Sci. J. Fac. Sci. Menoufia Univ, VoL.VI (1992)125-142.

SOME ASPECTS OF SEDIMENTATION IN THE GULF SUEZ,

Mamdouh Abdel-Maksoud Mohamed

Geology Department, Faculty of Scine, Menoufia University

ABSTRACT

The present study has been undertaken to disclose the nature and the factors controlling the carbonate as a tool for interpretation.

The bottom of the Gulf of Seuz is covered mainly by sand grains of biogenic orgigin. Finer calstic material (mainly silt) was brought into the Gulf by Wadi systems. The sediments of the Gulf are characterized by low organic carbon content (0.49%) as compared with the calculated world average for nearshore sediments (2.5). The areas of relatively high organic ar ganic carbon are situated near the places where the Wadi mouths are drained. and, are not considered as the sites of carbonate accumulations.

Thr Gulf of Suez sediments are characterized by high carbonate content (75.32%). The evaporation rates in all parts of the Gulf are high, including rapid precipitation of carbonate, especially in shallow coastal water arter areas, where much terrigenous sediments mainly eolian, reaches the Gulf.

The carbonate bottom sediments are made up of originally eolian sand, fragmental skeletal debris and partly to almost wholly fine nonskeletal grains. The hydrological regime in the Gulf exerts a considerable control over carbonate precipitation but biological interference is more important and certain aspects of this dual control may be considered .

The mineral components of carbonate, are aragonite, calcite, Mg-calcite in addition to an appreciable amount of dolomite. The carbonate sediments might have been formed as a result of an interplay of an interplay of organic and inorganic processes in high energy environment.

The factors affecting the distrbution of Recent marine sediments of the Gulf of Suez are the biological community, Wadi systems, salinity, sea water chemistry and marine grasses in addition to the geology of the coastal plains, discharging their load into the Gulf.

There fore the of the sediments, the rate of deposition and biochemical interference may exert a considerable control over the sediment disitribution and the areas with high amount of terrigenous deposits are not the site of caronate accumuation.

Therefere the texture of the sediments, the rote of deposition and biochemocal interference may exert a considerable control over the sediment distribution and the areas with high amount of of terrigenous deposits are not the site of carbonate accumulation.

INTRODUCTION

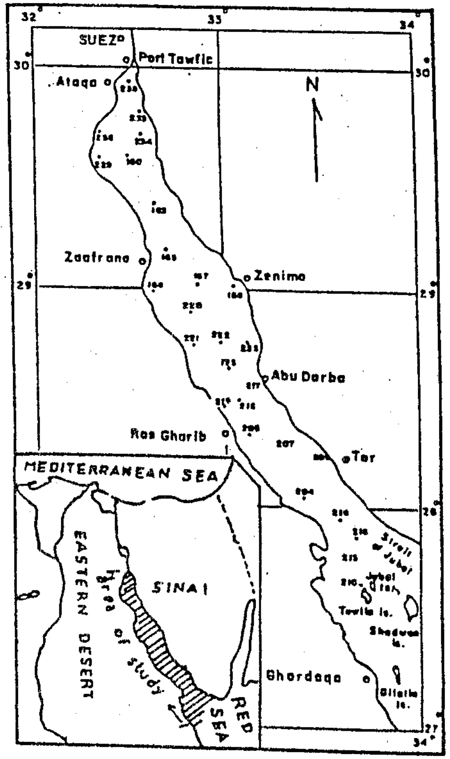
Gulf of Suez is a nearly closed arm of the Red Sea. It extends for about 300 km amd is of about 50 lm at its widest point. It connects with Mediterranean sea through the Suez Cuez Canal and with Red Sea through the straight of Jubal. The Gulf of Suez is an arid baid basid with minor amount of fresh water influx it form the surrounding Wadi systems. However, Bitter Lakes affected its northern part by changing its saliniyh .

The Gulf of Suez constitutes a linear zone of subsidence. it represents a taphrogeosyncline (said, 1969). Heybroek (1965) stated sediments of about 5 km thick overlie the Precambrian basement, 2 km of which are of Tertiary age. The present form of the Gulf was attained sometimes during the Oligocene, when the modern graben was formed (Said, 1969). The Gulf of Suez fault trough is about 80 km wide, becoming narrower towards the north. One thrid to one half of this fault trough is covered by shallow water (Girdler, 1969). A marine gravity survey revealed a negative gravity anomaly of approximately-50 gal, indicating an infill of light sediments (Masson and Agnich, 1958). The magentic field (Coleman, 1974) is relatively smooth, reflecting the lack of igneous activity and suggesting that he sediments are underlain by down faulted Pre-cambrian Shield rocks. Rifting in the Gulf is very recent and appears to have begun sometime in Pliocene. The present study is based on samples collected on the board of Russian R/V "Ichthiology" in September (1970).

SAMPLING AND METHODS

Twenty-seven surface samples were collected from the bottom of the Gulf of Suez, with coordinates between longitudes 32° 20' E & 34° 00'; E and latitudes 27° 00' N & 30° 00' N and depth varying between 13 and 88 meters (Fig.1). The location and the field observation are shown in Table (1). The samples were collected by means of Peterson grab (capacity 0.2 m^3 on the board of R/V "Ichthiolog" in September 1970. The collected samples were chemically analyzed for organic carbon and carbonate as a tool explaining environment. The organic carbon content was determined in washed dried powdered samples following the technique described by El-Wakeel and Riley (1957). The carbonate content was determined using the method described by Anwar and Mohamed (1970). These analyses were carried out in geology Department Faculty of science, Menoufiya University.

The mineral compositions of 16 selected samples were identified using the X-ray diffraction technique. For this purpose a Shamadzu X-ray differactometer was used and runs with Ni filter and Cu radiation (λ =1.541A) at 30 kv and 20 MA potential. The time constant is 2 second, scanning speed 10 and chart speed 10 mm/min. This technique was carried in the central laboratory of Faculty of Science, Menoufiya University. The data derived from chemical and mineralogical analysis are listed in Table (2).



(Fig. 1) THE LOCATION OF THE COLLECTED SAMPLES

Table (1): The Coordination of collected samples and field observations.

Sample NO	Station NO	Depth (meters)	Latitude (N)	Langitude (E)	Colour of Wet Sediments	Sediment type
1	160	54	29° 36.6	32° 31.0	Greyish White	Silty sand
2	163	65	29° 23.5	32° 40.8	Brown	Sand
3	165	55	29° 10.2	32° 42.4	Greyish black	Sand
4	166	34	28° 59.3	32° 39.3	Whitish grey	Sand
5	167	65	29° 0.4	32° 54.2	Greyish White	Silt
6	168	38	28° 1.2	32° 6.6	Greyish White	Silt
7	173	59	28° 39.2	33° 3.0	Greyish White	Silt
8	204	62	28° 3.4	33° 27.0	Grey	Sand
9	205	62	28° 20.2	33° 9.5	Greyish White	Sandy silt
10	207	25	28° 17.5	33° 19.5	White (coral)	Sand
11	209	27	28° 14.0	33° 34.2	White brown	Sand
12	210	13	27° 45.2	33° 45.0	White	Sand
13	213	54	27° 46.8	33° 46.1	Whitish grey	Sand
14	215	82	27° 53.0	33° 42.0	Whitish grey	Silty Sand
15	216	85	27° 58.2	33° 38.4	White	Silt
16	217	35	28° 32.5	33° 11.5	Greyish White	Sand
17	218	53	28° 30.7	33° 6.6	Whitish grey	Sand
18	219	33	28° 28.5	33° 2.4	Brownish black	Sand
19	220	25	28° 54.0	33° 55.5	Greyish black (shell)	Sand
20	221	27	28° 45.0	33° 52.5	White	Sandy silt
21	222	89	28° 45.0	33° 0.0	Whitish grey	Sandy silt
22	223	52	28° 45.2	33° 9.4	Whitish grey	Sandy silt
23	229	44	29° 34.0	32° 24.6	Grey	Sand
24	233	44	29° 2.3	33° 4.0	Whitish grey	Silty sand
25	234	44	29° 41.5	32° 35.8	Whitish brown	Silt
26	236	44	29° 41.4	33° 22.0	Whitish brown	Silty sand
27	239	22	29° 55.9	32° 32.3	Whitish brown	Silty sand

Table (2):The data derived from carbonate,organic carbon and X-ray mineralogical analyses

Station No	carbonate content	organic carbon content	The carbonate minerals aragonite	calcite	Mg-calcite	dolomite
160	79.51	0.345	—	—	—	—
163	95.22	0.161	**	**	***	*
165	54.78	0.414	—	—	—	—
166	87.98	0.552	***	**	**	*
167	54.91	1.058	**	**	***	**
168	67.35	0.667	**	***	***	*
173	72.12	0.828	—	—	—	—
204	89.62	0.460	—	—	—	—
205	74.59	0.138	—	—	—	—
207	96.45	0.483	**	**	***	*
209	82.45	0.115	**	**	***	*
210	95.91	0.230	**	**	***	*
213	91.53	0.299	—	—	—	—
215	88.80	0.414	—	—	—	—
216	76.92	0.805	***	*	***	*
271	81.70	0.391	—	—	—	—
218	64.49	0.299	**	**	***	**
219	62.30	0.299	**	*	***	**
220	79.37	0.552	—	—	—	—
221	70.23	0.828	—	—	—	—
222	70.50	0.644	**	**	***	*
223	58.70	0.483	—	—	—	—
229	95.91	0.184	—	—	—	—
233	64.07	0.874	**	**	***	*
234	46.04	0.920	—	—	—	—
236	64.07	0.253	**	*	***	*
239	66.67	0.345	**	*	***	*
average	75.32	0.489				

HYDRAULIC REGIME

The Gulf of suez is located in a region characterized by an arid climate. The climate is hot and dry with scarce rainfall. The average surface water temperature in the Gulf decreases northwards (Fig. 2A) whereas, the average surface salinity increases (Fig. 2B).

The prevailing winds in the Gulf flow from the north-northwest most of the year. The climatic conditions and the prevailing winds determine the character of water in the Gulf. Also, the character of the currents is related to the character of the prevailing winds (Fig. 3). The velocity of the surface water currents ranges between 6 and 40 cm/sec and their directions (S & SW) are parallel to the axis of the Gulf (Millard, 1971). Thompson (1939) pointed out that, the prevailing winds bring about an additional circulation. The NNW winds cause upwelling along the eastern coast and piling up of the surface waters along the western coast.

Tides are large and play a great role in moving great amount of water masses. Tides are durinal in nature and range between 1.0 m and 2.5 m in hight. The velocity of the generated currents decreases rapidly with depth.

SEDIMENT DISTRIBUTIONS

The bottom of the Gulf of Suez is mainly covered with sediment of sand size. Their main components are carbonate deposited from sea water and clastics of terrestrial origin. The fresh water boring sediments are very little consequence except near the wadi mouths (Fig. 4). The greater part of the Gulf coasts consists of unconsolidated recent sediments of one sort or another and very little primary sediment resulting from marine erosion (Mohamed, 1991).

The prevailing wind in the region is NW and before reaching the Gulf it traverses hundereds of mile of desert. The desert sands contain a variety of minerals and although much of the terrain over which they are blown consists of carbonate rocks. The softer minerals including the carbonate are selectively reduced to fine dust. The large grains reaching the Gulf have in most cases become well rounded and frosted (Fig. 5).

In these shallow water area, marine organisms with carbonate skeletons occur in profusion and all the sediments particulary sands, contain quantities of skeletal detritus (Mohamed, 1991).

Two main factors play a major role in influencing sediment distribution. The

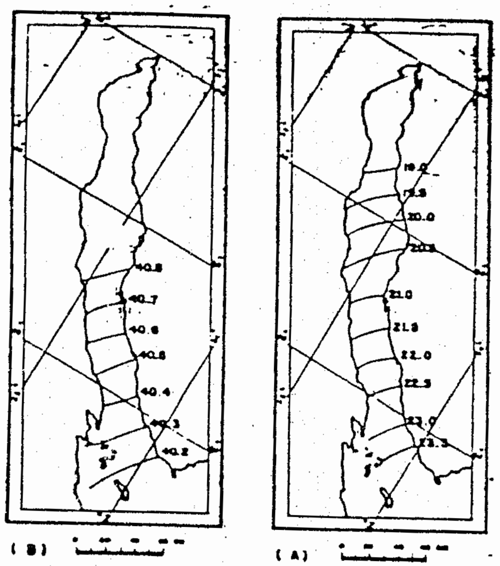


Fig.(2): The average temperature(A) and Salinity (B) of superficial waters of the Gulf Of Suez (after millerad,1971)

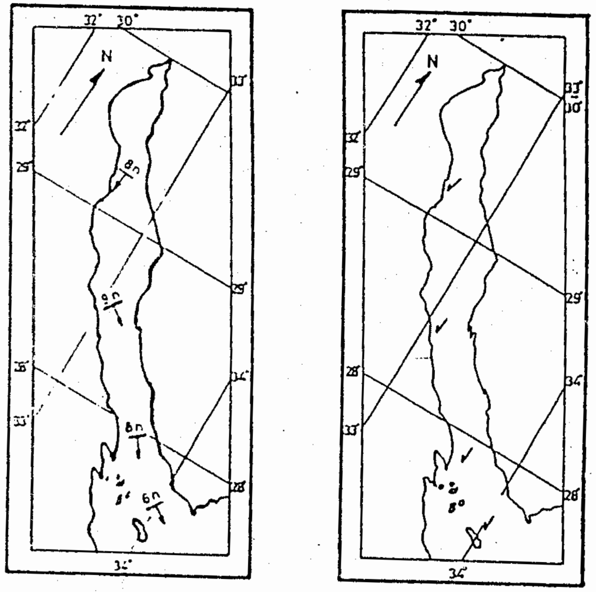


Fig.(3): A B

A- The velocity and the direction of the wind prevailed on the Gulf of Suez.

B- The direction of the wind generated currents in the Gulf of Suez.

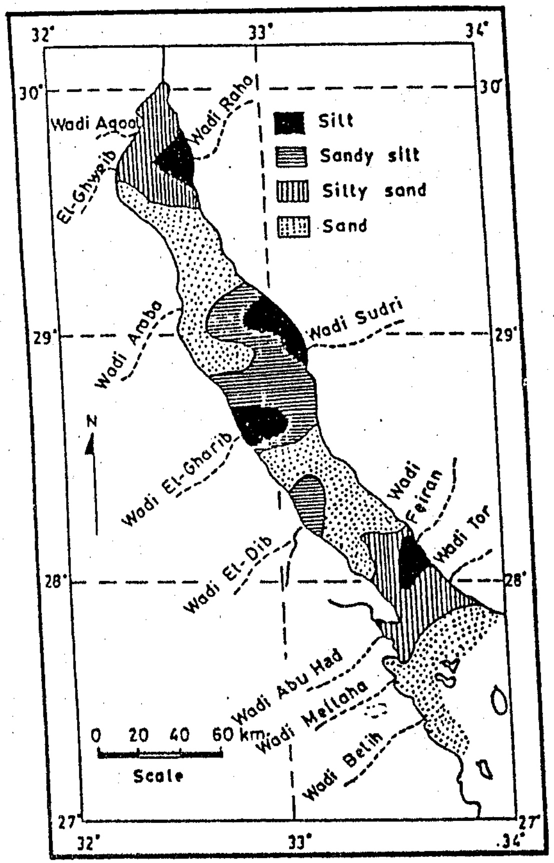


Fig.(4):Sediment distributions map
Based on sand -silt-clay ratio.

Fig.(5) : Unconsolidated Recent sediments of carbonate and terrestrial origin,of well rounded and frosted grains first is the abundance of fringing reefs, and the second is the presence of wadis draining the surrounding areas and passing into the Gulf.

ORGANIC CARBON CONTENT

The organic carbon content present in the sediments of the Gulf of Suez ranges between 0.12% and 1.06% with an average 0.49%. It increases with decreasing grain size (Fig. 6) and decreasing carbonate content (Fig. 7). However, it has no distinct relation with depth.

From the organic carbon distribution (Fig. 8), it was found that the areas facing directly the wadi mouths have relatively high organic carbon content. The western side of the Gulf has low organic carbon content relative to the eastern side.

Generally, the variation of organic carbon contents throughout the Gulf areas may be controlled by geomorphology and texture of the sediments. There is a similarity between the settling velocity of organic constituents and the fine particles (Mohamed and Al-Shamlan, 1979).

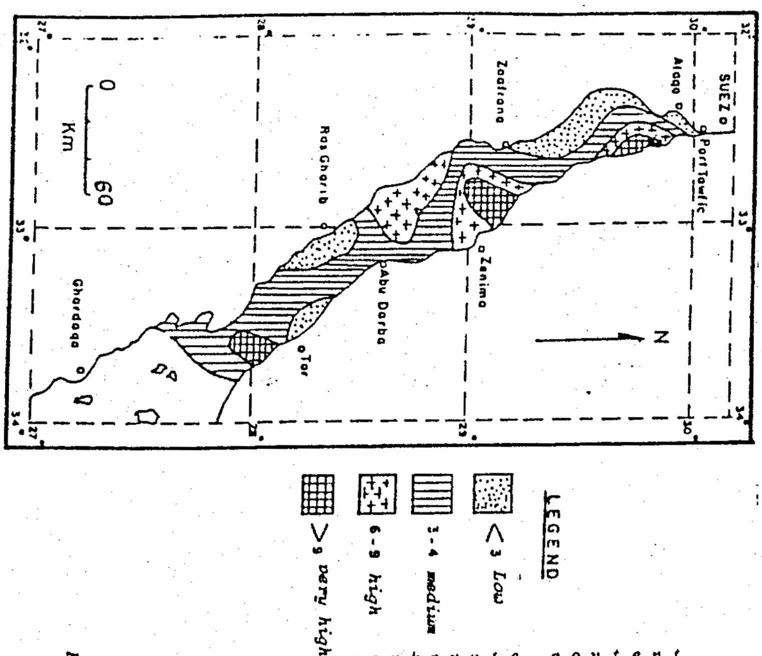
So, the factors controlling the distribution of organic carbon content in the Gulf of Suez sediments are the texture of sediments, wind generated currents and the organic materials drained from land though wadi system in addition to the organic production in the Gulf itself due to aquatic organisms.

On the basis of similarities between the settling velocity of organic carbon and the fine particle size (silt and clay), the energy of environments can be easily deduced, that is the relatively high the organic carbon content, the low the energy of environment.

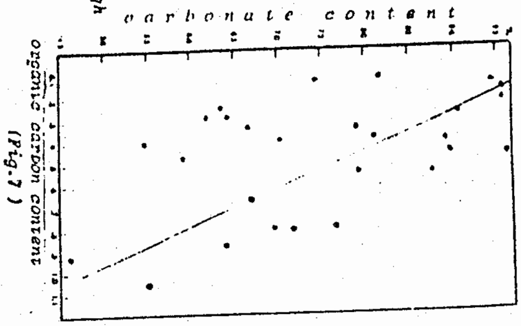
The Gulf of Suez sediments are generally characterized by low organic carbon content as compared with the calculated world average (2.5%) for nearshore sediments recorded by Trask (1939). Accordingly the sediments of the Gulf of Suez may be considered as deposited in part under high energy environment.

CARBONATE CONTENT

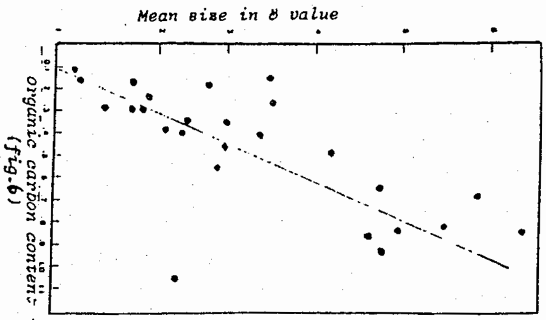
The carbonate content present in the Gulf of Suez ranges between 46.04% and 96.45% with an average 75.32%. The interelation between carbonate content and depth (Fig. 9) reveals that depth has little effect on carbonate distribution. Furthermore, it increases in coarse sediments than in fine ones (Fig. 10).



(fig.8)



(Fig.7)



(fig.6)

Fig.(6):The relation between organic carbon content and Mean size

Fig.(7):The relation between organic carbon content and carbonate content.

Fig.(8): The organic carbon distributions.

AREAL DISTRIBUTION OF CARBONATE

On the basis of carbonate distribution (Fig. 11), Gulf of Suez area is subdivided into two main zones. The first zone is located in the southern part of the Gulf and extends from the entrance of the Gulf to an arbitrary line between Ras-Gharib to the West and Abu-Darba to the east. This zone has a high carbonate content reaching from 60% up to 96.45%. The second zone is located in the northern part of the Gulf and has a relatively low carbonate contents and extends from the line between Ras Gharib and Abu-Darba to the extreme northern end where carbonate content varies from a minimum value of 46.04% up to 90%. In the second zone, a patch of high carbonate content (about 80%) is found near Zaafrana. Areas facing major wadi mouths have relatively low carbonate content. Generally, the carbonate contents increases southwards and westwards.

It is worth mentioning that bottom sediments in the Gulf of Suez have generally high carbonate contents.

The factors affecting the carbonate distribution in the Gulf of Suez are arranged roughly in order of decreasing importance as follows :

1- The presence of coral reefs and carbonate skeletal remains.

2- The salinity that gradually increases northwards (Millard, 1971). This may affect the distribution of carbonate skeletal remains which decrease with increasing salinity (may be over the tolerant limit of organisms. The cause of increasing salinity in the Gulf is the radient energy which rise the temperature of the Gulf water. A resulting rise in temperature tends to cause reduction in dissolved CO_2 and hence carbonate precipitated and increasing salinity (Sverdrup, *et al.*, 1970).

3- There is a marked decrease of carbonate content facing wadi mouths. This can be referred to the deposition of non carbonate materials and also, increasing the trubidity which hinders the coral reef growth.

4- The rock types that are present on both sides of the Gulf are different in nature and age (Said, 1969). The detrital materials supplied from the eastern side contain an appreciable amount of terrigenous sand (Hussein, *et al.*, 1971, Meneisy *et al.*, 1973). On the other hand, the western parts can produce greater amount of deterital carbonate sand, due to their rock compositions.

5- The beach rocks located in the western side of the Gulf contain more

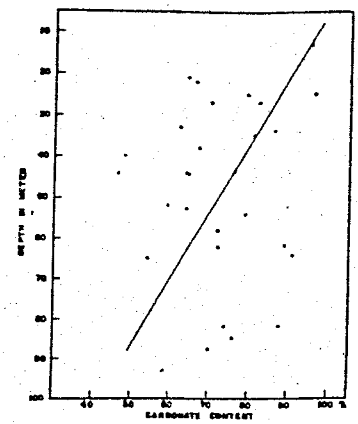


Fig.(9.): The relation between depth and oarbonate content

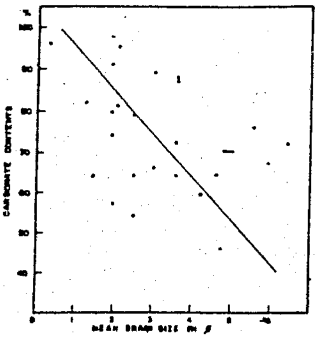


Fig.(10): The relation between Mean size and oarbonate content

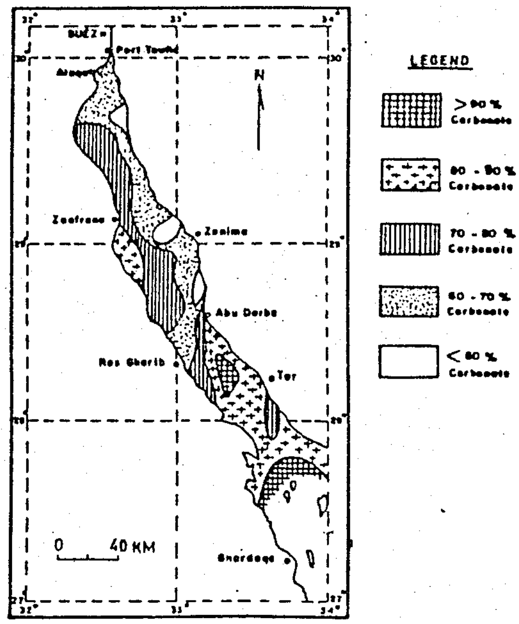


Fig.(11): The carbonate distribution

carbonate than the beach rocks located in the eastern side, which contain great amount of non-carbonate sand (Mohamed, 1991).

6- The marine grasses may causes the biochemical deposition of aragonite and the formation of composite grains (Illing, 1954; Sugden, 1963).

CARBONATE MINERALS

Microscopic examination of the carbonate particles reveals that they are formed mainly of coral debris, forminiferal tests, gastropod and pelecypod shells, echinoid fragment and unidentified shell fragments. Carbonate rock fragments and pelletal carbonate are also recorded (Fig. 12).

X-ray diffraction analysis reveals that aragonite, Mg-calcite and calcite in addition to minor dolomite are the main constituents. the semiquantitiative estimation adopting the technique by Abu Zeid, 1974 of the individual carbonate minerals is shown in Table (2).

As stated before all the sediments particulary the sand size contain mostly carbonate skeletal debris, detrital grains (partly to wholly fine non-skeletal grains) and colimnites.

The majority of gastropod and pelecypod shells are aragonitic wall structures. Only few genera are mixed aragonite and calcite. ALso, ostracods microsturcture consists of fine srystals of Mg-calcite (George and George, 1979). So, aragonite, calcite and Mg-calcite partly give an indication to biogenetic origin. Mg-calcite is prevailing in nearly all the Gulf carbonate sand reflects the relative abundance of corals, coralline algae and Mollusca shells (Friedman, 1968). Aragonite which is nearly present in all the carbonate sediment samples may reflect the direct biochemical precipitation. Aragonite may also be originated from skeletal remains due to thickening wall structures as a result of interaction with sea water chemistry (Winland, 1969 & Mohamed and Al-Shamalan, 1979). This means that aragonite may reflect indirect biochemical precipitation.

X-ray analysis has also revealed the presence of minor dolomite. No particular significance can be attached to the presence of dolomite, except for eolian dust falling into the Gulf that might contain dolomite derived from the exposed nearby country rocks. So, dolomite is mostly detrital in nature, being brought into the Gulf as wind-blown dust.

The local increase of aragonite near Zaafrana (st. 166) and near Ras-Gharib

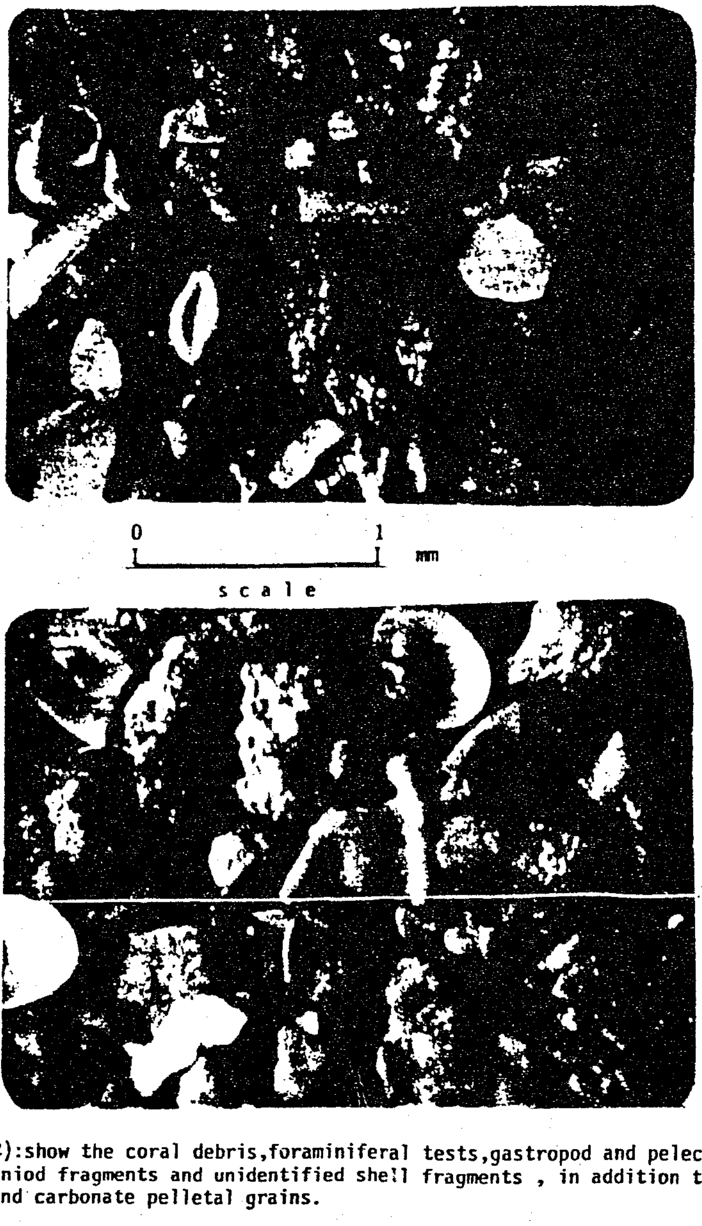


Fig.(12):show the coral debris,foraminiferal tests,gastropod and pelecypod shells,echiniod fragments and unidentified shell fragments , in addition to rock fragments and carbonate pelletal grains.

(st. 219) may be related to marine erosion process of beach-rock rich aragonite and or to marine grasses which might cause aragonite cementation and the formation of the so called composite sand (Sugden, 1963).

From the above discussion, it can conclude that the carbonate sediments in the Gulf of Suez are originated as a result of an interplay of marine and terrestrial influences and were deposited in high energy environment.

COMPARATIVE STUDY

Comparing the average carbonate contents in the Gulf of Suez with Red sea, Gulf of Aqaba and the Persian (Arabian) Gulf, one comes to the following observations :

Area	Mean depth	particle size in micron	Surface salinity	Carbonate content
* Gulf of Suez	50	40	40.5	75
** Gulf of Aqaba	1100	18	40.8	59
*** Red Sea	500	30	40.2	81
**** Persian Gulf	31	40	39	75

* Present author   ** Emery, 1963.
*** Sverdrup, *et al.*, 1970.   **** Purser, 1973.

Obviously the physico-chemical environments of the Gulf of Suez bottom sediments are rather correlatable with that of the Persian Gulf.

CONCLUSION

From the foregoing discussion, the following conclusions are reached :

1- The areas off wadi mouths are characterized by fine fraction (silt and clay), low carbonate content and high organic carbon content.

2- The variation in carbonate content between one locality and another can be attributed to a variation in the rate of carbonate deposition and the variation in the rate supply of eolian sand which is certainly important.

3- The carbonate materials composing sediments in the Gulf of Seuz are mainly originated from the biological remains in addition to low amount of terrigenous materials drained to the Gulf through the wadi system and or fallout from dust storm.

4- The factors affecting the carbonate distribution in the Gulf of Suez are the coral reefs and skeletal remins, salinity, wadi system, sea water chemistry and marine grasses in addition to the geology of the coastal plains.

ACKNOELWDGEMENTS :

The author wishes to express his appreciation and gratitude to the Geology Department, Faculty of Science, Menoufia Univeristy for helpful suggestions during the progress of this work. The author also wishes to express his thank to prof. Z. Kukal, C.Sc., Central Geological survey, Prague, for his helpful suggestions and reading the manuscript and to the staff members of R/V "Ichtiology".

REFERENCES

Abu Zeid, M.M. (1974) : Contributions to the mineralogy and geochemistry of veriegaied and El Dakhla shales. Ph.D. Thesis, Fac. Sci., Ain Shams University, Cairo Egypt.

Anwar, Y.M. & Mohamed, M.A. (1970) : The distribution of calcium carbonate in continental shelf sediments of Mediterranean Sea, north of the Nile Delta. Bull. Inst. Ocean. & Fisheries, Vol. 1, P. 451-460.

Akkad, S. and Dardier, A.A. 91966) : Geology of Red Sea between Ras Ghagra and Mersa Alam. Egypt. Geol. Survey, vol. 35, P. 67.

Coleman, R.G. (1974) : Geological background of the Red Sea. In Burk, C.A. and Drake. C.L. (Eds). The geology of continetal margins. Springer-verlag, P. 743-751.

El-Wakeel, S.K. and Riley, J.p. (1957) : The determination of orgainc carbon in marine muds : J.Con. Intern. Pour l. Exploration de la mer, vol. 12, P. 180-183.

Emery, K.O. (1963) : Sediment of the Gulf of Aqaba (Eilat). In : Miller, R.L. (ed). Papers in marine geology, Shepard commeorative volum. Macillian company, New York.

Friedman, G.M. (1968) : Geology and geochmistry of reefs, carbonate sediments and waters, Gulf of Aqaba (Eilat), Red Sea. J. Sedi. petrol., Vol. 38, P. 985-919.

Gorge D. and George, J. (1979) ; Marine life, and illustrated encyclopedia of invertebrate in the sea. Douglas and MacIntye, Vancouver.

Girdler, R.W. (1969) : The Red Sea-A geophysical background. In : Degans, E.T. and Ross, D.A. (eds). Hot brine and Recent heavy metal deposits of the Red sea. Speinger-verlag. New York.

Heybrok, F. (1965) : The Red Sea Miocene evaporite basin. In : Salt basins around Africa. Inst. Petroleum, London, P.17.

Hussein, H.A., Anwar, Y.M., and El-Sokkary, A.A. (1971) : Radiogeological studies of some carboniferous rocks of west central Sinai. j. Geol., Vol.

15, P. 119-127.

Illing, L.Y. (1954) : Bahama calcareous sands. AAPG Bull. Vol. 38, P. 1.95.

Masson, P.A. and Agnich, F.D. (1958) : Seismic survey of sinai and the Gulf of Seuz. Geophysics. vol. 23, P. 329-349.

Menesiy, M.Y., Atia, A.K. and Abu-Zeid, M.M. (1973) : A mineralogical study of clays from wadi Araba, Gulf of Suez region. Egypt. J. Geol., VOl. 17, P. 97-110.

Millared, C. (1971) : Étude hydrologique et dynamiqué de la Mer Rouge, en hiver. Thésé presenté à la Fac. Sci. Paris. (doctorate 3e cycle).

Mohamed, M.A. (1991) : Marine geological studies of the Recent bottom sediments in the Gulf of Seuz. Annals of Geol. Survy. Egypt., Vol. XVII, P. 183-192.

Mohamed, M.A. and AL-shamlan, A.A. (1979) : the factors controlling the distribution of carbonate content in Kuwait Bay sediments. Geol. Rundschau, No. 68 Vol.2, P. 622-630.

Purser, B.H. (1973) : The persion Gulf. Springer-Verlag, Berlin, New York, P. 1-471.

Said, R. (1969) ; General stratigraphy of the adjacent land areas of the Red Sea. In : Degans, E.T. & Ross, D.A. (Ed.) Hot brine and recent heavy metal deposits of the Red Sea. Springer-Verlag, New York, P. 71-79.

Sugden, W. (1963) : Some aspect of sedimentation in the Persian Gulf. J. Sedi. Petrol., Vol. 33, P. 355-364.

Severdrup, H.V., Johnson, M.W. and Fleming, R.H. (1979) : The ocean, their physics, chemistry and biology, 3rd edition, prentice-Hall, New York.

Thompson, E.F. (1939) : Chemical and physical investigation, the general hydrography of the Red Sea. John Marray Exped. 1933-34. Sci. Report 2, P. 83-103.

Trask, P.D. (1939) : Organic content of recent marine sediments In : Trask, P.D. (Ed.) Recent marine sediments, AAPG, P. 428-453.

Winland, H.D. (1969) : Stability of calcium carbonate polymorphs in warm shallow seawater, J. Sedi. Perol., Vol. 39 P. 1579-1587.

بعض مظاهر الترسيب فى خليج السويس - مصر

ممدوح عبد المقصود محمد

قسم الجيولوجيا - كلية العلوم - جامعة المنوفية - مصر

تختص هذه الدراسة بالعوامل الطبيعية التى تتحكم فى توزيع الرواسب الحديثة فى خليج السويس باستعمال الكربون العضوى والكربونات كوسيلة للتفسير .

وقاع خليج السويس مغطى أساسا بحبيبات الرمل أما المواد الدقيقة فتتكون من السلت والتى دخلت الخليج من الوديان المحيطة . وتتميز رواسب الخليج بنسبة قليلة من الكربون العضوى (٠٠ر٤٩ ٪) وتتركز النسب الكبيرة بالقرب من مصبات الوديان وبعيداً عن تجمع الكربونات .

وتتميز رواسب الخليج بنسبة عالية من الكربونات (٣٢ر٧٥ ٪) وكذلك معدلات البخر العالية وخاصة فى المناطق الضحلة .

وتتكون معادن الكربونات من الأراجونت والكالسيت والماغنيسيوم كالسيت بالإضافة إلى الدولوميت وقد تكونت الكربونات من مشاركة العوامل العضوية وغير العضوية فى البيئات ذات الطاقة العالية .

ولهذا فإن العوامل التى تؤثر على توزيع الرواسب الحديثة فى خليج السويس هى التأثير البيولوجى ، الوديان ، الملوحة ، كيميائية ماء البحر والأعشاب البحرية وجيولوجية السهول الساحلية .