

## 1.083 Source identification and health risk assessment of trace metals in suspended particulate matters collected in Dhaka, Bangladesh.

Early Career Scientist

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Abstract:

In order to investigate the human health risk of suspended particulate matter (SPM) in Dhaka, ambient air samples were collected weekly during August 2016 to January 2017. Trace elements were determined with Inductively Coupled Plasma Mass spectrometry (ICP-MS). Source apportionment study was done with correlation analysis, enrichment factor, positive matrix factorization (PMF). Air mass back trajectory analysis was carried out by NOAA HYSPLIT model. Human health risk assessment was conducted by US EPA model. The average mass concentration was recorded  $329.16 \pm 89.29 \mu\text{g m}^{-3}$  with a range of  $173.81\text{-}496.99 \mu\text{g m}^{-3}$ . Strong seasonal variation was noticed in the mass concentration with maxima during winter ( $423.90 \pm 40.79 \mu\text{g m}^{-3}$ ) and minima during monsoon ( $243.73 \pm 46.30 \mu\text{g m}^{-3}$ ). Thirty three trace elements (Li, B, Na, Mg, K, Ca, Al, Si, P, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, As, Se, Rb, Sr, Zr, Mo, Cd, Sn, Ba, W, Ag, Sb, Cs, Pb) were measured and was accounted for  $\sim 7.0\%$  of particulate mass. High enrichment factors of Cd, Pb and Zn indicates anthropogenic source. The major source of PM were soil dust (39.0%) followed by road dust (31.2%), vehicle emissions (13.6%), industrial sources (9.4%) and mixed sources (6.8%) from PMF analysis. Back trajectory analysis revealed that particulate matters were greatly affected by Indo-Gangetic Plain (IGP) during winter, while from Bay of Bengal in monsoon and eastern part of India in post monsoon. The health risk of heavy metals (HMs) was evaluated by hazard quotient (HQ) and hazard index (HI) and the results showed that ingestion and dermal contact were the

major exposure pathways to human health. The HI values of Pb for children exhibited to be higher than 1 indicating that a non-carcinogenic health effect. The carcinogenic risks of Cd, Ni and Cr were all below the safe value.