Supplementary material of

Anthropogenic VOC in Abidjan, southern West Africa: from source quantification to atmospheric impacts

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Table SM1. Mean VOC to CO emission ratios (ERs, ppb_v per ppm_v CO) for each emission source analysed in this study.

Name	MW (g/mol)	ER VOC/CO (ppb _v /ppm _v)											
		SOAP	KOH	HDDV	TW 2T	TW 4T	CH	FW	CHM	WB	LDDV	LDGV	HDDV-T
benzene	78.11	92.9	1.2	0.41	52.35	10.37	1.73	1.48	0.92	9.46	3.01	1.39	13.51
Toluene	92.14	100	5.6	0.26	115.63	15.70	0.57	0.81	0.66	12.50	1.19	6.80	4.55
m+p-xylene	106.2	76.3	19	0.21	100.43	8.19	0.31	0.57	0.27	1.35	0.32	9.88	3.21
o-xylene	106.2	95.5	14	0.08	57.29	3.16	0.08	0.06	0.08	0.10	0.17	4.75	1.06
ethylbenzene	106.2	111.6	7.5	0.07	58.47	5.47	0.29	0.10	0.09	7.81	0.24	2.49	1.24
Styrene	104.1	212.3	43	0.06	36.87	2.75	0.09	0.15	0.05	0.00	0.00	0.00	0.04
isopropylbenzene	120.2	95.5	6.6	0.01	8.181	0.61	nd	0.01	0.02	0.00	0.00	0.00	0.44
1,3,5-trimethylbenzene	120.2	13.5	60	0.06	29.60	0.82	0.00	0.02	0.04	0.12	0.17	0.72	0.88
1,2,4-trimethylbenzene	120.2	20.6	32	0.19	64.56	2.78	0.02	0.02	0.10	0.36	0.42	4.23	4.10
1,2,3-trimethylbenzene	120.2	43.9	29	0.07	20.44	0.61	0.64	0.20	0.14	0.41	0.12	1.30	1.61
isoprene	68.12	1.9	100	0.02	3.922	0.67	0.06	1.65	0.22	1.67	0.04	0.17	0.29
Hexane	84.16	0	37.0	nd	22.32	0.35	0.11	0.00	0.03	0.00	0.00	0.00	1.05
Pentane	72.15	0.3	3.8	0.01	41.86	3.44	0.17	0.06	0.11	0.00	0.00	0.00	0.09
2-methylpentane	86.18	0	5.2	0.02	72.30	5.81	1.61	0.00	0.04	0.00	0.00	0.00	0.48
3-methylpentane	86.18	0.2	5.2	0.01	60.20	3.47	2.62	0.42	0.01	0.00	0.00	0.00	0.00
Hexane	86.17	0.1	5.2	0.02	73.87	5.72	0.88	0.01	0.15	0.00	0.00	0.00	0.06
2,2-dimethylpentane	100.2	0	4.77	0.00	7.093	0.12	0.05	0.16	0.06	0.00	0.00	0.00	0.42
2,4-dimethylpentane+	100.2	0.3	4.77	0.00	23.93	0.37	0.03	0.02	0.00	0.00	0.00	0.00	0.00
2,2,3-trimethylbutane+	100.2	0.3	3.81	0.00	3.021	0.06	0.01	0.02	0.03	0.00	0.00	0.00	0.06
3,3-dimethylpentane+	100.2	0.3	4.77	0.01	8.315	0.02	0.02	0.20	0.11	0.00	0.00	0.00	0.12
cyclohexane	84.16	1	7.0	0.00	26.15	1.63	0.36	0.01	0.00	0.00	0.00	0.00	0.05
2-methylhexane	100.2	0	7.0	0.01	67.30	1.78	0.00	0.05	0.13	0.00	0.00	0.00	0.16
2,3-dimethylpentane	100.2	0.4	4.77	nd	20.31	0.55	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Heptane	100.2	0.1	6.8	0.13	39.38	2.30	0.09	0.02	0.53	3.17	0.06	0.09	0.28
Octane	114.2	0.8	8.1	0.25	31.59	0.93	0.10	0.83	0.19	1.44	0.05	0.32	0.88
isooctane	114.2	0.8	3.34	0.03	16.51	0.15	0.04	0.13	0.01	0.08	0.05	0.01	0.24
Nonane	128.2	1.9	9.7	0.14	10.43	0.32	0.02	0.02	0.01	0.00	0.00	0.00	3.65
Decane	142.3	7	11.0	0.24	6.551	0.15	0.03	0.00	0.00	0.00	0.00	0.00	8.12
nC11	156.3	16.2	12.0	0.27	2.021	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.61

Table SM1. continued

Name	MW (g/mol)	SOAP	kOH	ER VOC/CO (ppb/ppm)									
				HDDV	TW 2T	TW 4T	CH	FW	CHM	WB	LDDV	LDGV	HDDV-T
nC12	170.3	34.5	13.2	0.28	0.99	0.03	0.02	0.01	0.00	0.00	0.00	0.00	14.47
nC13+	184.4	34.5	15.1	0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
nC14+	198.4	34.5	17.9	0.06	0.24	0.01	0.00	0.01	0.01	0.00	0.00	0.00	2.15
nC15+	212.4	34.5	20.7	0.02	0.08	0.00	0.01	0.03	0.00	0.00	0.00	0.00	1.21
nC16+	226.4	34.5	23.2	0.02	0.08	0.00	0.01	0.01	0.05	0.00	0.00	0.00	0.84
limonene+	136.2	18	164	0.01	0.40	0.00	0.02	0.46	0.03	7.42	0.00	0.00	0.48
a-pinene	136.2	17.4	52.3	0.01	1.78	0.01	0.05	0.00	0.00	0.02	0.00	0.00	0.25
b-pinene	136.2	18.1	74.3	0.02	0.92	0.01	0.06	0.01	0.00	0.15	0.00	0.00	0.28
camphene+	136.2	18	53	0.06	0.34	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.35
myrcene+	136.2	18	215	0.00	0.64	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.36
3-carene+	136.2	18	85	0.00	0.41	0.01	nd	0.00	0.00	0.00	0.00	0.00	0.39
a-terpinene+	136.2	18	363	0.02	4.08	0.18	0.00	0.00	0.01	0.00	0.00	0.00	1.03
a-ocimene+	136.2	18	252	0.02	12.09	0.30	0.00	0.01	0.00	0.00	0.00	0.00	3.56
g-terpinene+	136.2	18	177	0.05	0.95	0.01	0.03	0.09	0.09	0.00	0.00	0.00	0.33
terpinolene+	136.2	18	225	0.00	0.61	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.19
hexanal+	100.1	0	30	0.00	14.00	0.03	0.00	0.05	0.27	0.00	0.00	0.00	0.14
heptanal+	114.2	0	30	0.01	nd	nd	0.09	0.01	0.25	0.00	0.00	0.00	0.59
benzaldehyde	106.1	216	12	0.03	5.69	0.10	nd	0.00	0.02	0.00	0.00	0.00	0.01
octanal+	128.2	0	30	0.03	nd	0.13	0.09	0.03	0.00	0.00	0.00	0.00	1.05
nonanal	142.2	0	30	0.01	1.36	0.12	0.23	0.01	0.02	0.00	0.00	0.00	0.15
nopinone+	138.2	18	15	0.00	0.46	0.03	0.04	0.00	0.00	0.00	0.00	0.00	1.44
camphre+	152.2	18	4.3	0.05	8.71	0.20	nd	0.07	0.05	0.00	0.00	0.00	0.02
borneol+	154.2	18	49	0.00	2.27	0.04	0.00	0.00	0.01	0.00	0.00	0.00	1.75
decanal+	156.2	0	30	0.03	3.49	0.11	0.07	0.03	0.02	0.00	0.00	0.00	1.73
undecanal+	170.3	0	30	0.06	0.35	0.01	0.04	0.05	0.03	0.00	0.00	0.00	4.24
methylethylketone	72.11	0.6	1.2	0.05	nd	0.02	0.12	0.19	0.22	0.00	0.00	0.00	0.64
methylvinylketone	70.09	1	19	0.05	1.34	0.04	0.18	0.00	1.44	0.00	0.00	0.00	1.06

MW= molecular weight (g. mol⁻¹); ER=emission ratio in units of ppb_v per ppm_v CO equivalent to mmol per mol CO, kOH=second-order reaction rate coefficients of VOC+ OH reaction (×10¹² cm³ molec⁻¹ s⁻¹) obtained from Manion et al., (2015); SOAP= secondary organic aerosol potential values reported in Derwent et al.(2010b). + denotes species whose kOH and SOAP values estimated from the analogous species.

Table SM2: VOC species groups based on GEIA method and mean POCP values suggested for each family (Huang et al., 2017)

Class	VOCs families	VOC species integrated in this study	Mean POCP
VOC1	Alkanols (alcohols)	n.d.	
VOC2	Ethane	n.d.	
VOC3	Propane	n.d.	
VOC4	Butanes	n.d.	
VOC5	Pentanes	pentane	
VOC6	Hexanes and higher alkanes	2-methylpentane, 3-methylpentane, hexane, 2,2-dimethylpentane, 2,4-dimethylpentane, 2,2,3-trimethylbutane, 3,3-dimethylpentane, cyclohexane, 2-methylhexane, 2,3-dimethylpentane, iso-octane, heptane, octane, nonane, decane, undecane, dodecane, tridecane, tetradecane, pentadecane, hexadecane	
VOC7	Ethene (ethylene)	n.d.	
VOC8	Propene	n.d.	
VOC9	Ethyne (acetylene)	n.d.	
VOC10	Isoprenes	isoprene	
VOC11	Monoterpenes	α -pinene, β -pinene, camphene, 3-carene, α -terpinene, limonene, α -ocimene, γ -terpinene, terpinolene, myrcene,	
VOC12	Other alk(adi)enes/alkynes (olefines)	n.d.	
VOC13	Benzene (benzol)	benzene	
VOC14	Methylbenzene (toluene)	toluene	
VOC15	Dimethylbenzenes (xylenes)	M+p-xylene, o-xylene, ethylbenzene,	
VOC16	Trimethylbenzenes	1,2,4-trimethylbenzene, 1,2,3-trimethylbenzene and 1,3,5-trimethylbenzene	
VOC17	Other aromatics	Cumene, styrene	
VOC18	Esters	n.d.	
VOC19	Ethers (alkoxy alkanes)	n.d.	
VOC20	Chlorinated hydrocarbons	n.d.	
VOC21	Methanal (formaldehyde)	n.d.	
VOC22	Other alkanals (aldehydes)	Benzaldehyde, heptanal, hexanal, octanal, nonanal, decanal, undecanal, camphre, borneol	
VOC23	Alkanones (ketones)	Methylvinylketone, methylethylketone	
VOC24	Acids (alkanoic)	n.d.	
VOC25	Other NMVOC (HCFCs, nitriles, etc.)	n.d.	

POCP= photochemical ozone creation potentials (POCPs) reported on Derwent et al (2001, 2010)

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