

# THE PARTITIONING OF MAJOR AND TRACE ELEMENTS IN THE GEOCHEMICAL FRACTIONS OF SEDIMENTS COLLECTED FROM THE IERISSOS GULF AND THE ADJACENT AREAS

F. Sakellariadou

Air Forces Military Academy, Dekelia, Greece  
(Home address: 4 Ipsilantou Str, 16673-Voula, Greece)

The partitioning of 20 elements (Ti, Al, Fe, Mn, Mg, Ca, K, P, Li, Be, V, Cr, Co, Ni, Cu, Zn, Sr, Ba, Pb and La) among the various geochemical fractions of 20 sediment samples collected from the Ierissos gulf and the adjacent onshore area was examined applying, with a few modifications, the sequential extraction analytical procedure of Tessier et al (1979). The geochemical fractions dealt with are: (i) the exchangeable; (ii) the carbonate hosted; (iii) the reducible; (iv) the organic matter-sulphide hosted; and (v) the residual. For the first four fractions the respective leaching reagents are ammonium acetate, sodium acetate/acetic acid, hydroxylamine hydrochloride and hydrogen peroxide. The complete dissolution of the samples was achieved by a HF-HClO<sub>4</sub>-HNO<sub>3</sub> mixture.

It was found that there is some easily hydrolyzed Mg, Ca and Sr components as well as a minor K-contribution from the seasalt in the sediments. Significant enrichments in Cu, Zn and Pb occur in the exchangeable fraction. These are attributed to nearshore sulphide ore sources and man-made pollution (metal processing activities). Calcium and Sr are mainly present as carbonates. A small biogenic contribution of Mn is determined. A carbonate related contribution of Pb and Zn was found. The major part of the non-residual fractions of the metals Fe (72%), Pb (46%), Mn (34%) and Zn (24%) are associated with the reducible fraction that consists of Fe, Mn-oxides scavenging trace metals. Traces of chalcopyrite may occur in the Ierissos gulf sediments. A minimal attack of the major silicate phase by H<sub>2</sub>O<sub>2</sub> was disclosed. The major parts of the elements Ti, Al, Fe, V, K, Cr, Li, Co, La, Ni, Ba, Be, P, Cu, Mg and Zn are hosted in the lattice structure of silicate minerals and clays.

In summary, the elements determined in the Ierissos gulf marine sediments are mainly hosted in the residual and the reducible fractions. Also, the contamination of the Ierissos gulf sediments by mining effluents is suggested.

The results of the partition geochemical analysis are fully compatible with those provided by the statistical treatment (cluster and factor analysis) of the geochemical data of 85 samples from the Ierissos gulf, reported elsewhere by the present author.