Paleosalinity of the Black Sea (Yelta Region)

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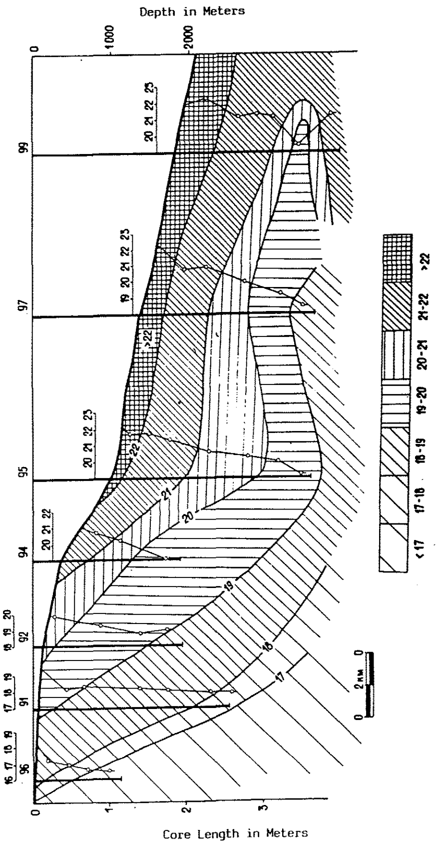
The aim of this study was to construct a distribution map for paleosalinities in Yelta region to highlight the environmental conditions and geological evolution of the Black Sea during the Late Quaternary time. Seven successive core samples were collected along a profile extending for about 40 Km offshore. According to a previous stratigraphic study (Nasr,1983), the age of core sediments No.96, 91 and 92 is Holocene (New Black Sea + Old Black Sea), while cores No. 94, 95, 97 and 99 is Holocene + Upper Pleistocene (New Euxinian). Values of paleosalinities of interstitial water varied from 16.38 to 22.69 %. in the investigated sediments. In nearshore area, the values of paleosalinities of interstitial water were less than salinities of the overlying sea water, while in deep sea , it was the contrary. Contouring for vertical distribution of interstitial paleosalinities in Yelta region (Fig.1) reflected two important facts:(1)Gradual increase in the offshore direction,and(2)Gradual decrease in the downward direction . The gradual increase of paleosalinities in offshore direction reached a maximum value (22.69 %.) at the top of core No.99 in the deepest part of the



(Fig.1) Distribution of Paleosalinities in Yelta Region, Black Sea. (g/Kg)

investigated area (1820m)., while a minimum value (16.38 %.) was recorded at the lower part of core No. 96 in nearshore area (36m depth). The values of paleosalinities observed in nearshore area could be attributed to inland fresh water dicharege into the Black Sea. This is in agreement with Manheim and Chan (1974), who suggested the presence of subsea discharge of relatively fresh water in the Black Sea basin, espcially from west of Crimea. Gradual decrease of paleosalinities in downward direction in sediment succession i.e. from Holocene to Upper Pleistocene (New Euxinian) is due to environmental conditions and geological evolution prevailed during this time. In glacial stage of New Euxinian time, the sea level was lower than present, and the Black Sea had less salinity. It virtually became brakish water- or even fresh water lake when the sea level stayed low long enough (Emery and Hunt,1974). Irregular disribution of paloesalinity is evident in the tongue shaped pattern in the lower part of core No. 99 . This could be attributed to the reaccumulation of deposits from the continental margin to the deep sea sites.

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Danube Delta, Genesis, Evolution and Sedimentology

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The Danube Delta can be divided into three major depositional systems (fig.1,2): the delta plain with a total area of about 5,800 sqKm, from which the marine delta plain area is of 1,800 sqKm; the delta front with an area of ca.1,300 sqKm, divided into delta-front platform (800 sq Km) and delta-front slope (ca.500 sqKm) extending off-shore to a water depth of 30-40 m; the prodelta lies off-shore, at the base of the delta-front slope till 50-60 m depth, covering an area of more than 5,500 sqKm. The delta front and especially the prodelta display a pattern of sub-marine channels, 4-10 m deep, bordered by lateral levees; these channels seem to constitute discharge ways of turbid flow yield by the river distributaries at high flood. Beyond the prodelta seaward there is the continental shelf with a thin, non-consolidated, actual sediment cover (fig.2). Here we can identify the pattern of the channels followed by the Danube during the low sea level periods towards the shelf edge, more precisely to the canyon Viteaz (fig.1). It is also to notice the existence of some deformational processes of nonconsolidated sediments, such as: rotational slides, affecting the superficial layer of 10-30 m thick, mass- or mud-flows, collapse depressions etc.

The delta development is controled by: the river sediment input (the Danube average sediment discharge is ca.50.106 t/y out of which 5-8.106 t/y sandy material); the prevailance of winds from the northern sector (40-50 % of instances); the predominance of southward trending of marine currents; the long-shore sediment drift directed also towards the South; the relatively important values of wave power etc. The interaction of these factors is controlling the delta morphological type, the geometry of the volumes of deltaic deposits, the assimetry of the deltas of Danube's distributaries and their development and evolution. In the end to characterize the delta sediment distribution and the magnitude of fluvial and marine processes controlling the delta shape and development there were used the indices of protrusion (Ipr),of crenulation (Icr) and of sediment distribution or skewness (Sk) proposed by Coleman and Wright (1971).

The Danube Delta overlaps the predobrogean Depression which, in its turn, lies mainly on the Scythian Platform. The sequence of the Scythian Platform cover deposits which constitute the filling material of the Predobrogen Depression display six sdimentation cycles (Paleozoic, Lower Triassic, Middle-Upper Triassic, Jurassic, Lower Cretaceous and Sarmatian-Pliocene)(Patrut et al., 1983). The Danube Delta is situated in a area of high mobility of the Earth crust, repeatedly affected by strong subsidences and important sediment accumulations. The deltaic conditions were settled here during the Quaternary, when the Danube started flowing into the Black Sea basin.

The Danube Delta edifice is build up of a sequence of detrital deposits of tens to 300-400 meters thick formed mainly during the Upper Pleistocene (Karangatian, Surojskian, Neoeuxinian) and the Holocene. The Holocene evolution of the Danube Delta include the following main phases: (1) the formation of the Letea-Caraorman initial spit, 11,700-7,500 years BP; (2) the Sf. Gheorghe I Delta, 9,000-7,200 years BP; (3) the Sulina Delta, 7,200-2,000 years BP; (4) the Sf.Gheorghe II and Chilia Deltas, 2,000 years BP- present; (5) the Cosna-Sinoie Delta, 3,500-1,500 years BP.

The Danube delta plain displays a few main facies types of sediments, as follows (fig.4):(I) marine littoral deposits of two types: type"a", formed by the longshore drift from the North (from the mouths of rivers Southern Bug, Dniester and Dnieper) and type"b", of Danubian origin; (II) lacustrian littoral deposits, forming the Stipoc and Rosca-Suez lacustrian spits; (III) fluvial deposits, genetically related to the Danube distributaries system, include several types: bed-load and mouth-bar deposits, subaqueous and subaerial natural levees deposits, crevasse and crevasse-splay deposits, point bar and meander belts deposits, decantation deposits into intradeltaic depressions and interdistributary area etc.; (IV) marsh deposits;(V) loess-like deposits.

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