

Lead isotopic compositions of ash sourced from Australian bushfires

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Abstract

This study identifies natural and industrial lead remobilized in ash deposits from three bushfires in relatively pristine areas of Australia in 2011 using lead isotopic compositions ($^{208}\text{Pb}/^{207}\text{Pb}$; $^{206}\text{Pb}/^{207}\text{Pb}$). Lead concentrations in the ash ranged from 1 to 36 mg/kg, bracketing the range of lead (4–23 mg/kg) in surface soils (0–2 cm), subsurface (40–50 cm) soils and rocks. The lead isotopic compositions of ash and surface soil samples were compared to subsurface soils and local bedrock samples. The data show that many of the ash and surface soil lead isotopic compositions were a mixture of natural lead and legacy industrial lead depositions (such as leaded petrol combustion). However, some of the ash samples at each of the sites had lead isotopic compositions that did not fit a simple two end-member mixing model, indicating other, unidentified sources.