Supplementary Information

Revelation of Coupling Biogenic with Anthropogenic Isoprene by Highly Time-resolved Observations

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Figure captions

Fig. S1. A typical chromatographic analysis resulted from the Wanhua station to show the two compounds of interest – ethylene and isoprene. This chromatogram corresponds to analysis of 16:00, July 17, 2009.

Fig. S2. Linear regression of the winter nighttime data in Fig. 4d to show the ratio of isoprene to ethylene in car exhaust.

Table captions

Table S1. Analytical precision for 56 NMHCs for a typical PAMS instrument. Precision is assessed based on seven replicates of a diluted standard mixture at sub-ppb levels.

Table S2. MIRs and reaction rate consants towards OH radicals for the PAMS target compounds.

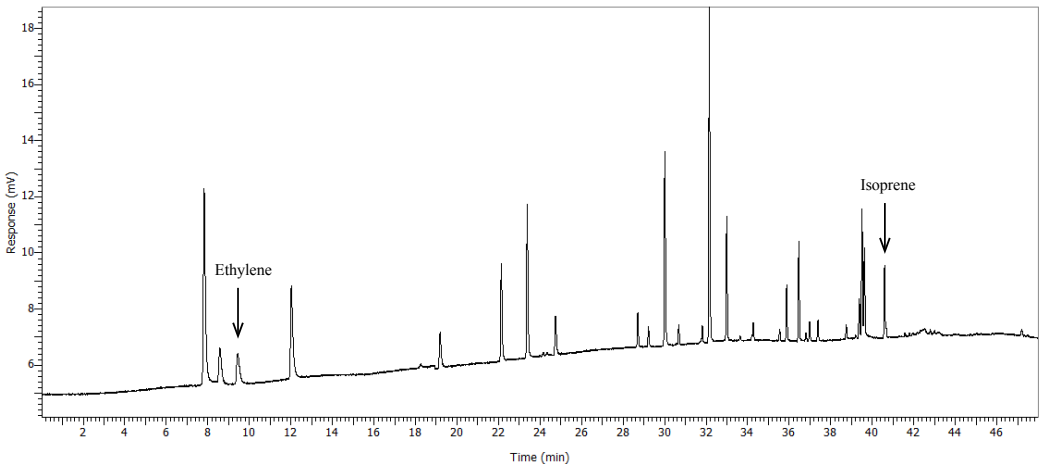

Fig. S1.

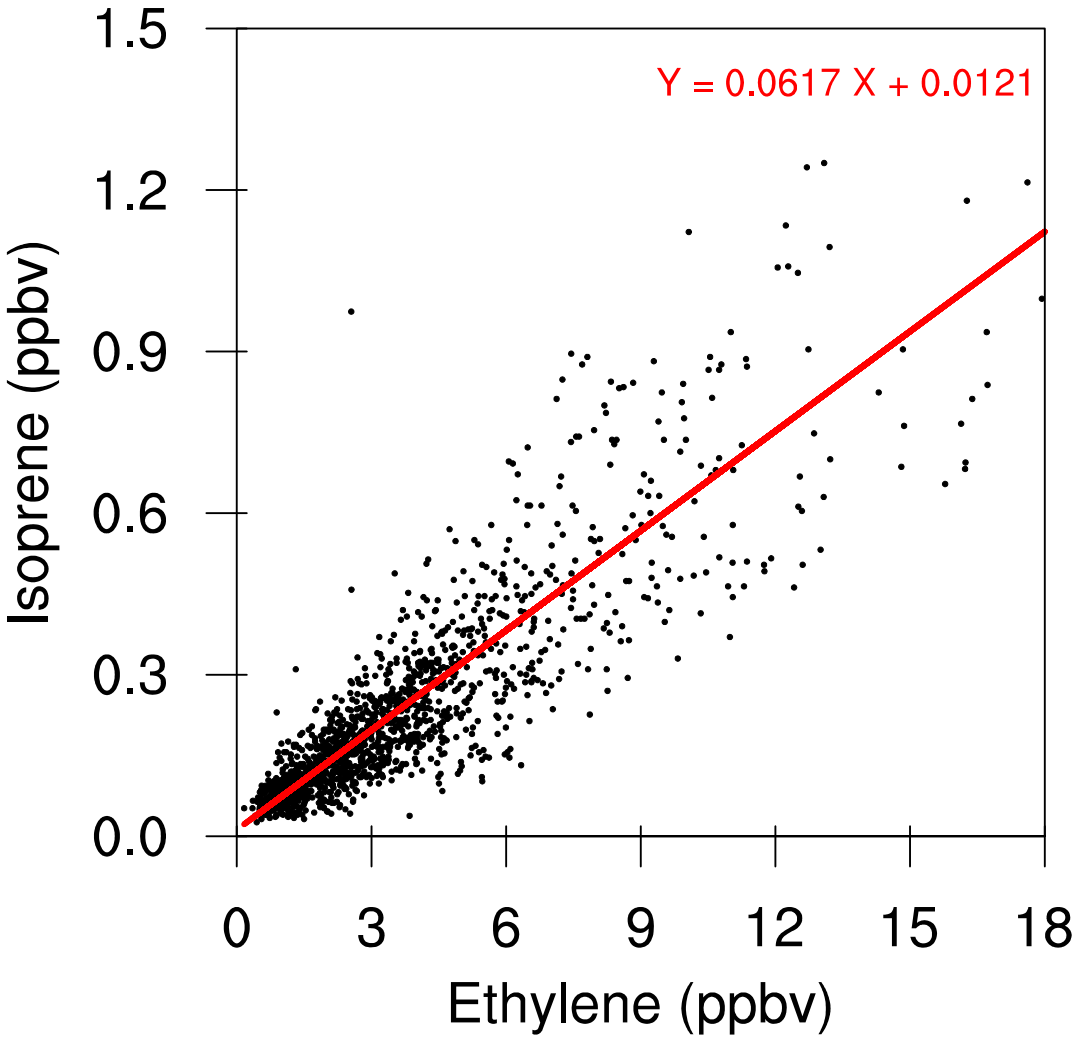
Y = 0.0617 X + 0.0121
Isoprene (ppbv)
Ethylene (ppbv)
0.0
0.3
0.6
0.9
1.2
1.5
0
3
6
9
12
15
18

Fig. S2.

Table S1.

Compound	RSD% (n=7)	Detection limit (ppbC)	Compound	RSD% (n=7)	Detection limit (ppbC)
Ethane	0.77	0.62	n-Hexane	3.17	3.14
Ethylene	1.65	1.09	Methycyclopentane	1.10	0.89
Propane	0.60	0.78	2,4-Dimethylpentane	1.27	1.64
Propylene	0.84	0.68	Benzene	1.09	1.08
Isobutane	0.85	0.68	Cyclohexane	1.23	1.63
n-Butane	0.97	1.28	2-Methylhexane	1.43	1.16
Acetylene	0.60	0.80	2,3-Dimethylpentane	1.15	1.90
trans-2-Butene	0.54	0.44	3-Methylhexane	5.83	4.72
1-Butene	1.27	1.25	2,2,4-Trimethylpentane	2.65	2.62
cis-2-Butene	0.67	0.77	n-Heptane	3.05	2.47
Cyclopentane	1.18	0.78	Methylcyclohexane	0.85	0.84
Isopentene	1.39	1.80	2,3,4-Trimethylpentane	0.63	0.51
n-Pentane	0.84	0.68	Toluene	1.10	1.45
trans-2-Pentene	0.92	0.74	2-Methylheptane	1.92	1.55
1-Pentene	1.38	1.12	3-Methheptane	3.82	3.09
cis-2-Pentene	0.86	0.96	n-Octane	1.84	1.82
2,2-Dimethylbutane	0.95	1.26	Ethylbenzene	0.57	0.46
2,3-Dimethylbutane	0.72	1.19	m,p-Xylene	0.85	1.13
2-Methylpentane	0.67	0.44	Styrene	0.95	1.25
3-Methylpentane	1.28	1.68	o-Xylene	2.51	2.03
Isoprene	1.03	1.36	n-Nonane	3.60	2.91
1-Hexene	1.49	2.95	Isopropylbenzene	2.85	3.59
			n-Propylbenzene	1.26	1.21
			m-Ethytoluene	1.24	1.01
			p-Ethyltoluene	0.99	1.31
			1,3,5-Trimethylbenzene	1.53	1.24
			o-Ethyltoluene	1.84	1.82
			1,2,4-Trimethylbenzene	1.70	2.25
			n-Decane	2.40	2.38
			1,2,3-Trimethylbanzene	1.92	1.56
			m-Diethylbenzene	1.38	1.82
			p-Diethylbenzene	3.39	2.75
			n-Undecane	2.89	2.87
			n-Dodecane	2.11	2.27

Table S2.

Compounds	MWt	MIR*	k_{OH}
Ethane	30.07	0.28	2.54×10^{-13}
Propane	44.1	0.49	1.11×10^{-12}
iso-Butane	58.12	1.23	2.14×10^{-12}
n-Butane	58.12	1.15	2.38×10^{-12}
Cyclopentane	70.13	2.39	5.02×10^{-12}
iso-Pentane	72.15	1.45	3.60×10^{-12}
n-Pentane	72.15	1.31	3.84×10^{-12}
2,2-Dimethylbutane	86.18	1.17	2.27×10^{-12}
2,3-Dimethylbutane	86.18	0.97	5.79×10^{-12}
2-Methylpentane	86.18	1.5	5.20×10^{-12}
3-Methylpentane	86.18	1.8	5.20×10^{-12}
n-Hexane	86.18	1.24	5.25×10^{-12}
Methylcyclopentane	84.16	2.19	5.68×10^{-12}
2,4-Dimethylpentane	100.2	1.55	4.77×10^{-12}
Cyclohexane	84.16	1.25	7.02×10^{-12}
2-Methylhexane	100.2	1.19	6.89×10^{-12}
2,3-Dimethylpentane	100.2	1.34	7.15×10^{-12}
3-Methylhexane	100.2	1.61	7.17×10^{-12}
2,2,4-Trimethylpentane	114.23	1.26	3.38×10^{-12}
n-Heptane	100.2	1.07	6.81×10^{-12}
Methylcyclohexane	98.19	1.7	9.64×10^{-12}
2,3,4-Trimethylpentane	114.23	1.03	6.60×10^{-12}
2-Methylheptane	114.23	1.07	8.31×10^{-12}
3-Methylheptane	114.23	1.24	8.59×10^{-12}
n-Octane	114.23	0.9	8.16×10^{-12}
n-Nonane	128.26	0.78	9.75×10^{-12}
n-Decane	142.28	0.68	1.10×10^{-11}
n-Undecane	156.31	0.61	1.23×10^{-11}
n-Dodecane	170.33	0.55	1.32×10^{-11}
Ethylene	28.05	9	8.15×10^{-12}
Propylene	42.08	11.66	2.60×10^{-11}
t-2-Butene	56.11	15.16	6.32×10^{-11}

Compounds	MWt	MIR*	k_{OH}
1-Butene	56.11	9.73	3.11×10^{-11}
cis-2-Butene	56.11	14.24	5.58×10^{-11}
t-2-Pentene	70.13	10.56	6.70×10^{-11}
1-Pentene	70.13	7.21	3.14×10^{-11}
cis-2-Pentene	70.13	10.38	6.50×10^{-11}
iso-Prene	68.12	10.61	9.96×10^{-11}
Benzene	78.11	0.72	1.22×10^{-12}
Toluene	92.14	4	5.58×10^{-12}
Ethylbenzene	106.17	3.04	7.00×10^{-12}
Styrene	104.15	1.73	5.80×10^{-11}
o-Xylene	106.17	7.64	1.36×10^{-11}
iso-Propylbenzene	120.19	2.52	6.30×10^{-12}
n-Propylbenzene	120.19	2.03	5.80×10^{-12}
m-Ethyltoluene	120.19	7.39	1.86×10^{-11}
p-Ethyltoluene	120.19	4.44	1.18×10^{-11}
1,3,5-Trimethylbenzene	120.19	11.76	5.67×10^{-11}
o-Ethyltoluene	120.19	5.59	1.19×10^{-11}
1,2,4-Trimethylbenzene	120.19	8.87	3.25×10^{-11}
1,2,3-Trimethylbenzene	120.19	11.97	3.27×10^{-11}
m-Diethylbenzene	134.22	7.1	2.55×10^{-11}
p-Diethylbenzene	134.22	4.43	1.64×10^{-11}
Acetylene	26.04	0.95	7.56×10^{-13}
1-Hexene	84.16	5.49	3.70×10^{-11}
m-Xylene	106.17	9.75	2.31×10^{-11}
p-Xylene	106.17	5.84	1.43×10^{-11}

* Carter, W.P.L., (2010). Development of the SPARC-07 Chemical Mechanisum and Updated Ozone Reactivity Scales, Report to the California Air Resources Board Contracts No. 03-318, 06-408, and 07-730.