

Sources of Pb during the last 9.5kyrs in a long sediment core of the Southern Portuguese shelf

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The temporal variations of Pb concentrations and stable Pb isotopic ratios were reconstructed from a five meters long vibrocore VBC2 collected at 96 mwd offshore of the southern Portuguese shelf. The VBC2 was dated using a combination of ²¹⁰Pb and ¹⁴C determinations. Lead is significantly correlated with Al ($r=0.79$, $p<0.01$) between bottom core (7500BC) and 1850AD suggesting that particle nature rule the Pb distribution in sediments. After this age, Pb concentrations shows a major increase towards the surface while Al content are nearly constant. Isotopic Pb (²⁰⁶Pb/²⁰⁷Pb) ratios are relatively constant between 7500BC and 960BC. The evolution of ²⁰⁶Pb/²⁰⁷Pb ratios towards a less radiogenic values occurred since the beginning of the Iron Age (c.a. 700 BC), which is in agreement with growth of mining activities at the sulfide deposits of the Iberian Pyrite Belt (e.g., São Domingos). The Pb enrichment level relative to Pb pre-industrial values is defined as the Pb enrichment factor (EF_{Pb}), taken the pre-industrial as the average Pb and Al concentrations older than 960BC. The significant coefficient of determination ($r^2=0.88$) between ²⁰⁶Pb/²⁰⁷Pb ratios and EF_{Pb} indicates that the highest EF found in recent sediments are associated with less radiogenic Pb (fig. 1). The EF_{Pb} temporal trend reflect the on-set of Pb inputs mainly associated with intense mining activity that started during the 1850s. Despite the exploitation of the São Domingos mine stopped during the 1960s, the legacy of Pb contamination (mainly resulting from leaching of slags and tailings) is still recorded in marine sediments.

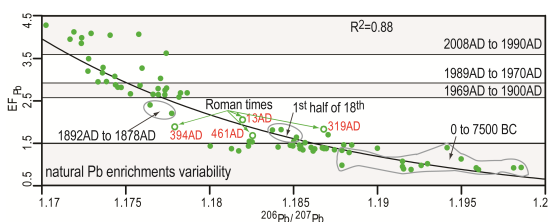


Figure 1: ²⁰⁶Pb/²⁰⁷Pb ratios versus Pb enrichment factors.