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Atmospheric Measurement Techniques Discussions

AMTD

Interactive comment

Interactive comment on "Elemental composition of ambient aerosols measured with high temporal resolution using an online XRF spectrometer" *by* Markus Furger et al.

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(Referee's statements in italics)

The authors would like to thank the referee for careful reading and critical commenting of the manuscript.

The abstract is too long and should be more focused on what the real novel results are. It reads more like a conclusion that an abstract.

We shortened the abstract from 408 to 262 words, deleting the details referring to source apportionment. We focussed the abstract on the main findings regarding the intercomparison of the Xact with external measurements.

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Figure 2 is too small and too many to be useful for interpretations. Needs to be redone with a focus on what the authors want us to see from this figure.

Figure 2 was redrawn, re-scaling the axes with respect to the maximum values of the filter data (ICP). Labels were enlarged. We included all data, spread over four panels, as we find it important to show the complete range of variability.

Data in tables 1 and 2 are excessive and again what is it the authors really want is to observe from these tables. Maybe plots of MDLs versus elements would be a better way to see this and more efficient. Why are regression tables like Table 2 useful - maybe a few sentences in the text with a few selected plots would show these correlations better.

We rearranged Tables 1 and 2. We moved the MDL information from Table 1 to Table 2. Then we moved Table 1, which now only comprises of statistical data characterizing the different periods, to the supplementary material (Table S1). Table 2 (new 1) now contains the regression coefficients and the MDLs. The data of Table 2 is presented in the new Figure 3, which shows the comparison between ICP and Xact MDLs, slopes and intercept-to-average concentration ratios for all studied elements. We consider it as advantageous when the data represented in Figures 2 and 3 can also be looked up quantitatively in a Table (as also supported by Referee 2), showing the full variability of slopes and intercepts.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-383, 2017.

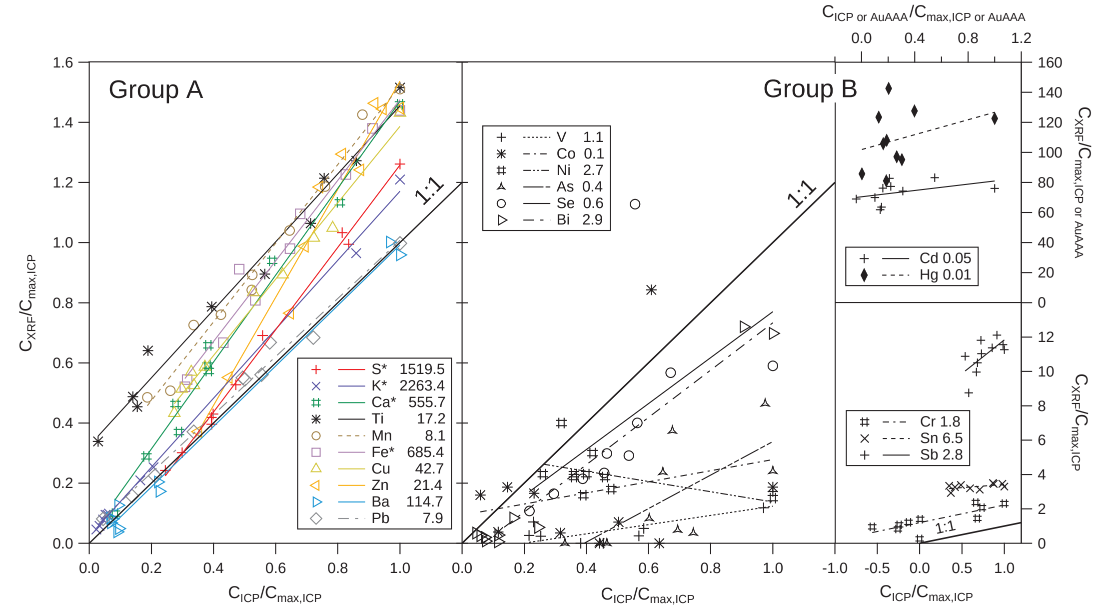

Fig. 1. New Figure 2.

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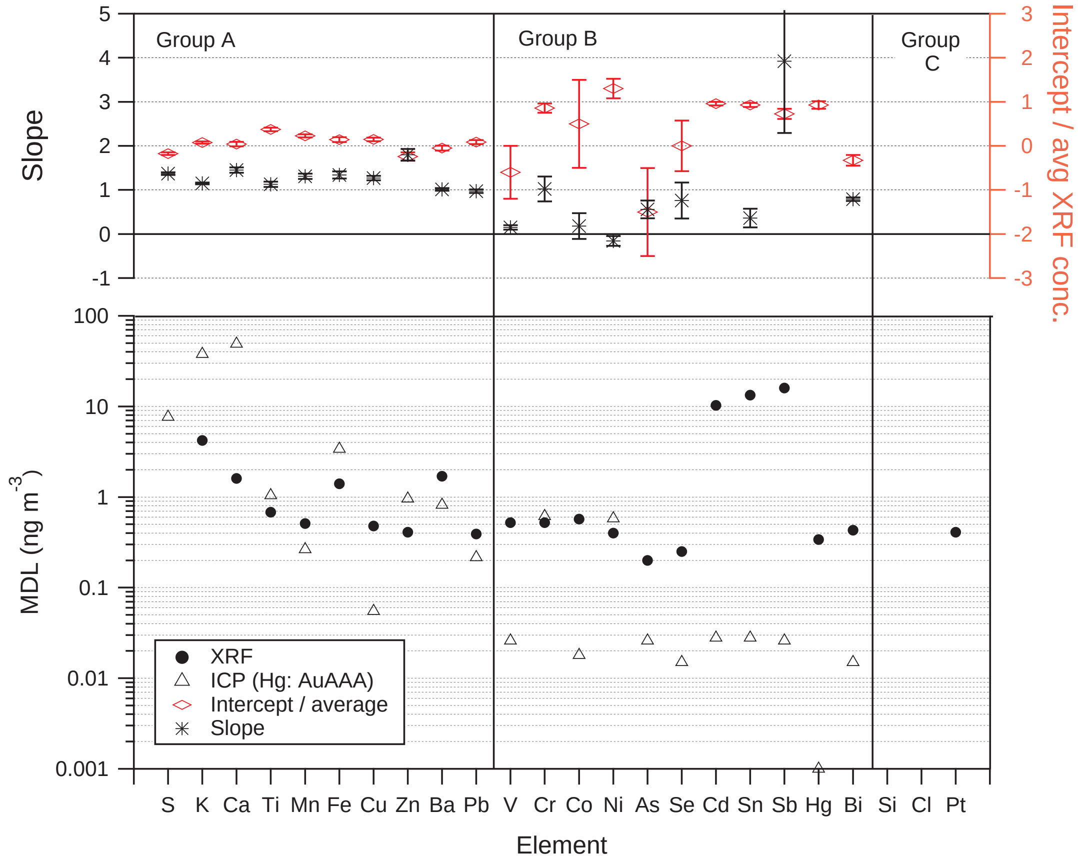

Fig. 2. New Figure 3.

	Non-Fireworks				Fireworks				South sector (non-fireworks)				North sector (non-fireworks)			
Element	avg	sdev	max	median	avg	sdev	max	median	avg	sdev	max	median	avg	sdev	max	median
	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}	ng m^{-3}
# cases	370				86				173				185			
S	739.28	524.59	2508.00	601.85	1155.32	1666.73	12034.00	677.15	795.31	516.19	2254.00	659.85	711.53	537.04	2508.00	499.31
K	161.00	56.98	484.09	152.81	1661.10	3854.66	27349.00	493.69	175.80	60.89	395.34	168.66	150.75	50.00	484.09	144.98
Ca	390.66	384.69	3211.00	262.79	253.21	389.74	3109.00	140.82	474.39	476.21	3211.00	274.58	324.91	266.10	2254.00	252.85
Ti	11.44	8.12	43.38	8.79	18.29	36.16	282.23	8.04	13.08	8.90	39.56	11.14	10.33	7.17	43.38	8.23
Mn	7.10	4.62	26.98	5.72	7.30	3.88	22.21	6.99	9.51	5.14	26.98	8.56	5.03	2.79	20.99	4.71
Fe	587.41	428.85	2338.00	460.08	699.95	385.97	1909.00	699.78	852.36	452.72	2338.00	779.67	350.25	227.50	1309.00	303.58
Cu	24.07	17.69	109.34	20.07	49.28	48.72	371.81	38.91	35.46	18.29	109.34	30.66	13.52	8.55	49.01	9.94
Zn	18.67	16.84	143.37	14.31	28.56	18.94	104.12	23.42	26.13	20.82	143.37	20.67	12.27	7.97	66.14	10.70
Ba	7.12	5.49	25.33	5.25	75.39	169.25	1127.00	22.58	10.19	5.96	25.33	9.19	4.42	3.21	17.22	3.46
Pb	2.96	3.89	41.07	1.99	4.17	3.02	15.30	2.96	3.95	5.26	41.07	2.77	2.18	1.62	9.38	1.72
V	*0.06*	*0.15*	*1.22*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.07*	*0.18*	*1.22*	*0.00*	*0.05*	*0.13*	*0.89*	*0.00*
Cr	2.40	2.30	12.96	1.75	2.51	2.22	9.23	1.98	3.81	2.47	12.96	3.43	1.09	1.10	6.17	0.76
Co	*0.02*	*0.08*	*0.70*	*0.00*	*0.01*	*0.03*	*0.23*	*0.00*	*0.00*	*0.02*	*0.21*	*0.00*	*0.03*	*0.11*	*0.70*	*0.00*
Ni	0.62	0.65	10.32	0.54	0.56	0.35	1.95	0.51	0.64	0.45	3.99	0.59	0.61	0.81	10.32	0.50
As	*0.02*	*0.14*	*1.31*	*0.00*	*0.09*	*0.31*	*1.91*	*0.00*	*0.04*	*0.20*	*1.31*	*0.00*	*0.01*	*0.06*	*0.84*	*0.00*
Se	*0.27*	*0.32*	*4.39*	*0.20*	*0.16*	*0.13*	*0.44*	*0.14*	*0.30*	*0.41*	*4.39*	*0.24*	*0.24*	*0.22*	*0.90*	*0.17*
Cd	*6.75*	*3.61*	*23.62*	*6.25*	*6.49*	*3.14*	*21.33*	*6.14*	*6.89*	*3.74*	*19.10*	*6.28*	*6.70*	*3.55*	*23.62*	*6.20*
Sn	20.79	7.82	55.34	19.57	21.78	8.27	54.28	20.10	22.15	8.38	55.34	21.15	19.64	7.01	45.41	18.68
Sb	31.31	11.22	111.88	29.80	30.97	10.42	67.96	29.38	33.03	11.93	77.63	31.30	29.90	10.43	111.88	28.90
Hg	0.63	0.25	1.49	0.61	0.64	0.18	1.31	0.63	0.63	0.23	1.18	0.63	0.64	0.26	1.49	0.61
Bi	*0.07*	*0.12*	*0.70*	*0.00*	*1.27*	*3.82*	*23.47*	*0.15*	*0.09*	*0.13*	*0.50*	*0.00*	*0.04*	*0.10*	*0.70*	*0.00*
Si	839.20	398.20	3415.00	713.75	570.13	223.75	1758.00	532.28	924.98	468.79	3415.00	795.77	775.17	308.86	2052.00	682.42
Cl	113.70	200.20	969.80	26.44	153.07	578.02	4455.00	18.11	87.95	161.12	871.19	19.79	116.38	210.81	969.80	30.50
Pt	*0.05*	*0.11*	*0.66*	*0.00*	*0.03*	*0.07*	*0.34*	*0.00*	*0.04*	*0.10*	*0.66*	*0.00*	*0.06*	*0.11*	*0.64*	*0.00*

Fig. 3. New Table S1 (in the supplement)

			Regression coefficients							Xact		ICP	
Group	Element	Analysis method	fitX = a + bx					Average XRF conc.	Ratio intercept/ average	MDL (60 min)	Pts > MDL	MDL (24 h)	Pts > MDL
			a	± a'	b	± b'	r^2	ng m^{-3}		ng m^{-3}	%	ng m^{-3}	%
A	S	ICP-OES	-169.73	30.57	1.37	0.03	1.00	956.48	-0.177			7.662	100
	K	ICP-OES	52.42	19.15	1.15	0.02	1.00	703.47	0.075	4.20	100.00	37.808	100
	Ca	ICP-OES	13.87	17.91	1.45	0.06	0.99	365.41	0.038	1.60	100.00	49.195	90
	Ti	ICP-MS	5.58	0.57	1.13	0.06	0.98	14.94	0.373	0.68	100.00	1.043	90
	Mn	ICP-MS	1.72	0.28	1.31	0.06	0.99	7.59	0.227	0.51	100.00	0.264	100
	Fe	ICP-OES	93.05	35.80	1.34	0.08	0.97	656.22	0.142	1.40	100.00	3.398	100
	Cu	ICP-MS	4.93	1.27	1.27	0.05	0.99	33.49	0.147	0.48	100.00	0.055	100
	Zn	ICP-MS	-5.56	2.18	1.80	0.13	0.96	22.97	-0.242	0.41	100.00	0.959	100
	Ba	ICP-MS	-1.62	1.73	1.01	0.03	0.99	31.92	-0.051	1.70	94.30	0.819	100
	Pb	ICP-MS	0.32	0.17	0.97	0.04	0.99	3.84	0.085	0.39	98.20	0.216	100
B	V	ICP-MS	-0.03	0.03	0.15	0.05	0.57	0.05	-0.619	0.52	2.00	0.026	100
	Cr	ICP-MS	2.13	0.26	1.02	0.28	0.63	2.48	0.860	0.52	74.60	0.614	40
	Co	ICP-MS	0.01	0.02	0.18	0.29	0.05	0.02	0.555	0.57	0.44	0.018	70
	Ni	ICP-MS	0.82	0.14	-0.16	0.11	0.22	0.63	1.310	0.40	67.80	0.581	100
	As	ICP-MS	-0.09	0.06	0.56	0.20	0.50	0.06	-1.481	0.20	4.00	0.026	100
	Se	ICP-MS	0.00	0.15	0.76	0.41	0.30	0.26	0.015	0.25	38.00	0.015	100
	Cd	ICP-MS	6.28	0.28	10.37	7.86	0.18	6.54	0.960	10.30	12.70	0.028	20
	Sn	ICP-MS	19.73	0.96	0.36	0.21	0.27	21.29	0.927	13.30	85.00	0.028	100
	Sb	ICP-MS	22.17	3.58	3.92	1.63	0.42	30.60	0.724	16.00	94.00	0.026	100
	Hg	*Au AAA*	*0.64*	*0.06*	*24.88*	*24.13*	*0.12*	0.69	0.935	0.34	86.80	*0.001*	*40*
	Bi	ICP-MS	-0.16	0.06	0.79	0.04	0.98	0.49	-0.318	0.43	7.20	0.015	100
C	Si												
	Cl												
	Pt									0.41	1.75		
	Group A	average slope			1.28								
	Group A	standard deviation			0.24								

Fig. 4. New Table 1 (former Table 2).

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