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Supplement of

Molecular composition of organic aerosols in central Amazonia: an ultra-high-resolution mass spectrometry study

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Table SI1. Aerosol sampling time, number of fires, average benzene and NO_y concentrations

Filter #ID		Day	Time (UTC, HH:MM)	[1]Number of fires	[2]Benzene (ppbv)	[3]NO_y (ppb)
MP14_06	Start	05/03/2014	7:47	0	0.039	0.83
	End	06/03/2014	6:54			
MP14_16	Start	14/03/2014	6:08	1	0.053	1.64
	End	15/03/2014	6:02			
MP14_17	Start	15/03/2014	6:16	4	0.047	1.41
	End	16/03/2014	6:38			
MP14_18	Start	16/03/2014	6:42	3	0.04	1.63
	End	17/03/2014	7:21			
MP14_20	Start	18/03/2014	6:16	0	0.074	2.14
	End	19/03/2014	6:24			
MP14_28	Start	25/03/2014	6:20	2	0.036	0.76
	End	26/03/2014	6:00			
MP14_128	Start	07/09/2014	9:25	28	0.069	2.29
	End	09/09/2014	6:35			
MP14_129	Start	09/09/2014	6:41	9	0.057	1.84
	End	10/09/2014	6:20			
MP14_131	Start	12/09/2014	10:05	15	0.11	2.77
	End	13/09/2014	11:55			
MP14_134	Start	14/09/2014	7:14	22	0.099	2.78
	End	15/09/2014	8:41			
MP14_135	Start	15/09/2014	8:46	33	0.219	3.52
	End	16/09/2014	8:16			
MP14_138	Start	18/09/2014	11:43	36	0.112	1.39
	End	19/09/2014	6:30			
MP14_143	Start	23/09/2014	10:57	254	0.108	1.90
	End	24/09/2014	6:12			
MP14_148	Start	27/09/2014	10:03	340	0.149	4.10
	End	28/09/2014	9:17			
MP14_153	Start	03/10/2014	11:29	69	0.083	1.67
	End	04/10/2014	9:14			

[1]number of fires in the radius of 200 km from the sampling station

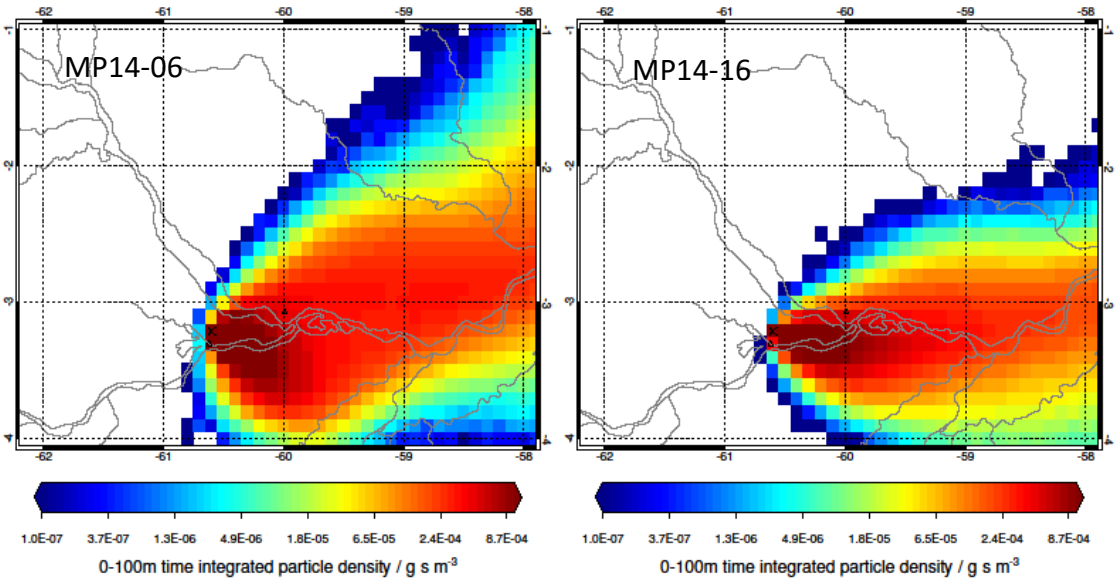
[2,3]concentrations were averaged for filter sampling intervals; the instrument detection limit for benzene and NO_y were below 0.02 ppbv and 0.05 ppbv, respectively.

source: http://www.dpi.inpe.br/proarco/bdqueimadas/

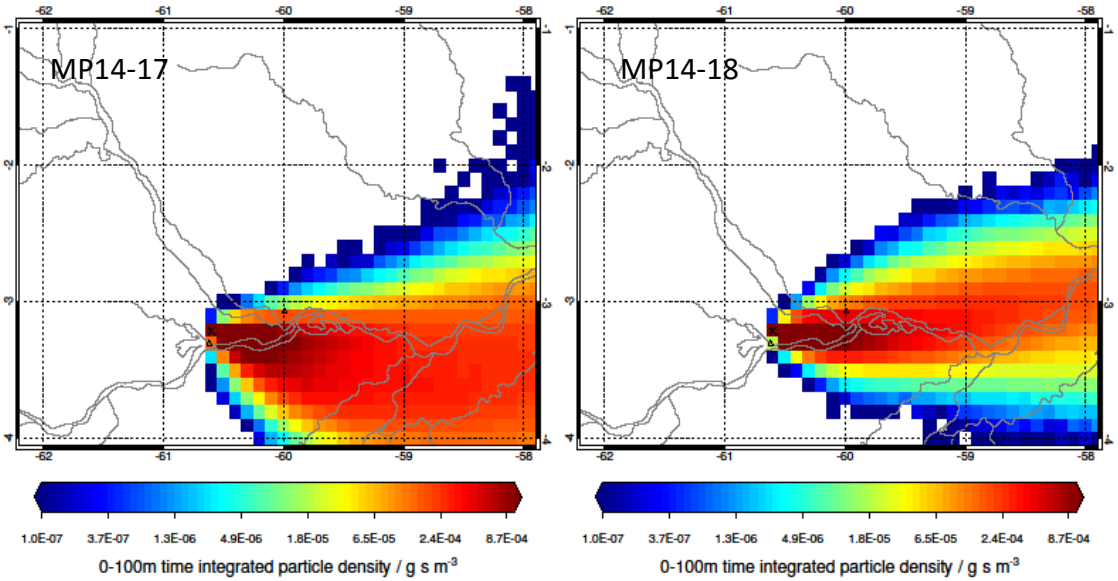
The samples MP14_06 to MP14_28 correspond to 'wet' (IOP1) period and MP14_128 to MP14_153 to 'dry' (IOP2) period.

Table SI2. Average percent occurrence of formula groups to all peaks assigned molecular formulae in the mass spectra during IOP1 and IOP2 periods.

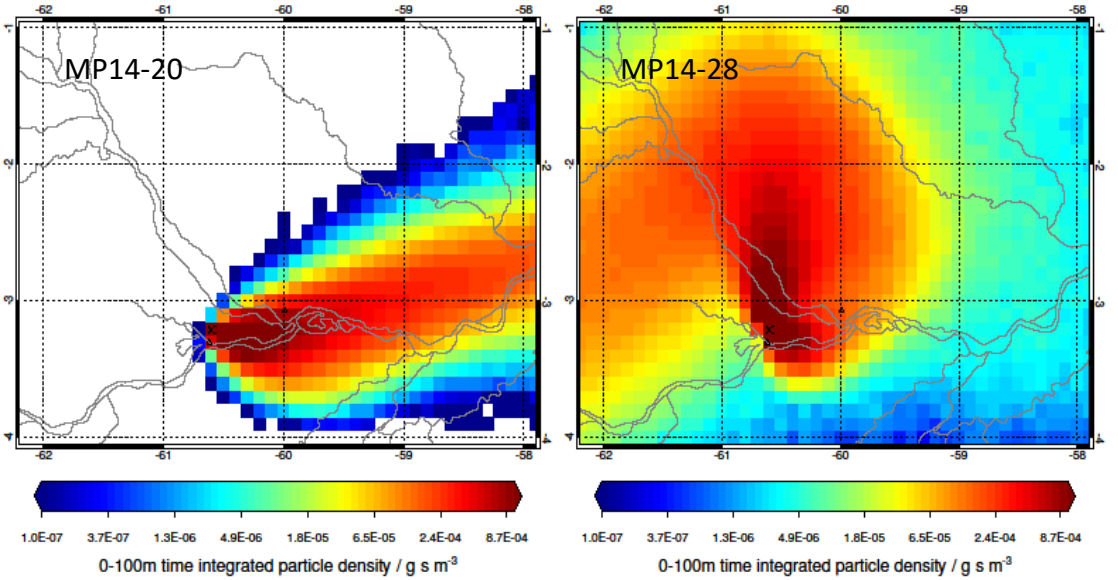
Elemental constituents	Percent occurrence	
	IOP1	IOP2
C,H,O	58	63
C,H,O,N	30	25
C,H,O,S	10	10
C,H,O,N,S	2	2


MP14-06
MP14-16
-62 -61 -60 -59 -58
-1 -2 -3 -4
1.0E-07 3.7E-07 1.3E-06 4.9E-06 1.8E-05 6.5E-05 2.4E-04 8.7E-04
0-100m time integrated particle density / g s m-3

51


MP14-17
MP14-18
-62 -61 -60 -59 -58
-1 -2 -3 -4
1.0E-07 3.7E-07 1.3E-06 4.9E-06 1.8E-05 6.5E-05 2.4E-04 8.7E-04
0-100m time integrated particle density / g s m-3

52


MP14-20
MP14-28
-62 -61 -60 -59 -58
-1 -2 -3 -4
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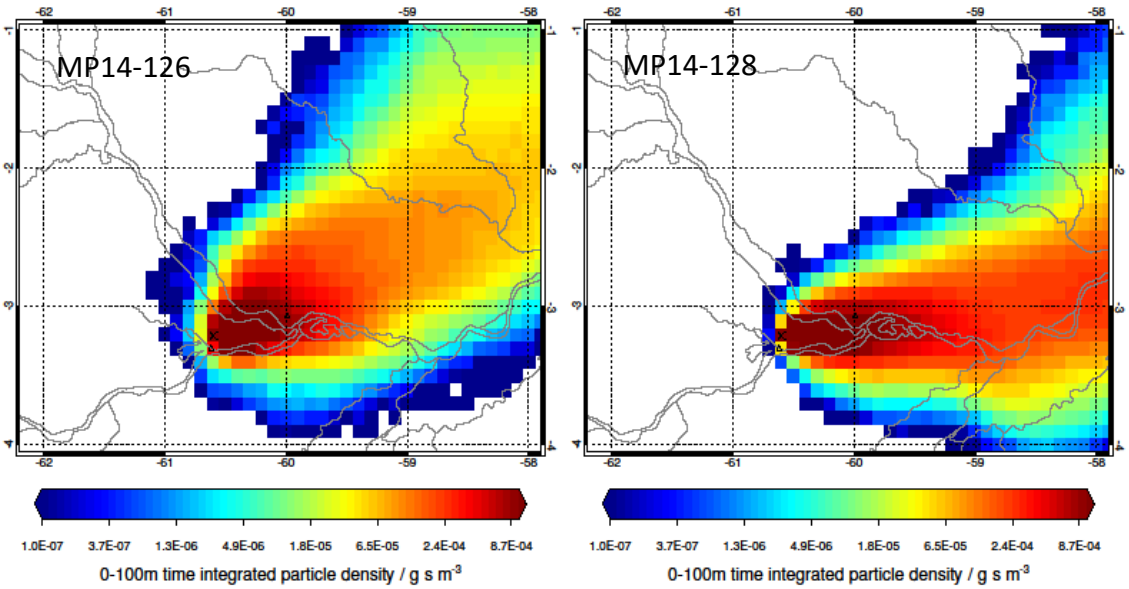
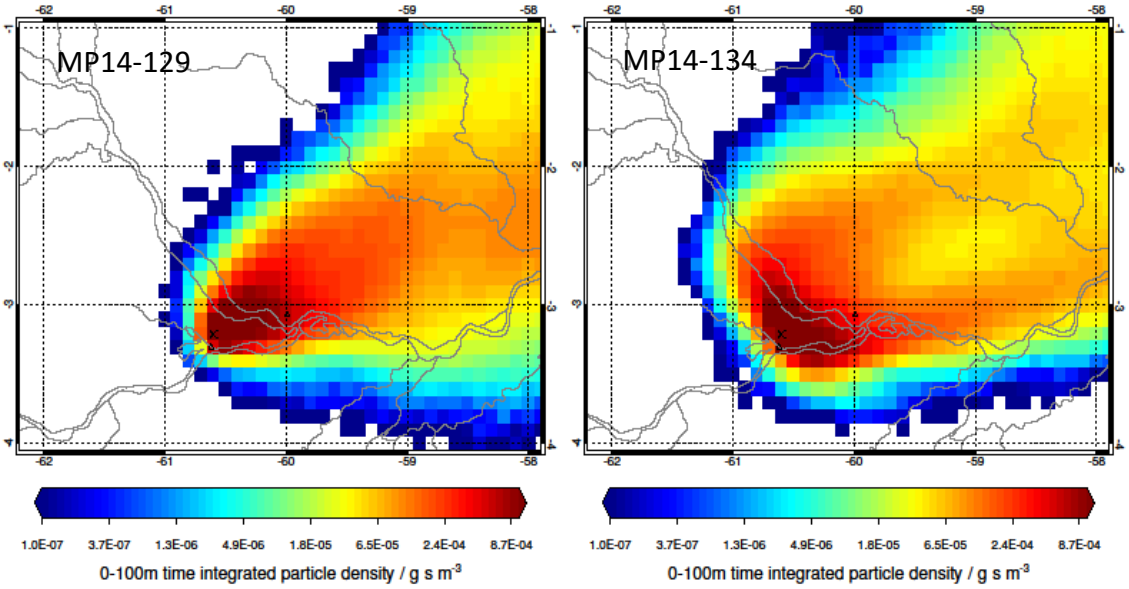
0-100m time integrated particle density / g s m-3

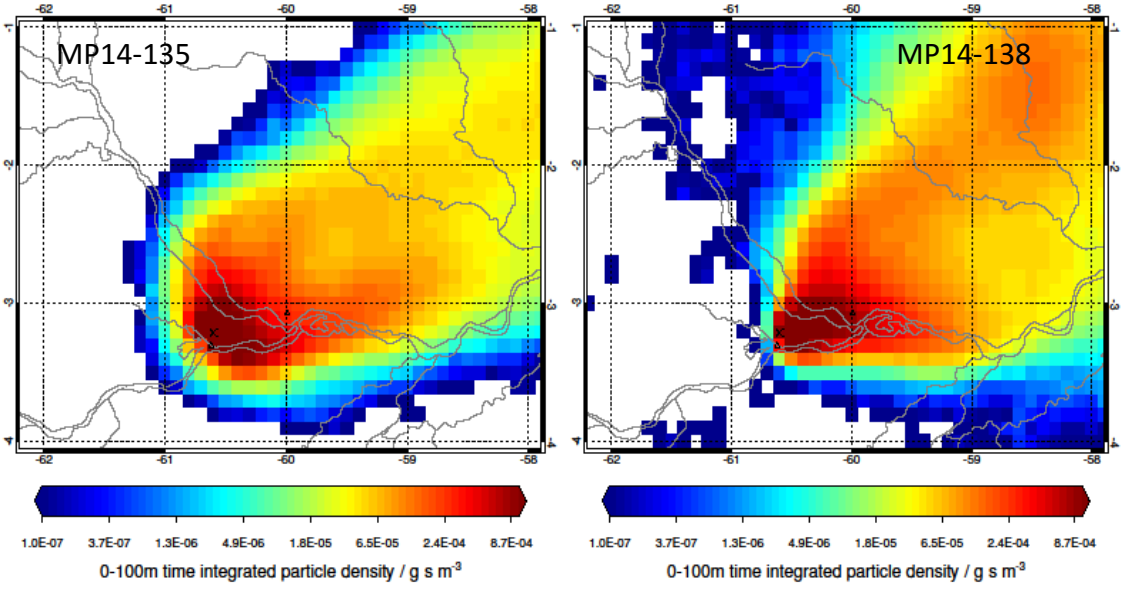
53


MP14-126
MP14-128
-62
-61
-60
-59
-58
-1
-2
-3
-4
1.0E-07
3.7E-07
1.3E-06
4.9E-06
1.8E-05
6.5E-05
2.4E-04
8.7E-04
0-100m time integrated particle density / g s m-3

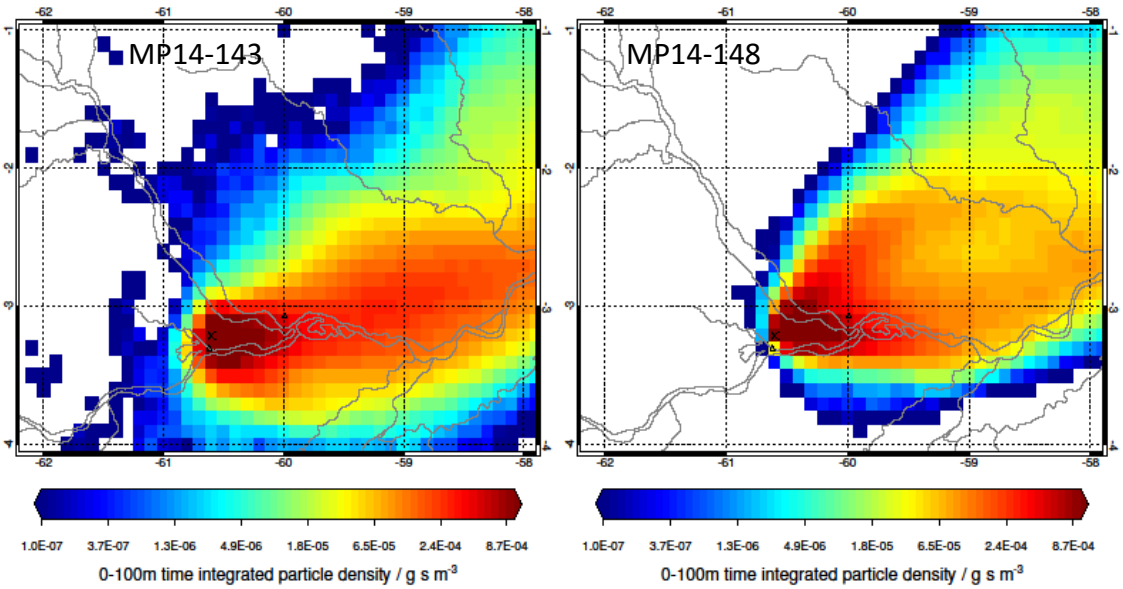
54


MP14-129
MP14-134
-62
-61
-60
-59
-58
-1
-2
-3
-4
1.0E-07
3.7E-07
1.3E-06
4.9E-06
1.8E-05
6.5E-05
2.4E-04
8.7E-04
0-100m time integrated particle density / g s m-3

55


MP14-135
MP14-138
-62
-61
-60
-59
-58
-1
-2
-3
-4
1.0E-07
3.7E-07
1.3E-06
4.9E-06
1.8E-05
6.5E-05
2.4E-04
8.7E-04
0-100m time integrated particle density / g s m-3

56



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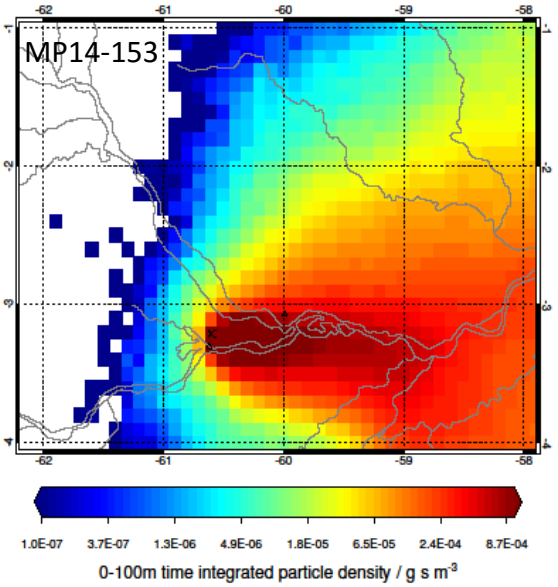


58

59 Figure SI1. 72 h back air mass history (‘footprints’) arriving at the T3 station for the periods
60 of the analysed filters (labelled as e.g. MP14-06, MP14-16, MP14-17). Warmer colours
61 indicate a greater probability of a particle passing near the surface in a grid box. The
62 sampling site is indicated by a cross symbol. Manaus and Manacupuru cities are indicated
63 as triangles (far right and below of the sampling site, respectively).

64

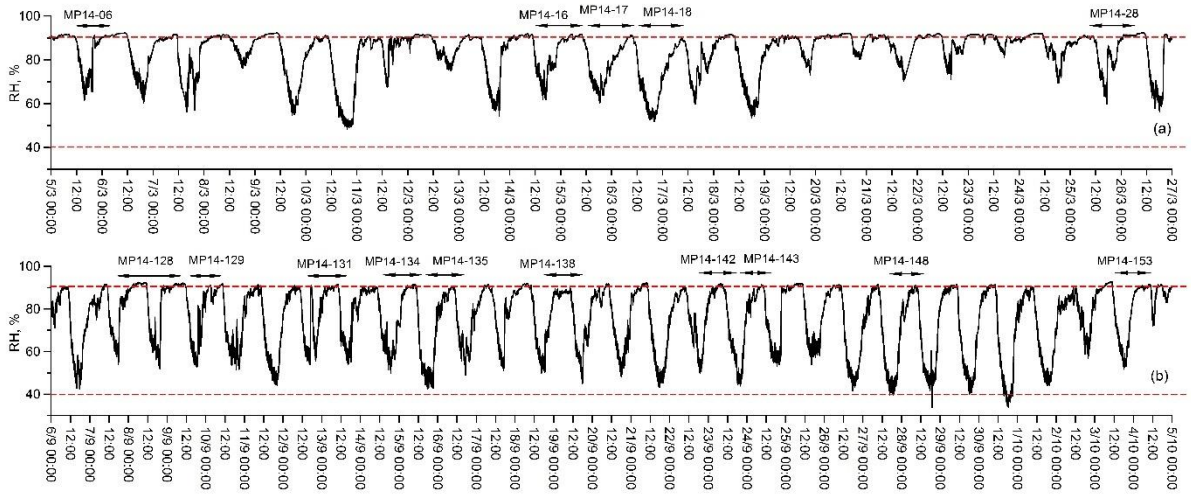


Figure SI2. Relative humidity (RH) at the T3 sampling site during (a) IOP1 and (b) IOP2 The arrows indicate sample collection periods. Atmospheric Radiation Measurement (ARM) data source http://www.archive.arm.gov. The continuous dashed line indicates the lowest and highest RH vales during both seasons.

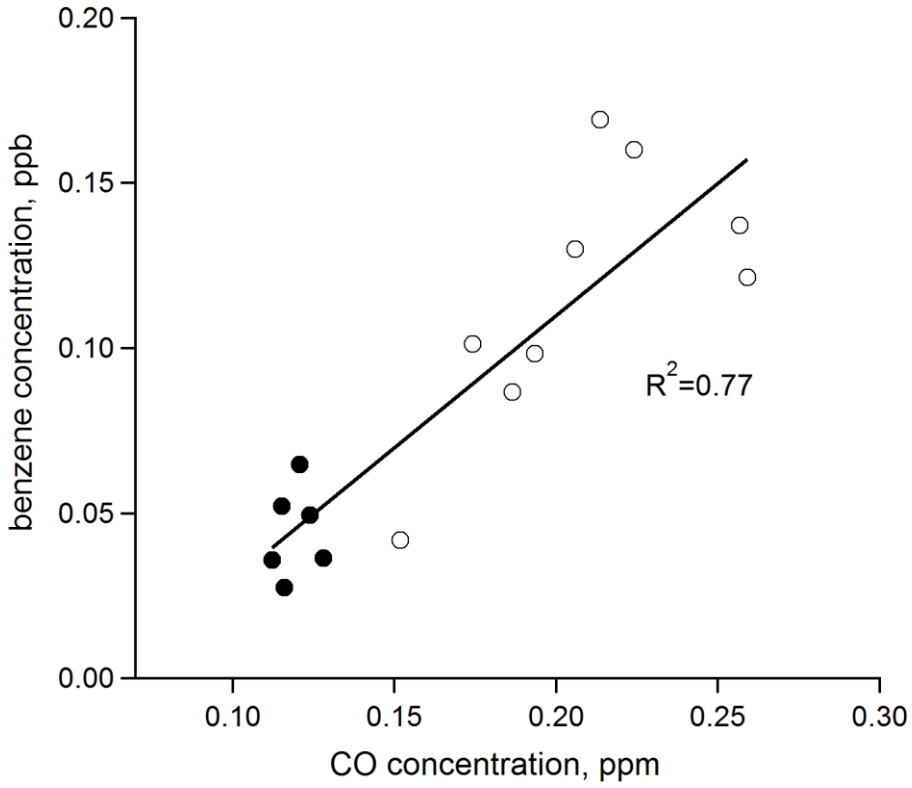
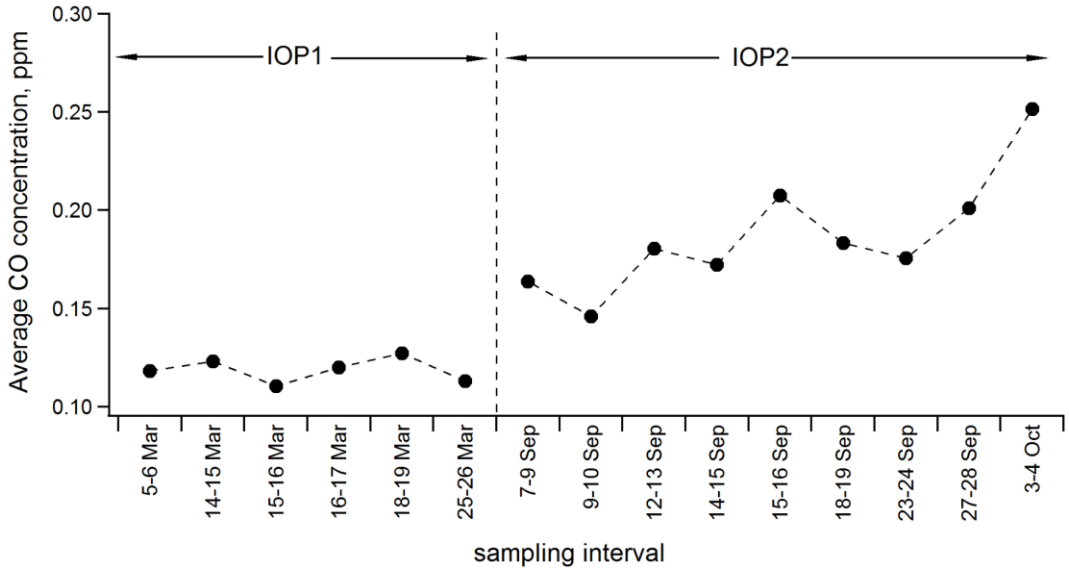


Figure SI3. Correlation between benzene and CO average concentrations during IOP1 and IOP2 sampling periods at sampling T3 site. The data was averaged for aerosol filter sampling intervals. Filled markers correspond to the average data points from the IOP1 and empty circles correspond to that from the IOP2 period.



77

78 Figure SI4. Average CO concentration during IOP1 and IOP2 sampling periods at T3 site.
79 Each data point corresponds to the average concentration within the sampling interval.

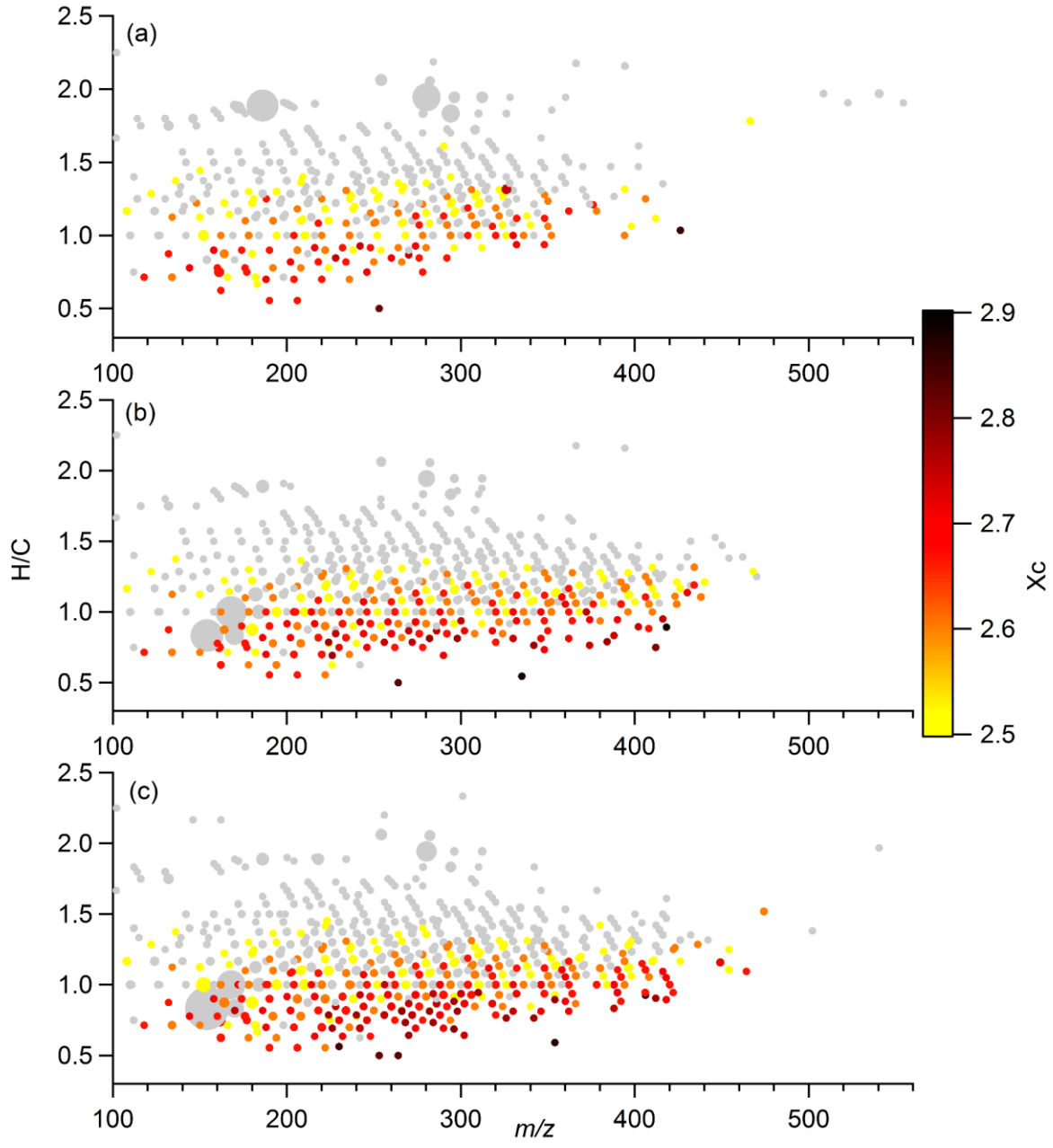


Figure SI5. H/C vs m/z plot for CHON containing formulae in the samples from the periods with (a) low (b) moderately high and (c) very high incidents of fires. The marker areas reflect relative ion abundance in the sample. The colour code shows aromaticity equivalent (Xc) in the individual molecular formula. Molecular formulae with Xc<2.5 are shown as grey markers. The largest grey circles in the panel 'a' correspond to the ions at *m/z* 187.11357 with a neutral molecular formula $C_9H_{17}NO_3$ and *m/z* 281.26459 with a neutral molecular formula $C_{18}H_{35}NO$. The largest grey circles in the panels 'b' and 'c' correspond to the ions at *m/z* 154.0146, *m/z* 168.03023 and *m/z* 152.03532 with neutral molecular formulae $C_6H_5NO_4$, $C_7H_7NO_4$ and $C_7H_7NO_3$, respectively.

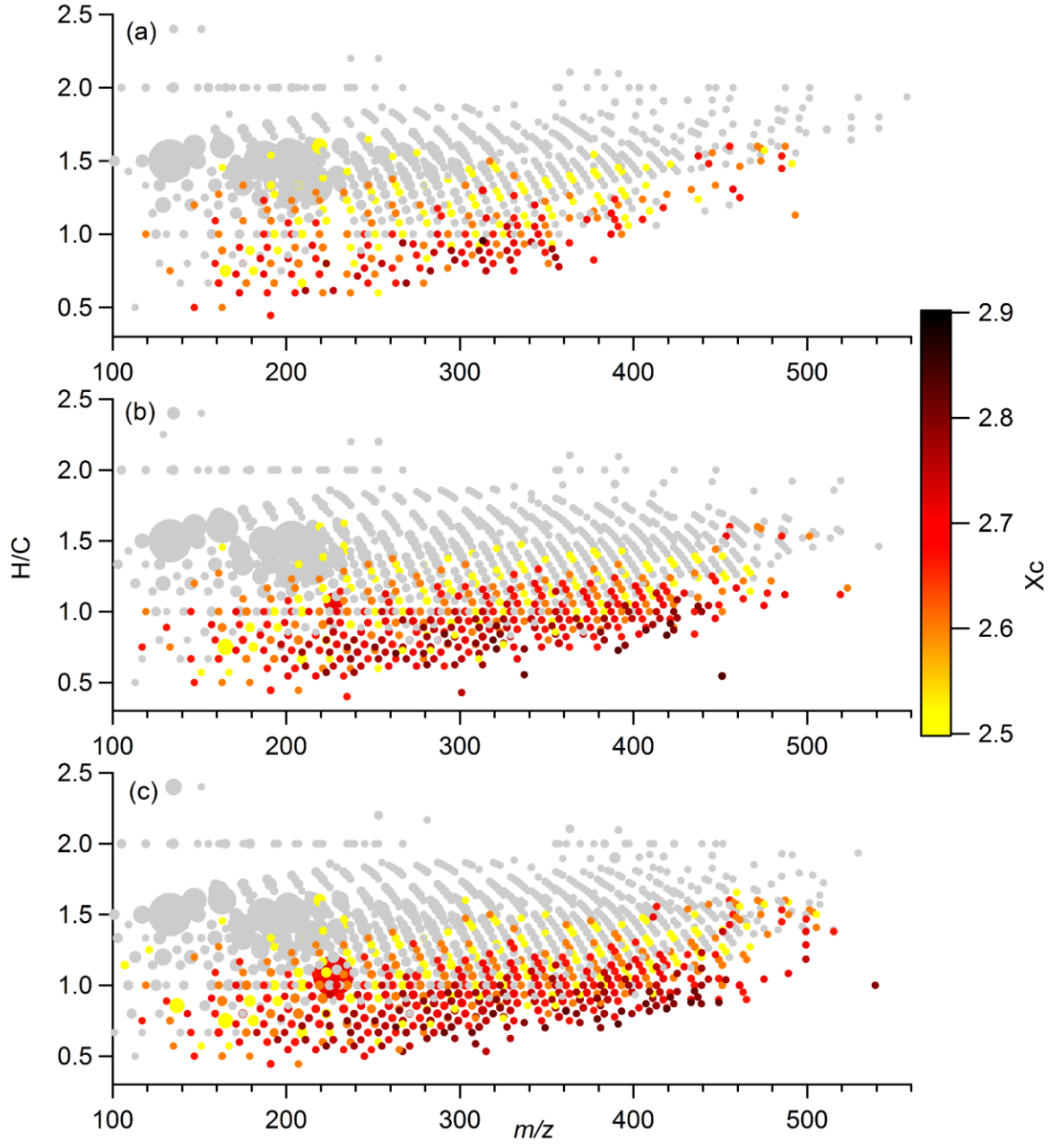


Figure SI6. H/C vs m/z plot for CHO containing compounds in the samples from the periods with (a) low (b) moderately high and (c) very high incidents of fires. The marker areas reflect relative ion abundance in the sample. The colour code shows aromaticity equivalent (Xc) in the individual molecular formula. Molecular formulae with Xc<2.5 are shown as grey markers.

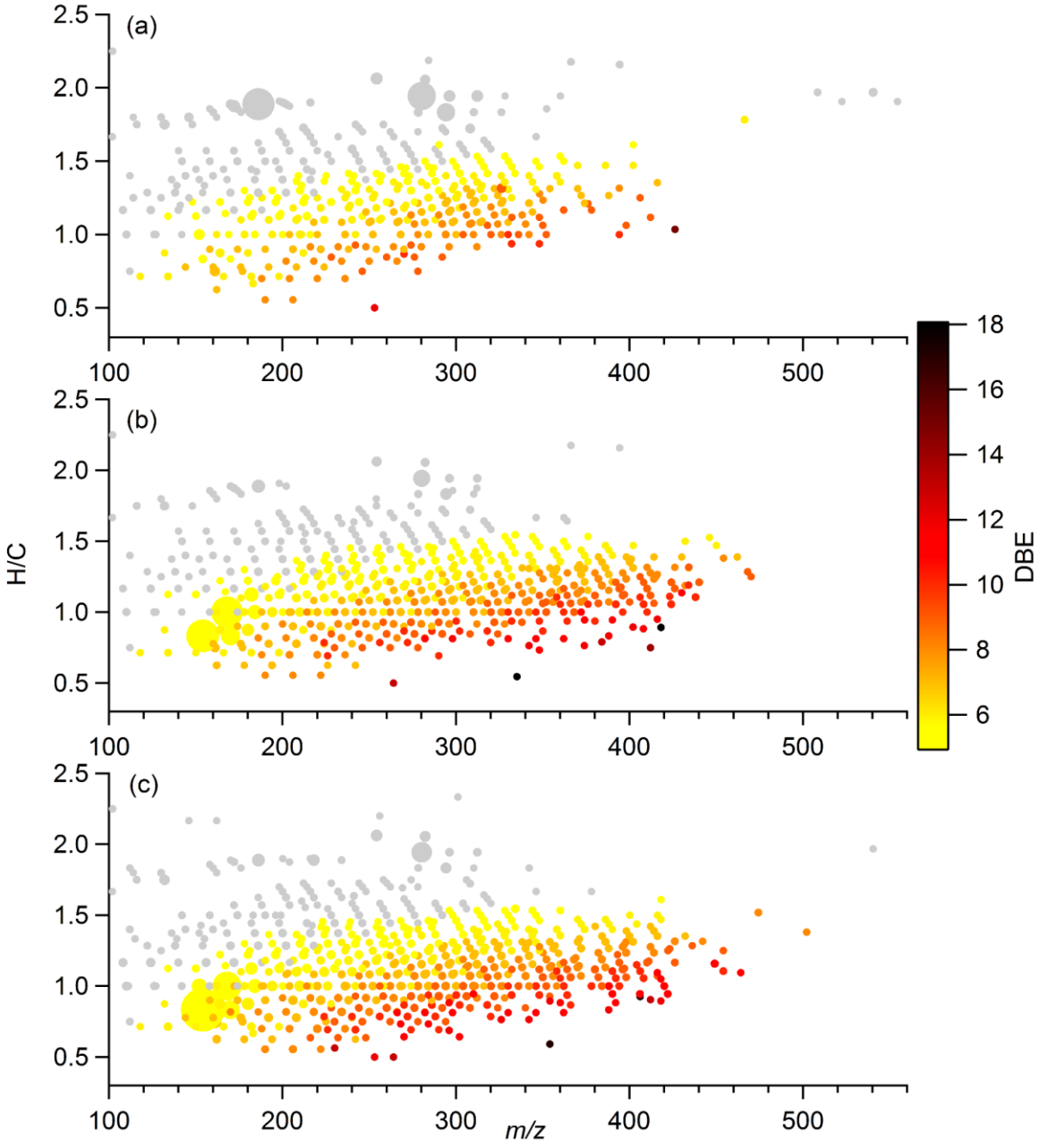


Figure SI7. H/C vs m/z plot for CHON containing compounds in the samples from the periods with (a) low (b) moderately high and (c) very high incidents of fires. The marker areas reflect relative ion abundance in the sample. The colour code shows double bond equivalent (DBE) the individual molecular formula. Molecular formulae with DBE<5 are shown as grey markers. The largest grey circles in panel 'a' correspond to ions at *m/z* 186.11357 and *m/z* 280.26459 with neutral molecular formulae $C_9H_{17}NO_3$ and $C_{18}H_{35}NO$, respectively. The yellow circles in panels 'b' and 'c' correspond to the ions at *m/z* 154.0146, *m/z* 168.03023 and *m/z* 152.03532 with molecular formulae $C_6H_5NO_4$, $C_7H_7NO_4$ and $C_7H_7NO_3$, respectively, which are known biomass burning marker compounds (see discussion in the main text).