

Mercury contamination in sediment cores off the Portuguese Margin

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Down-core Hg, Pb, Al, grain-size, organic carbon and radionuclide (²¹⁰Pb) analyses were carried out in three short multi-cores collected at the Portuguese Margin: PE252-16 (Estremadura Spur - 39.17670N; 10.66612W; 2084 m water depth); PE252-32 (Cascais Canyon - 38.36307N; 9.50690W; 2100 m water depth); PE252-55 (west of Sines Cape - 37.83320N; 9.58317W; 1374 m water depth) during the *Canyons 2006* cruise of RV Pelagia. The 3 cores were characterised by having similar down-core grain-size and organic carbon compositions and also by exhibiting an exponential down core decrease of excess ²¹⁰Pb allowing the establishment of a consistent radionuclide chronology. With the main goal of characterising Hg and Pb enrichments through time in these deep locations, Enrichment Factors (EF) were determined. EFs were calculated based on the ratio between the metal Al-normalised and the metal Al-normalised background values to reduce the grain-size effects [$EF = (Metal/Al)_{sample} / (Metal/Al)_{background}$]. Furthermore, we are also intending to contribute for a better understanding of environmental processes responsible for those enrichments. Despite Hg and Pb are derived from distinct sources they are strongly correlated in the 3 cores ($0.91 < r < 0.98$, $p < 0.05$), which is interpreted as reflecting the importance of mixing and homogenisation processes occurring either before sediments reaching the bottom or after deposition.

The continuous EF trends indicate both Hg and Pb enrichments towards recent times in the three cores, and are interpreted as reflecting the occurrence of anthropogenic contributions. Core PE252-16 presents the lowest level of enrichment in both metals. Mercury has the highest enrichment (EF=6) in core PE252-32, while Pb enrichments are very similar (EF=3) in cores PE252-32 and PE252-55. Despite core PE252-32 is located at the lower sector of the Cascais Canyon with relatively low sedimentation rates (ca. 0.1 cm yr^{-1}) equivalent to that obtained in open slope off Sines Cape (PE252-55), its major Hg enrichment can be explained by its proximity to the Tagus estuary one of the most contaminated in Europe. This estuary represents one of the major anthropogenic sources of Hg in Portugal associated with pyrite roast and chloralkali plants. The similarity of Pb enrichments may reflect the importance of atmospheric contributions in areas dominated by pelagic sedimentation.