



Overbank deposition of sediment-associated lead during severe flooding in a suburban area of south Yorkshire, UK

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The upper River Sheaf in the suburbs of Sheffield, south Yorkshire, has a long association with historical lead working for which there is now little surface evidence. Recent investigations around the valley's former water powered lead working sites have indicated high soil lead levels (up to 23,000 mg kg⁻¹). On the 25th June 2007 heavy rainfall (approx. 100 mm in 24 h) led to severe flooding in the Sheaf catchment. The aim of this study was to determine the impact of this flooding on sediment-associated lead dispersal and deposition. Fifty six samples of overbank sediments were collected along the upper River Sheaf after the cessation of flooding. Each sample was passed through a 2 mm sieve and analysed for lead using ICP-MS. Lead concentrations ranged from 17 to 516 mg kg⁻¹ (mean 245 mg kg⁻¹). The highest sediment-associated lead concentrations were found in an area of previous metallurgical activity. However, low lead concentrations were also found in other areas of known lead working. The marked spatial variability in lead concentrations may be explain by differences in sediment grain size and composition, and differences in the coupling of metal contaminated soils and the river channel. Legacy contamination in the upper River Sheaf is clearly impacting the fluvial system, but further work is needed to fully understand the dynamics of metal mobilisation in this residential area.