



Contaminated sediment dynamics in peatland headwaters

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Peatlands are an important store of soil carbon, provide multiple ecosystem services, and when located in close proximity to urban and industrial areas, can also act as sinks of atmospherically deposited heavy metals. The near-surface layer of the blanket peats of the Peak District National Park, UK, is severely contaminated with high concentrations of anthropogenically derived, atmospherically deposited lead (Pb). These peats are severely degraded, and there is increasing concern that erosion is releasing considerable quantities of this legacy pollution into surface waters. Despite substantial research into Pb dynamics in peatlands formal description of the possible mechanisms of contaminated sediment mobilisation is limited. However, there is evidence to suggest that a substantial proportion of contaminated surface sediment may be redistributed elsewhere in the catchment.

This study uses the Pb contamination stored near the peat's surface as a fingerprint to trace contaminated sediment dynamics and storage in three severely degraded headwater catchments. Erosion is exposing high concentrations of Pb on interfluvial surfaces, and substantial amounts of reworked contaminated material are stored on other catchment surfaces (gully walls and floors). We propose a variety of mechanisms as controls of Pb release and storage on the different surfaces, including: (i) wind action on interfluvial surfaces; (ii) the aspect of gully walls, and (iii) gully depth. Vegetation also plays an important role in retaining contaminated sediment on all surfaces.