Chemical Characterization of Fine Particulate Matter at a Kerbside of National Highway in Delhi, India

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Objective: *To evaluate the trace metals in ambient $PM_{2.5}$ at a national highway in Delhi, India*

Site Characteristics

- National Highway
- High Traffic Volume
- Mixed HDVs and LDVs
- 1,70,000 vehicles/day

Sampler Details

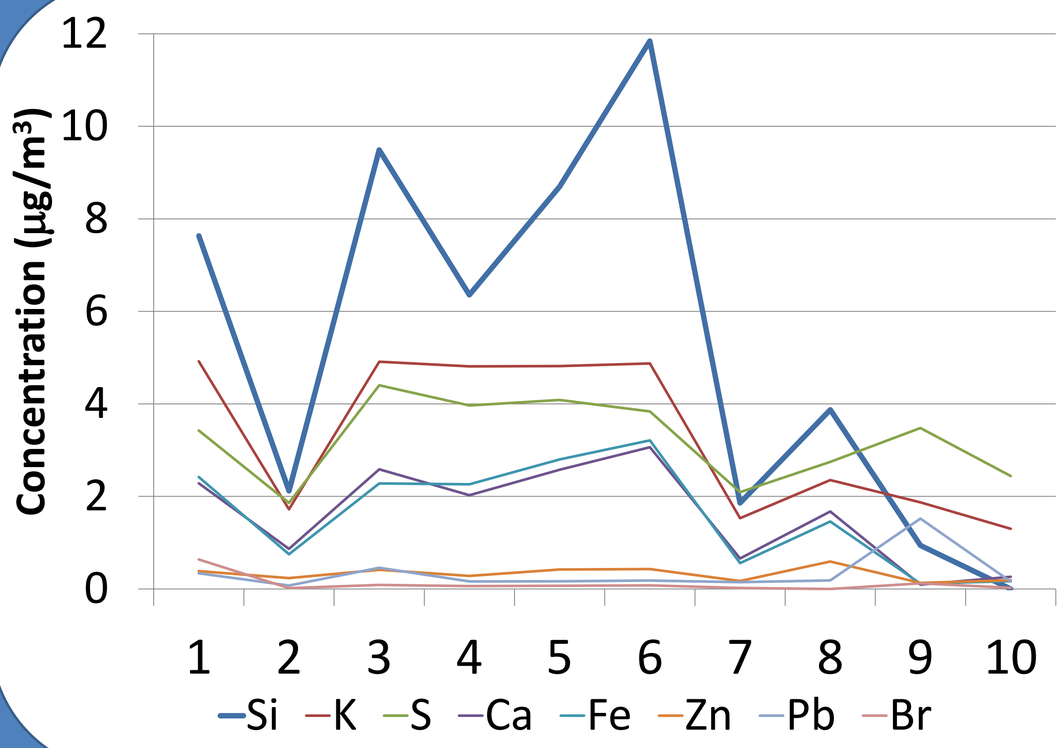
- $PM_{2.5}$ Sampler: Ecotech APM 550
- WINS Impactor

Sampling Protocol

- Sampling Month: November 2013 (Winter)
- Sampling Frequency: Alternate Days
- Sampling Duration: 24-hour

Analysis Protocol

- Trace Metals concentration using X-Ray Fluorescence (XRF)



Results

- Out of twenty-three metals, eight metals are detected in the samples in significant amount.
- Si, being the crustal element, is found to be maximum i.e. 33%, followed by K, 21% and S, 20%.

	Si	S	K	Ca	Fe	Zn	Br	Pb
Si	1	0.589	**0.871**	**0.956**	**0.944**	0.419	0.075	0.058
S		1	0.735	0.502	0.526	0.151	0.049	0.062
K			1	**0.853**	**0.891**	0.298	0.179	0.025
Ca				1	**0.976**	0.572	0.068	0.14
Fe					1	0.484	0.088	0.125
Zn						1	0.012	0.134
Br							1	0.021
Pb								1

Conclusions

- Si has high co-relation with Ca, Fe and K - crustal origin
- S, Br and Pb - vehicular exhaust emissions and/or abrasions due to brake and tyre wear

Future work

- Seasonal concentration analysis along with ionic and organic speciation

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