Legacy arsenic contamination from historical gold mining on the floodplains of South Eastern Australia river

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Many river catchments in Victoria were intensively mined during the Gold Rush (1850 – 1930), leading to wide-scale deposition of mine tailings and changes in river and floodplain geomorphology [1]. The contaminant distribution in these tailings deposits were examined, with a particular focus on the upper and lower reaches of the Loddon River. The presence of an arsenic-rich 'plume' was identified in the tailing deposits overlying the original (i.e. pre-mining) floodplain surface.

Detected arsenic concentrations were higher than both the low level (20 ppm) and high level (70 ppm) interim sediment quality quidelines (ISQG) for Australian and New Zealand [2], indicating a potential hazard for the aquatic ecosystems.

Microprobe and XAS examination of both source ore body specimens and deposited tailings shows a strong shift from reduced arsenic (arsenopyrite) to arsenate, co-precipitated or adsorbed onto iron oxide phases, likely occuring during mineral processing and river transport.

As these As-contaminated sediments are upstream of major reservoirs and distributed widely across agricultural floodplains, the mobility of As was investigated using a sequential extraction procedure on targeted sediment profiles.

The work will assist in the future management and understanding of the environmental risk presented by these tailings.

[1] Davis *et al*. (2018) *Anthropocene* **21**, 1-15; [2] Simpson *et al*. (2013) *CSIRO*, 132.