

Study of Carbonate Contents in the Shelf Sediments off the Nile Delta

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The carbonate content of the Nile sediments between El-Agami and El-Arish were studied (Figure 1.). The method described by Presley (1975) was used for determination of total carbonate content. Mineralogical analysis were performed using XRD.

Obviously, the carbonate content of the sediments between Rosetta and El-Arish are comparable to the previous results in the same area, and to the other data in similar areas. East of Rosetta, the carbonate content varies between 0.823 % and 8.85 % with an average of 2.48 %. On the other hand, the carbonate content of the sediments in the area west of Rosetta increases gradually west-ward with an average of 55.32 %.

Carbonate minerals occurred in the area west of Rosetta (off El-Agami and Abu-Qir). The Most dominant mineral was aragonite, followed by calcite, Mg-calcite and quartz . On the other hand quartz , feldspar and mica are, in order, the most dominant minerals in the area between Rosetta and El-Arish . Carbonate minerals in the area west of Rosetta are possibly derived by erosion from coastal formations. The formation of aragonite may be engendered by strontium, in addition to the possibility of inorganic precipitation through biological processes. This is in accordance with the results and conclusions obtained by Emelyanov (1972) ; El-Sayed (1974,1981,1985) ; El-Wakeel and El-Sayed (1978) ; Stoffers et al. (1980);.

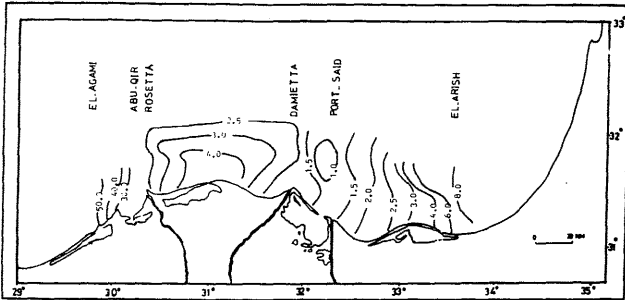


Figure 1. Areal distribution of total carbonate in the surficial sediments of the study area (%).

Conspicuously, on the basis of carbonate content and mineralogical data, the study area can be divided into two zones; El-Agami/Abu Qir zone and Rosetta/El-Arish zone. The former zone is characterized by high content of carbonate reaching about 84 % in the inner shelf area off El-Agami. The area between Rosetta and El-Arish is mainly covered with Nile sediments and is characterized by low carbonate content. The increasing of carbonates east of Port Said is due to the gradually increase by deposition from the water; in addition the area off Sinai is subjected to some supplementary contribution from sea cliffs and the seasonal streams of Sinai.

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Geological and Physical Aspects of the Nile Delta with reference to the natural and man-made hazards

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The Nile delta belongs to a group of deltaic coastlines that are largely shaped by waves. It represents one of the world's largest deltas with most conspicuous physiographic features (Fig.1).

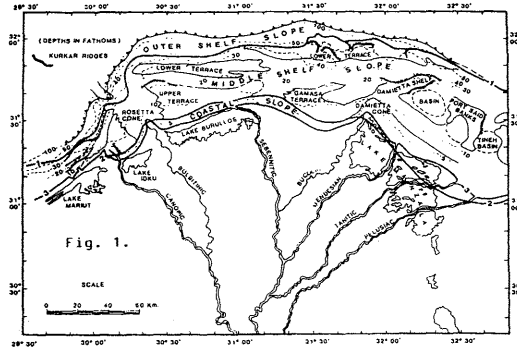


Fig. 1.

The geological history of the delta started in the Late Miocene; the contemporary delta is however much modern (Late Pliocene). Tectonics and sediment input influenced the formation and development of this area. The Nile cone was resulted from the accumulation of turbidites offshore.

The lower Nile delta host several axes of socio-economic development. However, this area has long experienced continuous erosional problems, and presently is regarded as most vulnerable to the expected rise of sea level. The erosion problem of the fragile coastal deltaic stretch is partly due to the cut off of about 100 million tons of sediments used to brought in the area prior to the construction of the Aswan High Dam, and largely due to continuous nature induced subsidence (Fig.2).

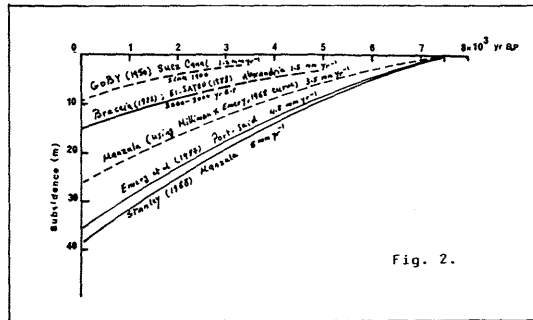


Fig. 2.

A conceptual model is provided to illustrate the variables forces and their different interaction on the coastal Nile area (Fig. 3).

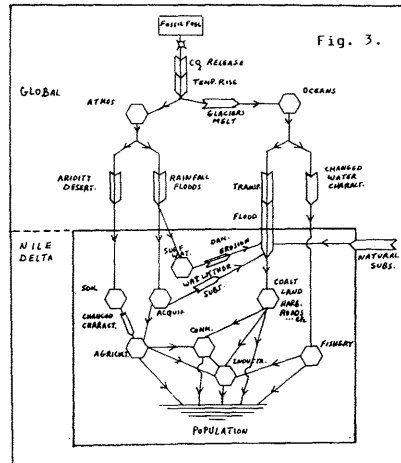


Fig. 3.

This paper presents a synthesis of geological, geomorphological, geophysical and hydrodynamic aspects of the Nile delta and aimed to discuss the natural and man-made hazards regarding the erosion and subsidence of this area.