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Bodengenetik, Bodensystematik und regionale Bodenkunde

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Titel
Überblick über Spurenelemente in Böden der Aue der Mittleren Elbe

Abstract
Floodplain soils across the Central Elbe River, Germany, have unique features. These soils vary considerably in their properties due to rapid fluvial processes and in metal contents due to frequent industrial discharge into the river. Although there have been works studying such soils, there has never been a comprehensive study that would monitor a large number of entire soil profiles along the Elbe River.
Our aim was to describe the main properties of 94 profiles representing different soils along the Elbe River, their content from 15 potentially toxic elements (PTEs) in various depths, and assess various soil contamination and health risk indices.
We measured soil properties auch as pH, organic carbon (OC), particle size distribution, as well as total concentrations of aluminium (Al), arsenic (As), barium (Ba), chromium (Cr), copper (Cu), iron (Fe), manganese (Mn), lead (Pb), nickel (Ni), rubidium (Rb), strontium (Sr), tin (Sn), vanadium (V), zirconium (Zr), and zinc (Zn) in all soil profiles.
We presented the data for all soil horizons and in top- (0-30 cm depth) and subsoil (>30 cm depth). We found that pH, OC, and clay differed significantly between top- and subsoil horizons reflecting different water regimes and other factors. On the other hand, Al, Fe, and Mn were not affected significantly by depth. Among the studied PTEs, Sn was found to be generating the highest values in Contamination Factor, Geoaccumulation Index, and Enrichment Factor; it was followed by As, Zn, and Pb. Other PTEs such as Ba, Rb, Sr, V, and Zr, and exhibited much lower soil contamination index values. The Pollution Load Index was very high. Health risk assessment indicated rather unexpectedly that Zr was the primary contributor to total risk. We conclude that in multi-element contamination cases, even PTEs with low soil concentrations (such as Zr here) may have predominant role in the risk related to soil contamination.