Non-living Marine Resources in the Egyptian Mediterranean Offshore

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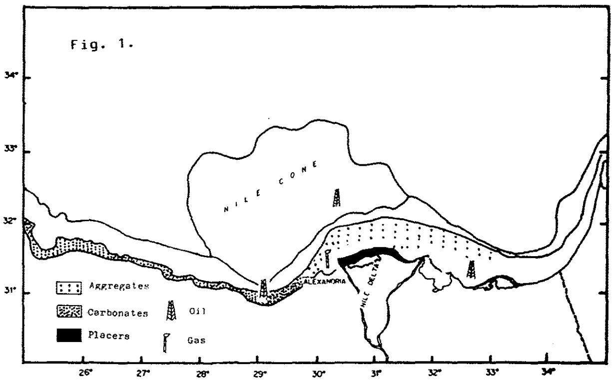
Ocean mining is considered to be a new frontier for mineral development; yet it is a long established industry in many countries. The IOC-UN(OALOS)/OSNLR have stressed on the importance to develop the techniques for the exploration and exploitation of the non-living marine resources. There are serious efforts to develop an ocean science in relation to the non-living marine resources in the Mediterranean.



The Egyptian Mediterranean offshore is considerably large (Fig.1); however, its non-living resources are not yet seriously evaluated. This area could be a source for several non-fuel and fuel marine resources.

Most of the non-fuel potentially valuable resources in this region are not presently exploited for several technical and marketing demand reasons. Aggregates and carbonates are widely distributed in the offshore region, surface exposed placers, on the other hand, have been intensively mined and hence exhausted. Large estimated amounts (reserves) of subsurface (Pleistocene?) placers in the coastal zone along the Nile delta contain zircon, tourmaline, ilmenite and rutile in appreciable quantities.

Marine oil and gas fields are explored in the Nile cone and to the west of Alexandria; gas is intensively exploited from marine gas field east of Alexandria.

The offshore oil discoveries in the eastern Nile cone in Oligocene and early Miocene indicate the need for deeper explorations.

Special attention was paid to the coastal zone as a resource (CZAR), as this area is highly attractive for socio-economic development. It comprises major cities, industrialization, harbours and several summer resorts and recreational centres. However, this area experiences continuous erosion and is vulnerable to the expected rise of sea level.

This paper is a contribution in assessing the non-living marine resources along the Egyptian Mediterranean offshore, with respect to their origin and factors that influenced their development and to review past and present mining activities. However, a more detailed resource inventory is required to provide a more certain assessment.

Facies Analysis of the Nile Delta Continental Shelf Sediments, Egypt

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This study serves to define more precisely the major sedimentary facies groups of the Nile delta shelf, and to relate their distribution patterns to environment of deposition. This was achieved by evaluating quantitatively the grain size distribution and mineralogical components of the coarse fraction in 108 bottom samples (Fig.1). Q-mode factor analysis of Klovan and Imbrie (1971) was employed on 19 variables, 7 textural (>-1, 0-1, 1-2, 2-3, 3-4, 4-8 and 8-10), plus 12 compositional (light minerals, heavy minerals, mica, "glauconite", plant matter, foraminifera, shell fragments, ostracods, echinoids, corals, bryozoans and carbonate oolites). Factor analysis of these variables related to sediment size and composition, reveals four dominant associations of lithofacies groups or factors. These facies statistically "explain" (or encompass) 83.6% of the total textural and compositional variation (variance).

1) The most significant contribution is facies I, formed of fine and very fine sands and contains light and heavy minerals and "glauconite". It covers most of the inner shelf area and progressively decrease seaward across the shelf and interpreted as delta front environment. The delta front facies appears to have been formed when there were several former Nile branches and the delta probably had an arcuate shape.

2) The next most important sediment group is facies II. It consists of silty sand enriched in biogenic components (foraminifera, shell fragments, echinoids, corals, bryozoans and ostracods). It occupies the entire outer shelf and its contiguous lower terraces. They are mostly relict (iron stained), probably resulted from sediment dynamics during lowering sea level of the Pleistocene.

3) Facies III is formed of fine-grained sediments of prodelta mud associated with mica, "glauconite", covering the middle shelf zone and the upper terraces. The gradient of concentration of this facies on the central delta off the Burullus headland may reflect an added sources related to the former branches of the Nile.

4) Facies IV is mainly represented by fine to coarse-grained sands and light minerals. Biogenic components are mainly absent. They are locally scattered on the inner shelf area along the coast of Idku, Burullus, Damietta promontory and El Gamil. These facies is equivalent to the upper Holocene prograding sands reported by El Askary and Frihy (1986) and Coutellier and Stanley (1987) from sediment cores at the Nile delta coastal zone. They interpreted these sands as coastal accretionary sand ridges of nearshore bars, accumulated during progradational phases of the delta when the Nile delta margin migrated northward. The geographic distribution of facies IV shows a correspondance with the position of the former Canopic, Sebennitic and Mendesian branches.

The configuration patterns of facies assemblages of grain size distribution, faunal and floral components on the shelf are related to former major distributary branches of the Nile as well as the pre-modern Rosetta and Damietta branches. The facies patterns are also a response to Holocene sediment transport processes, combined with sediment dynamics during lowering of sea level in Pleistocene.

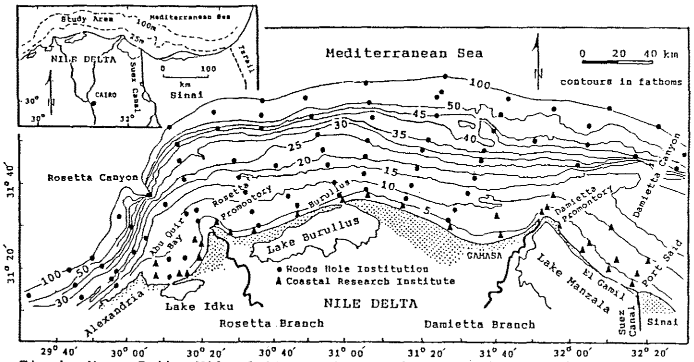

Fig.1 Map of the Nile delta continental shelf showing the locations of bottom samples examined.

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