



Catchment-scale environmental controls of sediment-associated contaminant dispersal

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Globally river sediment associated contaminants, most notably heavy metals, radionuclides, Polychlorinated Biphenyls (PCBs), Organochlorine pesticides (OCs) and phosphorous, constitute one the most significant long-term risks to ecosystems and human health. These can impact both urban and rural areas and, because of their prolonged environmental residence times, are major sources of secondary pollution if contaminated soil and sediment are disturbed by human activity or by natural processes such as water or wind erosion. River catchments are also the primary source of sediment-associated contaminants to the coastal zone, and to the ocean, and an understanding of the factors that control contaminated sediment fluxes and delivery in river systems is essential for effective environmental management and protection. In this paper the catchment-scale controls of sediment-associated contaminant dispersal are reviewed, including climate-related variations in flooding regime, land-use change, channel engineering, restoration and flood defence. Drawing on case studies from metal mining impacted catchments in Bolivia (Río Pilcomayo), Spain (Río Guadamar), Romania (River Tisa) and the UK (River Swale) some improved methodologies for identifying, tracing, modelling and managing contaminated river sediments are proposed that could have more general application in similarly affected river systems worldwide.