Danube Delta - Genesis and Evolution

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The Danube Delta can be divided into three major depositional systems: (1) ***the delta plain***, with a total area of about 5,800 sq Km, from which the **marine delta plain** area is of 1,800 sq Km; (2) ***the delta front*** with an area of cca. 1,3000 sq Km, devided into delta front platform (800 sq Km) and **delta front slope** (ca.500 sq Km), extending off-shore to a water depth of 30-40 m; (3) ***the prodelta*** lies off-shore, covering an area of more than 5,500 sq Km. The delta front and especially the prodelta display a pattern of submarine channels, 4-10 m deep, bordered by lateral levees; these channels seem to constitute discharge ways of turbide flow yield by the river distributaries at high flood.

The delta development is controled by the river sediment input (the average sediment discharge is ca. 50 milions t/y, out of which 5-8 milions 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 longshore 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.

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 Predobrogean Depression display six sedimentation cycles (Paleozoic, Lower Triassic, Middle-Upper Triassic, Jurassic, Lower Cretaceous ans Sarmatian-Pliocene) (PATRUT *et al.*, 1983). The Danube Delta is situated in a aera of high mobility of the Earth crust, repeatedly affected by strong susidences 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 m thick, formed mainly during the upper Pleistocene (Karangatian, Surojskian, Neoeuxinian) and the Holocene. The Holocene evolution of the Danube Delta includes the following main phases : (1) the formation of the Letea-Caraorman Initial Spit, 11, 700-7,500 y.BP; (2) the Sf. Gheorghe I Delta, 9,000-7,200 y.BP; (3) the Sulina Delta, 7,200-2,000 y.BP; (4) the Sf. Gheorghe II Delta and the Chilia Delta, 2,000 y.BP - present; (5) the Cosna-Sinoie Delta, 3,500-1,500 y.BP.

The Danube Delta Plain displays a few facies types of sediments, as follows : (I) marine littoral deposits of two types - type "a", formed by the longshore drift from the North (from the mouths zones of Rivers Dniester, Southern Bug and Dnieper), and type "b", of Danube origin; (II) lacustrian littoral deposits, forming the Stipoc and Rosca-Suez lacustrian spits; (III) fluvial deposits, genetically related to the Danube distributaries, include several types as : 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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The ecological condition in the N-W part of the Black Sea

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The paper presents the main conclusions of a joint Romanian-Russian geo-ecological survey in the North-Western part of the Black Sea bassin.

The rivers debouching into the NW part of the Black Sea, especially the Danube, are the main pollutant agents in this region of the sea. The river water and sediment discharge is bringing into the sea an abnormaly high amount of microelements and nutrients as a result of drainage of a very large (ca. 817,000 sqKm) and intensively polluted continental area.

The river supply of nutrients is among the main factors contributing to the very strong eutrophication of the sea. The seasonal hypoxia is almost permanently extending on the entire Northern continental shelf of the Black Sea northward the Portita parallel (44 35'N), while anoxia and H2S contamination of the bottom water and sediments are installing in some depressions of this zone (Paleo-Dniestreean Depression, Odessa Depression a.o.), at 25-30 m water depth, where the macrozoobenthos is almost inexistent. Only southward of Portita, on the Southern Romanian continental shelf, the bottom sea water and sediments have a close on normal Oxigen content, and consequently, in this area the macrozoobenthos is almost normaly developed.

In some zones of the continental shelf there became evident an abnormal content of certain microelements as a result of various technogene pollution ; for example, in the Lebada zone Ba, Cu, Zn, Ni from drilling activities, in the Navodari-Constantza nearshore zone - phosphates, V, Cr, resulting from industrial, petrochemical and agrotechnical works, on the Budak Plateau and Odessa Depression - Cr, V, Pb from multiple industrial activities a.s.o.

The entire North-Western continental shelf of the Black Sea is characterised by very high contents of Hg, reflecting a very strong technogene pollution.

The above mentionned results represent a valuable comparison data base for the following phases of a multiannual (1992-2000) and interdisciplinary survey and geo-ecological monitoring of the studied region, which will be carried out within the framework of the "Cooperative Marine Science Programme for the Black Sea" (COMSBLACK).

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