



Assessment of ground water and floodplain soil pollution caused by lead mining in the Vils River valley (Upper Palatinate, Germany)

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In the northern Vils River valley near Vilseck and Freihung (Upper Palatinate, East Bavaria, Germany) alluvial soils are contaminated with heavy metals, especially with lead. This was caused by former lead mining, milling and smelting alongside the Vils River during the period from 1427 until the end of the second world war. The US army training area Grafenwöhr north of the study area and outcrops of natural lead ores could further be potential sources of metal enrichments in the floodplain. Therefore, the aim of the study is the localisation and quantification of the heavy metal accumulations in the alluvial sediments of the Vils River. 150 percussion drillings of a fluvial section of 12 km provide the sedimentological composition of the floodplain. Using radiocarbon dating methods, possible primary sources should be located. By characterising the mobility of lead, zinc and arsenic the potential endangerment for ground and surface waters will be assessed according to German soil protection statutes (BBodSchV 1999). High mobilisation rates of the metals cause charges of so far uncontaminated downstream alluvial soils.

For the detection of total heavy metal contents aqua regia dissolutions are carried out with measurement by inductively coupled plasma mass spectrometry (ICP-MS). Heavy metal mobility is determined by elutions with de-ionised water according to DIN 38414-S4.

Furthermore, this study has an applied relation to a planned renaturation procedure of

a Vils River section between Vilseck and Freihung. The results of this study deliver application-oriented basics for the precaution of soil and ground water protection. For forthcoming dredging of a new meandering river-bed, knowledge of the spatial distribution of heavy metals is necessary. High contaminated areas could not only lead to contaminations of surface waters in cases of anthropogenic changes in the fluvial environment, but also if natural processes as river bank detachment or meander break-through occur.