



Anthropogenic Enrichment of Heavy Metals in Urban Dust and Possible Corresponding Sources

Neele van Laaten, Dirk Merten, and Michael Pirrung

Institute of Geosciences, Friedrich Schiller University, Jena, Germany (neele.van-laaten@uni-jena.de)

Atmospheric dust (particulate matter, PM) is regarded as a crucial factor for human health and a major environmental problem in densely populated areas. Due to anthropogenic processes like traffic, waste incineration and industry increased amounts of PM can be detected in those areas. To reduce the amounts detailed knowledge on both the composition of PM and the source contribution in a target area is needed. The latter has, to our knowledge, rarely been regarded in central Europe.

Within this study, spider webs from various locations in the city of Jena (Germany), that act as natural trappers of PM, were analyzed for the contents of 27 trace elements using aqua regia digestion followed by ICP-OES and ICP-MS determinations. Aerosol-crust enrichment factors were calculated for selected elements and both a cluster analysis and a factor analysis were executed to identify sources of PM.

High values for the enrichment factors clearly show an anthropogenic influence. In addition, the cluster analysis leads to a grouping of the sampling points mainly depending on the kind and volume of traffic at the corresponding locations. Five different possible sources of PM can be found by the factor analysis: Soil erosion (41% of variance), abrasion of rails (16%), tyre and break wear (16%), charcoal combustion (8%) and oil combustion (7%).