



Paved urban soils as sources and sinks for heavy metals

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Recently, more people live in cities than in rural areas. Therefore, questions on soil, water and air quality which directly affect human health must be studied inside urban areas. Crucial soil functions like the “sink-for-contaminants” function are related to the water balance and the flow patterns, which are both strongly altered in urban areas and which are influenced mainly by soil sealing. Remote sensing studies revealed, that up to 90 % of the city center of Berlin are sealed.

In such areas, it is only partially sealed (previously paved) soils, substantially altered by anthropogenic impact, which provide open spaces for infiltration of water and contaminants like heavy metals.

(i) We developed a method to calculate the sealing-portion related infiltration rates, (ii) we found, that the geometry of the pavements introduces time stable preferential flow paths to the soils, and (iii) we studied how the depositions of black carbon and other forms of organic matter influence the adsorption behaviour of the soil towards heavy metals and water.

We then integrated all the site specific study results to numerically simulate Cd and Pb transport to the groundwater in order to assess the source or sink function of the whole pavement system for heavy metals.

The results indicate that a Cd breakthrough through the pavement system must be expected after only 10 years, while the system is a good filter for dissolved Pb.