



New data concerning the geochemistry of unconsolidated sediments collected from the anoxic zone of the Black Sea

Octavian G. Dulu (1), Carmen Cristache (1), Nelida Florea (1), Gheorghe Oaie (2), Otilia A. Culicov (3), and Marina V. Frontasyeva (3)

(1) University of Bucharest, Department of Atomic and Nuclear Physics, P.O. Box MG-11, 077125 Magurele (Ilfov), Romania (dulu@b.astral.ro, 40214574521), (2) National Institute for Marine Geology and Geoecology, 34 Dimitrie Onciul str. 024504 Bucharest, Romania, (3) Joint Institute of Nuclear Research, 6 Joliot Curie str. 141980 Dubna, Russia

The content of eight major, rock forming elements (Na, Cl, Al, Si, K, Ca, Ti, Fe) and 34 trace elements (B, S, Sc, V, Cr, Mn, Co, Ni, Zn, As, Se, Br, Rb, Sr, Zr, Mo, Sn, Sb, Cs, Ba, La, Ce, Nd, Sm, Eu, Gd, Tb, Dy, Yb, Hf, Ta, W, Th and U) were determined by Prompt Gamma and Epithermal Neutron Activation Analysis in 45 samples of the uppermost 50 cm of undisturbed sediments collected from an anoxic continental zone of the Black Sea at a depth of 600 m, off the City of Constanta. ^{137}Cs geochronology has evidenced a sedimentation ratio of $0,42 \pm 0,12$ mm/y which, by extrapolation to the entire 50 cm column gave an age of 1300 ± 300 y for the oldest sediments.

Principal Component Analysis (PCA), Sc-La-Th and Co-Hf-Th ternary diagrams as well as La/Th ratio were used to interpret these data in correlation with the corresponding ones for the Upper Continental Crust (UCC), North American Shale Composite (NASC), as well as Atlantic, Pacific and Indian MORBs. At the same time the Se/Al, Se/Sc, Se/Mn, Mo/Al, Mo/Sc and Mo/Mn, ratios were used as indicators for anoxic conditions along sedimentary core.

Major components distribution showed, that excepting CaO, their contents are very close to UCC and NASC, while the Principal Component Analysis evidenced three clusters consisting of Na, K and Cl, Al, Ti and Fe and respectively Ca, in concordance with the sediments' mineralogical composition.

The Trace Elements Distribution was also close to UCC except for redox sensitive metals Se and Mo whose contents were 10 to 100 times higher than the corresponding UCC ones, this fact reflecting the anoxic conditions along the entire column of sediments. Moreover, by using Se and Mo as proxies for an anoxic environment, we estimated a relative consistency of the local conditions for a period between 350 ± 60 and 1300 ± 300 BP followed by a more fluctuant one during the last 300 years, this peculiarity also being confirmed by PCA, as well as by the vertical distribution of La/Th ratio.

A chondrite normalized plot of nine Rare Earth Elements (La, Ne, Nd, Sm, Eu, Gd, Tb, Dy and Yb) showed the presence of a weak Ce positive anomaly, explained by the existing anoxic environment as well as a significant Eu negative anomaly, confirming the continental origin of the sedimentary material.