



Heavy metal accumulation in flood detention basins

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Flood detentions basins are important tools within flood protection measures. During flooding sediments that can contain heavy metals are deposited within the flood retention area, which leads to an accumulation of heavy metals. The degree of pollution depends on the background concentrations within the catchment area of the detention basin. Furthermore, flooding of the retention area causes an interruption of the soil's oxygen supply which leads to a decrease in redox potential. This can cause remobilisation of heavy metals which can then be taken up by plants or be leached into the groundwater. Since many detention basins are agriculturally used it is important to know the processes that occur during flooding to avoid soil pollution and uptake of pollutants by plants.

To assess these processes two differently polluted catchment areas in Germany were studied: the catchment area of the river Rems with no known intense pollution sources and the catchment area of the river Erft which is strongly affected by mining activities. The background heavy metal contents of the topsoils of the catchment areas and the heavy metal content of the soils and their distribution with depth in the detention basins were determined and compared. Three heavy metal fractions were observed: total content, EDTA-extractable content and concentration in soil solution. Additionally, heavy metal content of the sediments and the sediment deposition rate had to be identified in order to model heavy metal accumulation and distribution in the soils of the detention basins.

The obtained results are used to predict the fate of heavy metals in the observed detention basins and to give recommendations for reasonable agricultural management.