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Old River Sediments – a Source of Contamination in Flood Events

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The river Weisse Elster (mean annual water flow: 24.9 m^3/s, Saale river basin) draining the thuringian-saxonian industrial region was one of the most badly polluted tributaries of the Elbe. At first there have to be mentioned Cd, Zn, Cr, U, and Hg. Since the beginning of remediation in 1990 the metal content in recent sediments has decreased by as much as 75%

However, in the great sediment depots in dammed river courses considerable amounts of old sediments are covered by younger deposits. Only within the Leipzig flood control system sediments have a mean thickness of between 2 and 3 m; nearly 350 000 t with e.g. Cd-contents up to 150 mg/kg.

Between 2001 and 2003 studies in the lower course of the Weisse Elster had been focusing on remobilisation of the highly polluted old sediments in floods and the risk of danger to a flooding area in the downstream course. About 500 random samples of suspended matter were taken in order to investigate about 25 hydrological events. The data enabled correlations to be determined between the suspended matter load and the water flow at certain river gauges and at several event types. Loads were calculated and there differences between the certain river gauges show the remobilization of old sediments and its sedimentation in flooding areas downstream.

An increase of suspended matter load downstream the sedimentation area at Leipzig up to 150 % is connected with a increase in Cadmium load of 400 %. These documents the remobilization of old sediments. Up to 80 % of the recorded high flood loads are relocated into the flooding area downstream.