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Identification of historical lead sources apportionments in estuary sediments from atmospheric aerosols/ NSW/Australia

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Abstract
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X-Ray fluorescence and stable lead (Pb) isotopic analyses have been determined in surface sediments from urbanized areas in south of Sydney, NSW, Australia. The main objective of this investigation was to determine the histologic record of Pb pollution. Surface and subsurface sediment samples were collected in the study areas. The concentration of lead varied from site to site in the study areas depending on several factors, such as number of discharge points (storm water), population, sediment particles (sand, silt and clay), grain size and mineral composition. The isotope composition found in the sediment samples, expressed here as \(\frac{^{206}\text{Pb}}{^{204}\text{Pb}}\), is relatively constant at 18.1 at a depth below 35 cm, whereas, the lead isotope declined with decreasing depth. These results are corresponded with increased lead concentration within surface sediment (Fig. 1).

As indicated by these figures the isotope ratio has increased with time since European settlement.

In addition, the lead isotope ratio of Botany Bay and Port Hacking sediment samples is represented by \(\frac{^{207}\text{Pb}}{^{206}\text{Pb}}\) vs. \(\frac{^{208}\text{Pb}}{^{206}\text{Pb}}\) in (Fig.2). The lead isotope ratio of the surface samples lies with and above some samples roof dust samples Chiaradia et al. (1997), and below Broken Hill, Mt Isa (the old lead deposited in Australia) and gasoline-air (Gulson, 1986). The lead isotope ratio of the subsurface sediment samples (background) of the study areas was below that of other samples, except the Lake Illawarra samples, which had isotope ratio of 2.1 and 0.85 of \(\frac{^{208}\text{Pb}}{^{206}\text{Pb}}\) and \(\frac{^{207}\text{Pb}}{^{206}\text{Pb}}\) respectively.

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References
