <sup>2+</sup>	n.d.	n.d.	n.d.	0.0073	n.d.	0.0073	n.d.	
	Ca <sup>2+</sup>	0.0072	0.0101	0.0127	0.0270	0.0129	0.0700	0.1347	
	OC	0.1311	0.2674	0.2620	0.2163	0.1874	1.0642		
	EC	0.0464	0.1915	0.1055	0.0279	0.0344	0.4057		
	Fe							3.17*	
	Cu							4.17*	
	Mn							1.34*	
	Zn							17.53*	

\*: in  $\text{ng m}^{-3}$ , n.d.: not detectable