SURFACE BOTTOM SEDIMENTS OF THE MEDITERRANEAN AND BLACK SEAS (LARGE SCALE MAPS)

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Abstract

The international colour maps "Unconsolidated bottom sediments of the Mediterranean and Black seas" (scale 1 : 1 000 000; Black Sea – scale 1 : 2 000 000), total 10 sheets, were issued under leadership of the IOC UNESCO in the HLNO of RF [1]. Popov A.V. is a chief editor of the maps. Representatives of Spain, France, Italy, Greece, Turkey, Israel, United Kingdom, Germany and other countries are coauthors of separate sheets of the maps. Separate sheets of the Mediterranean map were compiled with assistance of scientists: A. Monaco, P.F. Burolett and G.M Bellaiche (France), S. Varnavas and C. Papavasillon (Greece), A. Brambatti (Italy), A. Maldonado (Spain), Y. Nir (Israel). They presented important data for the map. The small version of this map in the scale 1 : 5 000 000 (1 colour scheet) was reissued in 1998 in Israel with assistance of John Hall.

Keywords: Mediterranean, Black Seas, sediment map.

Material

Genetic and granulometric types of sediments were presented according to the new legend which was worked out during some international workshops. Folk's triangle was used for classification of sediments according to grain size composition for both basins (Mediterranean and Black Seas), for deep-sea and shallow water areas as well [2]. New legend eliminates diversity in deposits classification, existing up to date in numerous publications and published schemes and maps. By different shade of blue colour there were sjhwn areas with <10, 10-30, 50-70, 70-90 and >90% $CaCO_3$. More detail and more exact picture of spatial distribution of different types of recent sediments, more better knowledge on recent sedimentation have got both in the Mediterranean and Black Seas.

Composition of lithologically homogeneous upper-most layer 5-10 cm of thickness is reflected on the Black Sea sediment map. According to biostratigraphic data and absolute datings by 14C, its age is approximately up to 1-2 k.y.

Mostly Upper Holocene sediments (3-5 k.y.) were mapped in the Mediterranean Sea. An age of the studied layer was established by radiocarbon datings, biostratigraphically and using well dated lithological layer (sapropel S-1, pteropod ooze) in some hundreds of sediment cores.

Material-genetic and granulometric composition of recent sediments are unsteady in the main sedimentary basins of the Mediterranean Sea. Heterogenity of its tectonic and morphologic structure, as well as climatic situation and water regime are the main reasons of it. More humid watershed of Algerian-Provence Basin predetermine originating of terrigenous low carbonate muds here. Carbonate foram-nano oozes widespread in the Eastern Mediterranean Sea, primary, in its southern part, bordering with drainless Africa coast where rates of sedimentation are lowermost. Saturation of sea waters with calcite is the highest one in the Eastern Mediterranean. This stimulates participation of chemogenic carbonates and originating of large amounts of high magnesian calcite in sediments. They predominate here in comparison with common calcite. In the Western Mediterranean common calcite consist almost all carbonate material.

Intensive fracturing of sea floor lead to hydrothermal activity and originating of metal-bearing sediments on some volcanic seamounts of the Tyrrhenian Sea. As a result of neotectonic fracturing small anoxic hollows with salt brines are appeared in the Eastern Mediterranean on the Eastern Mediterranean Ridge (Bannock and Tyro anoxic basins). Besides tsunami induced homogenites are accumulating on abyssal plains of number small basins here. Relatively enrichment of terrigenous muds and clays by number metals (Fe, Mn, Ti, Cu, Zn, Pb, Cr, Ni) in the vast Pre-Nile area and around the Cyprus island is related to accumulation od the Nile sediments and riverine matter from Troodos, accordingly. Recent sediments of Mediterranean Sea are lacked of diatomic oozes and sapropelitic muds. Diatomic oozes cannot be originated because of dissolution of silicic sceletons of diatoms and silicoflagellates, already in-upper strata of water. Low biological productivity and intensive destruction of organic matter by oxygen prevents its intensive fossilization in the bottom sediments.

Black Sea recent deep and shallow water sediments highly differ from that of Mediterranean Sea. More humidity of climate, much more high ratio of catchment and surface water areas favour for high rates of terrigenous sedimentation and widespread of terrigenous muds on shelf areas and along Turkish and Caucasian continental rises modern sediment fans are originating.

Anoxic conditions and specific system of surface water circulation favour to sapropelitic nano oozes originating in some central and peripheral areas of the basin. They are enriched in U, Mo, W, Se and others. The areas underly centres of cyclonic gyres where rates of accumulation of terrigenous material are low but biological productivity is high, because of upwelling of deep waters, enriched in nutrients, into photic zone. For the Black Sea is characteristic originating of Fe-Mn nodules of specific composition on some areas of lower shelf. The elements for their formation are coming from land sources and anoxic zone, as well.

References

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2 - Emelyanov E.M., Shimkus K.M., Kuprin P.N., 1996. Unconsolidated bottom sediments of the Mediterranean and Black Seas. – In: Intergovernmental Oceanographic Commission (UNESCO). IBCM Geol. – Geoph. Series. Scale 1: 1 000 000, 10 sheets, St.-Petersburg, Russia.

Separate issue "Explanatory Notes" in English is in press (2001 y.). Maps are available in E .Emelyanov's office.

Acknowledgments

Authors would like to express their gratitude to all scientists who helped to compile the maps and IOC UNESCO and P.P. Shirshov Institute of Oceanology RAS for the financial support.