



## **Heavy Metals and Benzo[a]pyrene in Soils from Construction and Demolition Rubble**

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Rubble is an important component in urban soils worldwide, especially in Europe. In Berlin, Germany, rubble composed soils cover about 17% of the total city area and 60% of the inner city. This study assesses the contamination status of rubble soil, particularly for heavy metals and benzo[a]pyrene (B[a]P).

The results of 164 soil surveys from Berlin, including more than 2000 analyzed soil samples of topsoils, rubble subsoils, and parent material have been analyzed for typical contamination patterns.

The concentrations of all contaminants range over several orders of magnitude and follow negatively skewed log-normal distribution functions. For rubble containing subsoils a proportion of 34, 71, 67, 68, 74, and 61% of the analyzed samples exceed precautionary values of the German Soil Conservation Act, regarding Cd, Pb, Cu, Zn, Hg and B[a]P respectively. Similar results were found for topsoils. A minor part of the soils is contaminated with Cd, while Pb and Hg are the most typical contaminants of rubble material. In contrast to topsoils and rubble containing subsoils, the majority of the parent subsoil material is not contaminated. Only low to moderate positive correlations were found between the contaminants.

Compared to parent soil material, rubble containing soils show clearly elevated concentrations of heavy metals and B[a]P. As the most characteristic contaminants for rubble are Pb and Hg, these heavy metals should first be analyzed as proxy contaminants.