



Spatial distribution and temporal accumulation of particulate associated Cu, Zn and Cd on impervious urban surface

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ABSTRACT

The presence of urban surface pollutants washed off by stormwater is a growing concern for their possible adverse effects on receiving water quality. The pollutants transport behaviour and pollution potential are mainly defined by their physico-chemical properties. The stormwater quality mitigation strategies, therefore, should be based on the knowledge of pollutants distribution and accumulation on urban surface.

This study enlightens particulate associated heavy metals, COD and TP as functions of surface characteristics and residence time. Samples were obtained from six sites in the city of Dresden, Germany, using wet vacuum sample-taking method.

Results show that except for a flat roof sampling site, the highest solid-phase concentrations (mg/g) of metals were found at high traffic loading road and associated with the smallest particle size fraction of 0.45 - 63 μm . By contrast, the highest surface loads (mg/m^2) of all given parameters were consistently found at natural stone paved pedestrian path. Through a combined assessment of temporal distribution and spatial accumulation, Cu and Zn seem predominantly introduced by vehicle and vehicle related accessories. On the contrary, the origins of Cd were less evident. Principal component analysis revealed that a strong positive inter-correlation was found among Cu, Zn, TP and COD. The concentration of Cd was only moderately correlated with other pollutants.

KEYWORDS

Distribution; accumulation; urban surface; heavy metal