

Redistribution of sediment and sediment-associated contaminants in the River Chern basin during the last 50 years

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Abstract A detailed study was undertaken in the upper part of the River Chern basin (126 km²). An integrated approach was used to investigate the redistribution of sediment and sediment-associated contaminants within the upper part of the basin, upstream from the reservoir located in the middle reach of the main valley. It was found that maximum sheet, rill and gully erosion rates were observed during the 1960s. This led to increased erosion rates in all parts of the fluvial system. The intensity of erosion decreased considerably after 1991 for a number of reasons. The commencement of mining activity and the sharp increase in the application of chemical fertilizers caused detectable heavy metal pollution within the basin during the late 1950s and early 1960s, when the Mikhailovsky iron ore mining development started. As a result, concentrations of Zn and As in floodplain sediment increased and exceeded the maximum permissible levels, according to Russian human health standards.

Key words erosion, sedimentation; ¹³⁷Cs; heavy metal pollution; mining; sediment redistribution; Central European Russia