

## **Quantification of the sediment budget of a river basin, based on reconstruction of the post-fallout redistribution of Chernobyl particle-bound <sup>137</sup>Cs**

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### **Abstract**

Quantitative assessment of the sediment budget of a fluvial system is a key approach to understanding its geomorphic behaviour and an essential tool for investigating the redistribution of particle-bound contaminants along the sediment cascade. Here, we present a study involving the application of several independent approaches for quantifying the post-fallout (1986-2009) redistribution of Chernobyl particle-bound <sup>137</sup>Cs and the basin-scale sediment budget for the River Plava basin situated in the northern part of the Srednerusskaya Upland (Central European Russia). The techniques employed include <sup>137</sup>Cs-based sediment tracing, two soil erosion models and the analysis of soil profile morphology. The results show that most of the sediment originating from human-accelerated soil erosion on cultivated slopes is redeposited on the uncultivated lower parts of the slopes or in the bottoms of infilled gullies, hollows and 1 - 3rd order valleys. The River Plava valley itself represents a system dominated by efficient transport, with very limited floodplain sediment storage. The <sup>137</sup>Cs-contaminated sediment export from the River Plava basin outlet exerts a significant impact on the River Upa. Its floodplain sediment contamination by <sup>137</sup>Cs downstream of the River Plava mouth increases by almost an order of magnitude. Copyright © 2012 IAHS Press.

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### **Keywords**

<sup>137</sup>Cs, Central European Russia, Fluvial system, Human-accelerated soil erosion, Sediment budget, Sediment sources and sinks