GEOCHEMISTRY OF SHELF SEDIMENTS FROM THE GULF OF ANTALYA, TURKEY, EASTERN MEDITERRANEAN SEA

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Abstract

Investigation of Holocene sediment cores from the Gulf of Antalya, southern Turkey revealed that low carbonate siliciclastic mud derived from the coastal hinterland is the dominant sediment type deposited in this region. Terrigenous components in sediments were represented not only by higher organic carbon contents but also higher Cr, Ni and Mg concentrations. Anthropogenic influences can be recognized by slightly higher Pb and Zn contents in uppermost core sections.

Keywords : Continental Shelf, Eastern Mediterranean, Sedimentation, Geochemistry.

To study the geochemical characteristics of shelf sediments in the Gulf of Antalya, in 1999, 7 gravity cores were collected (with 20 to 149 cm sediment recovery) onboard R/V Bilim of METU at water depths of between 18 and 101 meters. Selected sediment samples were then subjected to grain size. carbonate, organic carbon and multielement analysis. Available seismic profiles [1] suggest that the sediment cores studied here must have been deposited during the Flandrian transgression, following the lowstand of sea level since 18.000 yrs B.P.

Sediments covering the shelf seafloor in the gulf are mainly composed of siliciclastic silt and clay, the mud with percentages of between 2 and 99. Sand and gravel is contained 1 to 98 %. Although most of these clastic material is derived from the weathering of geological source rocks [2] on coastal hinterland, coarser-grained constituents are indicative of relatively higher energy and benthogenic conditions in inner- to mid-shelf areas. The carbonate contents with values from 20 to 80 % can be explained by the presence of both fine-grained terrigenous and carbonate mud and planktonic-benthic organism remains. Therefore variation in both grain size and carbonate distribution down the cores reflect changes in depositional environmental and terrestrial conditions with space and time.

The organic carbon contents fall in the range of 0.16 to 3.29 % and usually do not exceed 2 %. These values can not solely be related to higher organic productivy in the shallow-water areas, they rather indicate land-based sources. Of course, the finer-grained the sediments the higher contents the organic carbon.

The concentrations of Al, K, Na, P, Ti, Fe, Mn, Li and some other lithophile elements measured in sediments are largely comparable with those of average crustal rocks [3]. However, the slightly higher concentrations of Cr (10-114 ppm), Ni (3-144 ppm) and Mg (1.1-2.5 %) are indicative of a particular geological source, the land-based ophiolites of the gulf [2]. The ophiolites and associated mineral deposits are known for their higher Cr, Ni and Mg contents [4]. The levels of Pb and Zn concentrations in the sediments varied between 7 and 100 ppm and 12 and 69 ppm, respectively. Nevertheless, the highest contents of these two elements particularly in the topmost core sections could be explained by other than the geological sources (i.e., anthropogenic).

References

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