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## Thema
Kommission II: Bodenchemie

Schicksal, Wechselwirkungen und Wirkung von bodenfremden Stoffen im Boden

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## Titel
The distribution of organic contaminant in aged tar-oil contaminated soils

## Abstract
One of the most common soil contamination sources in Germany are former manufactured gas plants. Many of them were destroyed during the World War II or abandoned in late XXth century. As the result a lot of potentially fertile soils were contaminated with specific viscous tar oil wastes.
We studied a small tar oil waste basin. The age of the contamination was assessed to be at least 30 years. Natural attenuation processes resulted in formation of three soil layers. The upper layer (about 7cm in thickness) was rooted by weak grass vegetation and had features of newly formed humic-like organic matter. The total petroleum hydrocarbon (TPH) content was 28 mg/g. Below this layer (7-15 cm) we observed the most contaminated stratum with 90 mg/g TPH. The layer underneath (15-22 cm) had smaller concentrations of 16 mg/g TPH. Underlying strata had no visual evidence of contamination.
Microbial biomass analyses showed that the most contaminated layer had 2-3 times more bacteria than the control soils. We suppose that during the aging processes a new microbial consortium capable of transforming high-molecular weight hydrocarbons has developed.
Optical and FTIR-microscopy allowed us to observe the microstructure of contaminated soils. The tar oil formed dense spherical aggregates within the soil, which contained almost no mineral phase. Root channels and macropores were identified as preferential pathflows for the viscous tar oil, as they seemed to be coated with hydrocarbons even in less contaminated underlayers. We presume that open pores could initially act as remediation spots with aerobic conditions. Future oil migration might clog these pores, cease oxidation processes and slow down the remediation. High contents of total Fe and both dithionite-extractable and oxalate-extractable Fe as well as the occurrence of large siderite crystals in the most contaminated layer suggested that there might be isolated zones with anaerobic conditions to support this assumption.