Mapping of low density of the lead levels in drainage sediments at Pernambuco State, northeastern Brazil

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The low density geochemical mapping performed by Multipurpose Geochemistry Project, in the Geological Survey of Brazil (CPRM), has shown excellent results in Pernambuco State, both as regards the confirmation of known mineral occurrences, as the prospect of new areas and identifying anthropogenic sources of contamination. The sediment samples were collected in the active channel of the drainage, in 1170 points, representing drainage areas less than 100 km^2. The samples were sieved in situ in a nylon sieve fraction < 32 mesh (0.5 mm) and, in the laboratory, were dried at a temperature of 40 °C and sieved fraction < 80 mesh (0.177 mm). The extraction was done with aqua-regia and determination by ICP-MS. The levels of lead (Pb) in sediments showed a median 10 $mg.kg^{-1}$, the 3rd quartile at 13 $mg.kg^{-1}$ and 14 $mg.kg^{-1}$ average. These values are below the reference crust (14.8 $mg.kg^{-1}$) reported by Holland & Turekian (2003), set in the range of background to river sediments (4 - 17 $mg.kg^{-1}$) of NOAA (2008), and below the threshold at which expected low probability of adverse health effects (35 $mg.kg^{-1}$), adopted by NOAA and by the Brazilian environmental legislation for dredged sediments (CONAMA 344 / 2004). With a predominance of granite origins of affinity (18 $mg.kg^{-1}$) or shale (20-23 $mg.kg^{-1}$), the determination of Pb levels above Level 2 (91 $mg.kg^{-1}$) of the CONAMA resolution 344 (2004), which predicts the likely adverse effect on biota, identifies areas where there is evidence of contamination by lead or lithogenic enrichment. In the state of Pernambuco, stand out three areas that can be considered anomalous, for different reasons. In the town of Serrita in the Sertão region, levels of 117 and 215 $mg.kg^{-1}$ Pb were observed in area where it is known the occurrence of gold in quartz veins associated with other metallic elements and there are also very high levels of arsenic and cadmium. In Zona da Mata, near the city of Belo Jardim, were identified levels up to 2,479 $mg.kg^{-1}$ Pb in areas known for environmental liabilities arising from the industries of automotive batteries. On the Coast, near the town of Nossa Senhora do Ó, the concentration of Pb (559 $mg.kg^{-1}$) were significantly elevated, showing that the activities related to the Industrial Port Complex of Suape could certainly be causing environmental contamination in aquatic ecosystems.

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