Anthropogenic trace elements in bottom sediments from the Middle and South Adriatic Sea

[a]Ilijanić N, [a]Miko S, [b]Petrinec B, [b]Franić Z

Geochemical analysis and trace element distribution were determined in short marine sediments cores from the Middle (Jabuka and Palagruža pits, depth 230m and 170m respectively) and South Adriatic Sea (depth 1030m). This study was used to provide an insight to possible anthropogenic influence of the area. Shallow cores (length 400 mm, sample interval 20mm) were investigated in terms of their physical properties, mineralogical, magnetic and geochemical characteristics in the recent sediments. The distribution of As, Co, Cs, Cr, Ni, Zn, Hg, Cd, Tl and Pb and major elements such as Al, Fe and Mn in the sediments and their mineralogy is presented. The cores were dated using ^{137}Cs originating from atmospheric nuclear weapon tests and the Chernobyl accident. Both peaks were visible only in sediments collected on the South Adriatic Pit and it was possible to estimate a sedimentation rate of 1,8±0,5mm.y^{-1}. On other locations ^{137}Cs peaks were merged, allowing an estimate of the maximum sedimentation rate, which varied between 1.8mm.y^{-1} in Palagruža pit and 3.1mm.y^{-1} in Jabuka pit. The calculated sedimentation rates are consistent with published results for other locations in the Mediterranean Sea. Sediment cores provided evidence for the accumulation of metals in the deep sea environments of the Adriatic. Calculated enrichment factors (using Al as a conservative element) for Pb, Cd Tl and Hg are highest in the top 2cm and no enrichment was found in sediment intervals bellow 6 cm. Mercury shows the highest degree of enrichment in most 0-2cm sediment intervals (highest in the Jabuka pit, EF=2.95), followed by Tl (EF=2.5 in the South Adriatic Pit) and the least enrichment is shown by Pb and Cd (EF<2). Distributions of other heavy metals show no enrichment trends and therefore cannot be attributed to human activities. Geochemical signatures were correlated to mineralogical composition of the sediments and clay mineral distribution. Sediments are highly heterogeneous and consist of carbonate and siliciclastic components, mainly of detrital origin. Clay minerals are presented by smectite and less amounts of micas, chlorite and kaolinite. Clay minerals have an important role in aquatic systems, as both a carrier and source of pollutants.

[a] *Croatian Geological Survey, Sachsova 2, Zagreb 10000, Croatia (nikolina.ilijanic@hgi-cgs.hr)*
[b] *Institute for Medical Research and Occupational Health, Radiation Protection Unit, Ksaverska cesta 2, Zagreb 10000, Croatia*