

Natural vs. anthropogenic sources of heavy metals and their distribution in marine sediments around Attica region, Greece

A.P. KARAGEORGIS^{1*} AND F. BOTSOU²

¹Hellenic Centre for Marine Research, 46.7 km Athens-Sounio Avenue, 19013 Anavyssos, Greece (*correspondence ak@hcmr.gr)

²Lab. of Environmental Chemistry, Faculty of Chemistry, University of Athens, 157 84, Athens, Greece

Attica region is situated in a big peninsula of central Greece densely populated with more than 5,000,000 inhabitants. It is circumscribed on the north by South Evoikos Gulf (SEG), on the east by Petalion Gulf (PEG) and on the south by Saronikos Gulf (SAG). Anthropogenic activities and industry in particular are most often incriminated for environmental contamination and pollution, but the contribution of naturally occurring heavy metals is frequently underestimated. Here we examine the spatial distribution of selected heavy metals determined in surface sediments of the three gulfs taking also into account the lithology of the gulfs' catchments.

The comparison of total heavy metal contents against SQGs (ERL/ERM and TEL/PEL) shows that Cr and Ni are among the priority elements of potential toxicological concern. High Enrichment Factors (EF) are estimated when average shale is used as reference sediment. On the contrary, when local pre-industrial sediment is used as reference, EF values fall within normal ranges for SEG and PEG, whereas SAG appears to be seriously affected by human activities. Similar conclusions are drawn when the labile fractions of these metals are determined by means of single and sequential extractions. In conclusion, caution is required in sediment contamination assessment exercises and the determination of local background metal levels is strongly suggested, particularly in cases where metal-rich lithological complexes are present in the parent catchment areas.