Electronic Supplementary Material (ESI) for Faraday Discussions.

The relative importance of tailpipe and non-tailpipe emissions on the oxidative potential of ambient particles in Los Angeles, CA

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Table S1. Metals and organic species (segregated by different groups) which were used in the analyses, by their names.

Metals	**n-alkanes**	**Organic acids**	**PAHs**	**Hopanes**
Li	n-Undecane	Octanoic Acid	Fluoranthene	17A(H)-22,29,30-Trisnorhopane
B	n-Dodecane	Decanoic Acid	Acephenanthrylene	17A(H)-21B(H)-30-Norhopane
Na	n-Tridecane	Dodecanoic Acid	Pyrene	17A(H)-21B(H)-Hopane
Mg	n-Tetradecane	Tetradecanoic Acid	Methylfluoranthene	22S-Homohopane
Al	n-Pentadecane	Pentadecanoic Acid	Benzo(ghi)fluoranthene	22R-Homohopane
P	n-Hexadecane	Hexadecanoic Acid	Cyclopenta(cd)pyrene	22S-Bishomohopane
S	Norpristane	Heptadecanoic Acid	Benz(a)anthracene	22R-Bishomohopane
K	n-Heptadecane	Octadecanoic Acid	Chrysene	22S-Trishomohopane
Ca	Pristane	Nonadecanoic Acid	1-Methylchrysene	22R-Trishomohopane
Sc	n-Octadecane	Pinonic Acid	Retene	
Ti	Phytane	Palmitoleic Acid	Benzo(b)fluoranthene	
V	n-Nonadecane	Oleic Acid	Benzo(k)fluoranthene	
Cr	n-Eicosane	Linoleic Acid	Benzo(j)fluoranthene	
Mn	n-Heneicosane	Linolenic Acid	Benzo (e) pyrene	
Fe	n-Docosane	Eicosanoic Acid	Benzo(a)pyrene	
Co	n-Tricosane	Heneicosanoic Acid	Perylene	
Ni	n-Tetracosane	Docosanoic Acid	Indeno(1,2,3-cd)pyrene	
Cu	n-Pentacosane	Tricosanoic Acid	Benzo(g,h,i)perylene	
Zn	n-Hexacosane	Tetracosanoic Acid	Dibenz(a,h)anthracene	
As	n-Heptacosane	Pentacosanoic Acid	Picene	
Se	n-Octacosane	Hexacosanoic Acid	Coronene	
Rb	Nonacosane	Heptacosanoic Acid	Dibenzo(a,e)pyrene	
Sr	Triacontane	Octacosanoic Acid		
Y	Hentriacontane	Nonacosanoic Acid		
Nb	Dotriacontane	Triacontanoic Acid		
Mo	Tritriacontane	Dehydroabietic Acid		
Rh	Tetratriacontane	7-oxodehydroabietic acid		
Pd	Pentatriacontane	Phthalic Acid		
Ag	Hexatriacontane	Isophthalic Acid		
Cd	Heptatriacontane	Terephthalic Acid		
Sn	Octatriacontane	1,2,4-Benzenetricarboxylic Acid		
Sb	Nonatriacontane	1,2,3-Benzenetricarboxylic Acid		
Cs	Tetracontane	1,3,5-Benzenetricarboxylic Acid		
Ba	Decylcyclohexane	1,2,4,5-Benzenetetracarboxylic Acid		
La	Pentadecylcyclohexane	Methylphthalic Acid		
Ce	Hexadecylcyclohexane	Succinic Acid		
Pr	Heptadecylcyclohexane	Glutaric Acid		
Nd	Octadecylcyclohexane	Adipic Acid		
Sm	Nonadecylcyclohexane	Pimelic Acid		
Eu	Squalane	Suberic Acid		
Dy		Azelaic Acid		
Ho		Sebacic Acid		
Yb				
Lu				
W				
Pt				
Tl				
Pb				
Th				
U				

Table S2. Source contributions estimates (± standard deviation) (μg/m^3) to a) PM$_{2.5}$ and b) PM$_{0.18}$ mass concentrations at Central LA.

a) PM$_{2.5}$

	Wood smoke	Primary biogenic	SOC	Vehicle tailpipe emissions	Crustal material	Vehicular abrasion	Secondary ions	Sea salt
Jul 2012	0.12 ± 0.05	1.56 ± 0.34	0.90 ± 0.46	0.49 ± 0.13	0.42 ± 0.17	0.33 ± 0.14	4.49 ± 1.91	1.10 ± 0.40
Aug 2012	0.09 ± 0.03	1.69 ± 0.51	0.74 ± 0.17	0.69 ± 0.24	0.66 ± 0.14	0.44 ± 0.12	3.66 ± 1.55	1.09 ± 0.12
Sep 2012	0.19 ± 0.07	2.27 ± 0.30	0.94 ± 0.19	0.74 ± 0.27	0.50 ± 0.09	0.42 ± 0.13	3.58 ± 0.86	1.04 ± 0.22
Oct 2012	0.28 ± 0.14	1.96 ± 0.36	1.39 ± 1.06	1.19 ± 0.50	0.66 ± 0.16	0.70 ± 0.13	3.81 ± 3.77	0.54 ± 0.05
Nov 2012	0.65 ± 0.38	2.04 ± 0.69	1.13 ± 0.23	0.95 ± 0.26	0.99 ± 0.59	0.98 ± 0.57	6.96 ± 3.37	0.71 ± 0.32
Dec 2012	2.07 ± 1.54	2.75 ± 1.13	0.47 ± 0.36	0.91 ± 0.41	0.50 ± 0.10	0.88 ± 0.23	3.38 ± 2.07	0.51 ± 0.27
Jan 2013	1.24 ± 0.45	2.87 ± 0.35	0.62 ± 0.09	1.36 ± 0.25	0.80 ± 0.48	1.06 ± 0.70	1.89 ± 0.64	0.37 ± 0.14
Feb 2013	1.04 ± 0.62	2.09 ± 1.07	1.32 ± 0.80	1.00 ± 0.47	0.64 ± 0.50	0.85 ± 0.81	5.20 ± 2.77	0.71 ± 0.45

b) PM$_{0.18}$

	wood smoke	Primary biogenic	SOC	Vehicle tailpipe emissions	Crustal material	Vehicular abrasion	Secondary ions	Sea salt
Jul 2012	0.04 ± 0.02	0.69 ± 0.15	0.42 ± 0.14	0.34 ± 0.09	0.12 ± 0.10	0.11 ± 0.08	0.49 ± 0.05	0.09 ± 0.45
Aug 2012	0.04 ± 0.02	0.87 ± 0.25	0.32 ± 0.08	0.43 ± 0.17	0.16 ± 0.08	0.13 ± 0.07	0.41 ± 0.03	0.09 ± 0.45
Sep 2012	0.07 ± 0.03	1.16 ± 0.26	0.38 ± 0.03	0.33 ± 0.10	0.14 ± 0.06	0.14 ± 0.05	0.31 ± 0.02	0.07 ± 0.33
Oct 2012	0.12 ± 0.04	1.05 ± 0.15	0.44 ± 0.20	0.53 ± 0.20	0.36 ± 0.14	0.37 ± 0.09	0.3 ± 0.01	0.07 ± 0.85
Nov 2012	0.23 ± 0.15	0.99 ± 0.24	0.49 ± 0.16	0.44 ± 0.18	0.38 ± 0.35	0.34 ± 0.27	0.26 ± 0.03	0.07 ± 1.98
Dec 2012	0.74 ± 0.54	1.39 ± 0.63	0.19 ± 0.13	0.29 ± 0.19	0.16 ± 0.06	0.28 ± 0.12	0.15 ± 0.07	0.10 ± 0.31
Jan 2013	0.40 ± 0.12	1.28 ± 0.14	0.28 ± 0.06	0.56 ± 0.09	0.43 ± 0.13	0.49 ± 0.11	0.18 ± 0.01	0.07 ± 0.77
Feb 2013	0.39 ± 0.20	1.12 ± 0.59	0.43 ± 0.18	0.45 ± 0.21	0.10 ± 0.27	0.08 ± 0.05	0.25 ± 0.01	0.09 ± 1.14

Table S3. Source contributions estimates (± standard deviation) ($\mu g/m^3$) to a) $PM_{2.5}$ and b) $PM_{0.18}$ mass concentrations at Anaheim. Sampling was not conducted in December 2013. Results for October 2013 correspond to one data point.

a) $PM_{2.5}$

	Wood smoke	Primary biogenic	SOC	Vehicle tailpipe emissions	Crustal material	Vehicular abrasion	Secondary ions	Sea salt
Jul 2013	0.17 ± 0.07	1.65 ± 0.91	0.58 ± 0.07	0.06 ± 0.05	0.42 ± 0.17	0.23 ± 0.13	1.85 ± 0.23	0.70 ± 0.27
Aug 2013	0.22 ± 0.18	2.06 ± 0.85	0.95 ± 0.35	0.27 ± 0.22	0.49 ± 0.26	0.29 ± 0.16	2.69 ± 0.70	0.62 ± 0.09
Sep 2013	0.15 ± 0.10	1.18 ± 0.35	0.79 ± 0.12	0.12 ± 0.09	0.54 ± 0.20	0.44 ± 0.33	1.87 ± 0.85	0.75 ± 0.11
Oct 2013	0.25	1.52	1.11	0.32	1.13	0.84	1.14	0.72
Nov 2013	0.70 ± 0.29	2.86 ± 0.90	0.91 ± 0.41	0.78 ± 0.11	1.14 ± 0.01	1.35 ± 0.39	1.50 ± 0.30	0.60 ± 0.07
Dec 2013								
Jan 2014	1.12 ± 0.62	2.55 ± 0.67	1.59 ± 0.80	0.67 ± 0.31	1.66 ± 0.22	1.19 ± 0.63	3.92 ± 1.03	0.41 ± 0.08
Feb 2014	0.71 ± 0.03	2.34 ± 0.68	1.07 ± 0.24	0.81 ± 0.00	0.36 ± 0.03	0.41± 0.03	3.7 ± 0.77	0.35± 0.11

b) $PM_{0.18}$

	wood smoke	Primary biogenic	SOC	Vehicle tailpipe emissions	Crustal material	Vehicular abrasion	Secondary ions	Sea salt
Jul 2013	0.05 ± 0.02	0.85 ± 0.37	0.28 ± 0.07	0.11 ± 0.07	0.20 ± 0.10	0.09 ± 0.05	0.40 ± 0.26	0.09 ± 0.06
Aug 2013	0.07 ± 0.04	1.41 ± 0.51	0.45 ± 0.08	0.22 ± 0.12	0.23 ± 0.25	0.12 ± 0.12	0.48 ± 0.16	0.10 ± 0.05
Sep 2013	0.05 ± 0.02	0.68 ± 0.11	0.42 ± 0.13	0.14 ± 0.06	0.20 ± 0.14	0.13 ± 0.12	0.42 ± 0.16	0.10 ± 0.03
Oct 2013	0.10	0.92	0.50	0.24	0.63	0.37	0.31	0.13
Nov 2013	0.19 ± 0.08	1.52 ± 0.40	0.31 ± 0.16	0.47 ± 0.13	0.64 ± 0.03	0.67 ± 0.17	0.41 ± 0.25	0.15 ± 0.02
Dec 2013								
Jan 2014	0.33 ± 0.17	1.30 ± 0.36	0.28 ± 0.09	0.48 ± 0.22	0.86 ± 0.18	0.51 ± 0.31	0.30 ± 0.11	0.09 ± 0.02
Feb 2014	0.22 ± 0.23	1.01 ± 1.07	0.34 ± 0.24	0.79 ± 0.06	0.18 ± 0.13	0.29± 0.02	0.24 ± 0.11	0.03 ± 0.01

Figure S1 (a-e). Yearly trends of per volume concentrations (μg/m^3) of individual vehicular abrasion's tracers(i.e. Ba, Cu, Mn, Pb and Sr) in $PM_{2.5}$ size range, obtained from Speciation Trends Network (STN) data at the North Main street, Los Angeles. Dotted lines represent the annual arithmetic means. The black dots correspond to the 5th and 95th percentiles.

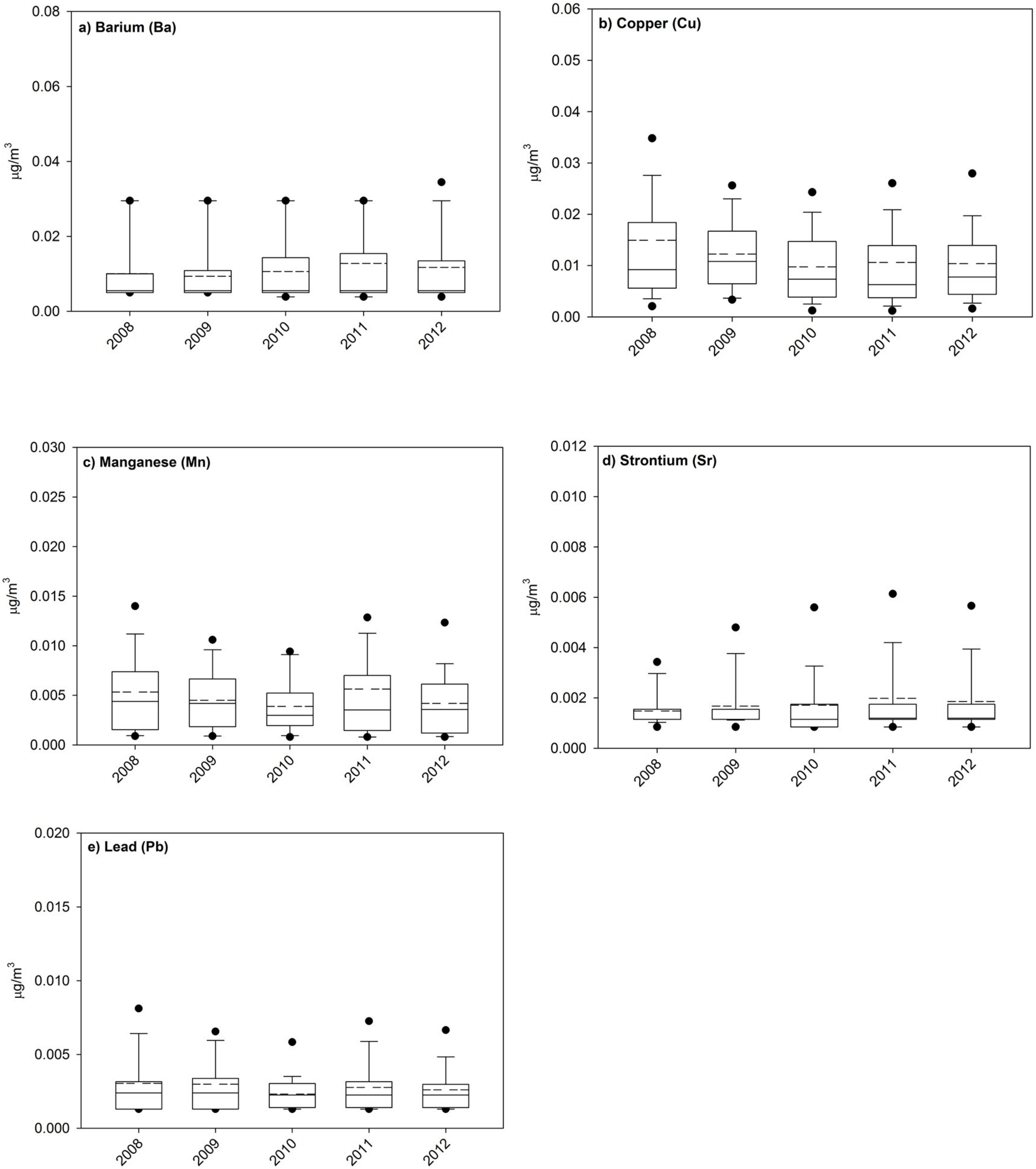
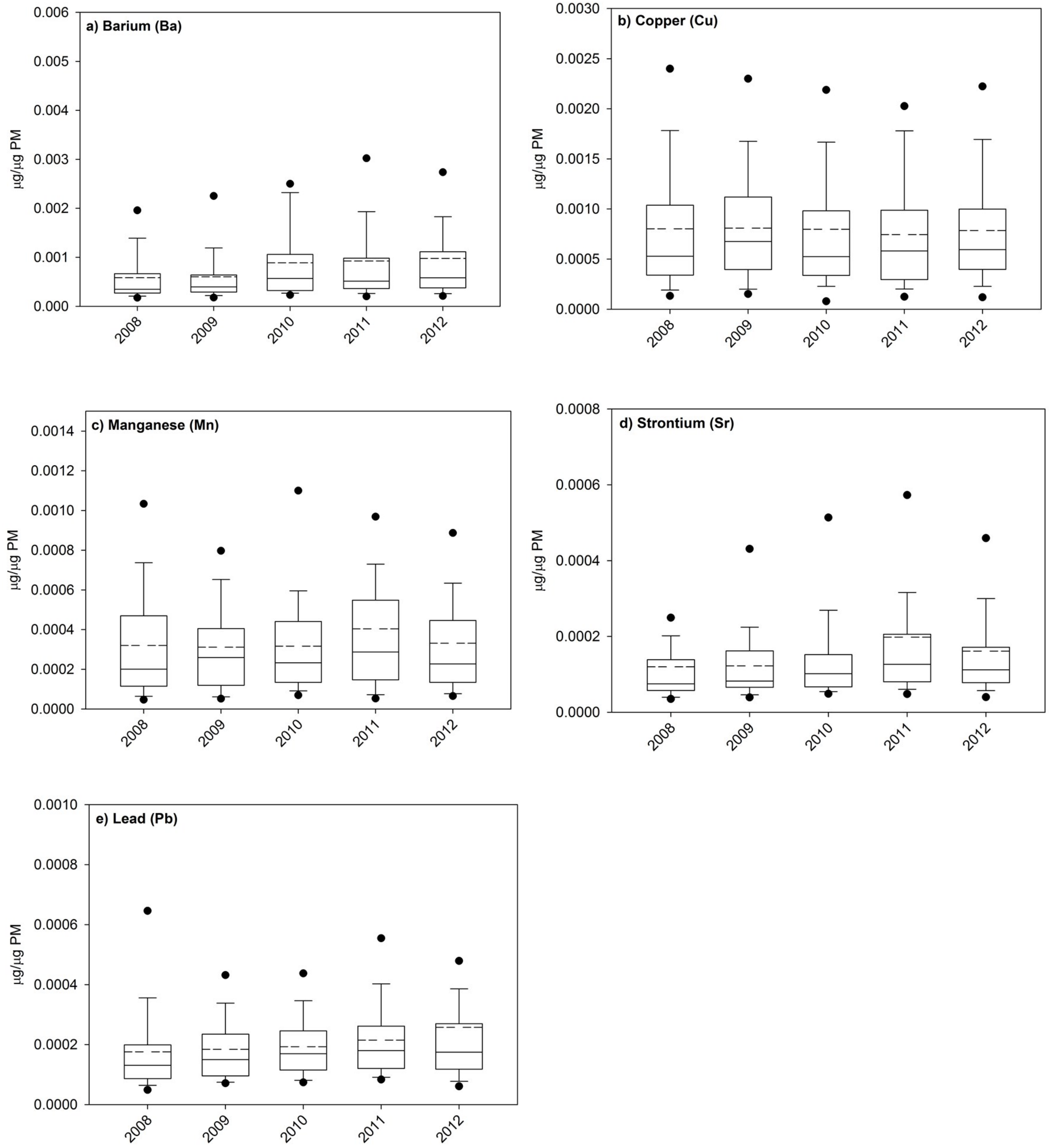


Figure S2 (a-e). Yearly trends of per mass concentrations (μg/μg PM) of individual vehicular abrasion's tracers (i.e. Ba, Cu, Mn, Pb and Sr) in $PM_{2.5}$ size range, obtained from Speciation Trends Network (STN) data at the North Main street, Los Angeles. Dotted lines represent the annual arithmetic means. The black dots correspond to the 5th and 95th percentiles.



The Speciation Trends Network (STN) is established by the U.S. Environmental Protection Agency (EPA) and began operation in late 1999. STN provides nationally consistent speciated $PM_{2.5}$ data including numerous trace elements, ions (sulfate, nitrate, sodium, potassium, and ammonium), elemental carbon, and organic carbon in selected urban areas across the country. STN has 54 sites across the country. In this study, data was obtained from the sampling site located at North Main street, approximately 5 km north of our sampling site in downtown Los Angeles. PM samples were collected once every six days from 2008 to 2011, while every other three days after 2011. Teflon filters were used for mass concentration measurements and were analyzed with energy dispersive X-ray fluorescence spectrometry (EDXRF) for the elemental composition (RTI, 2009).

Reference

RTI: Standard Operating Procedure for the X-ray Fluorescence Analysis of Particulate Matter Deposits on Teflon Filters, Research Triangle Park, NC, 2009a