BATHYMETRY OF RECENT FORAMINIFERA FROM SEA FLOOR OF GULF OF SUEZ

THESIS
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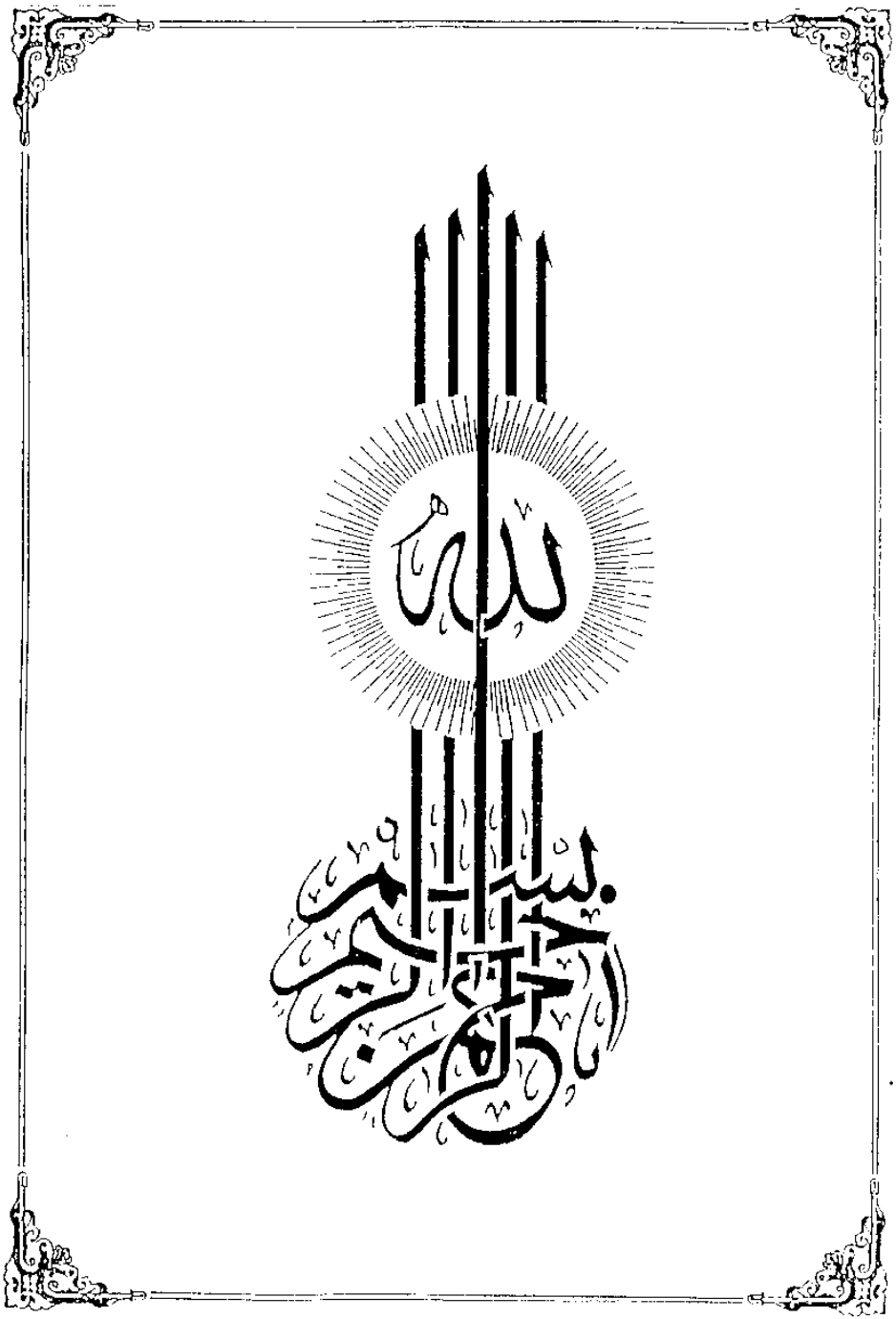

NOTE

The present thesis is submitted by Gamal El-deen M. Azazy to the Faculty of Science, Ain Shams University in partial fulfilment of the requirements for the degree of Master of Science in Science in Geology.

Beside the research work materialized in this thesis, the candidate has attended ten post graduate courses for one year in the following topics :

- Micropaleontology.
- Paleoecology.
- Biostratigraphy.
- Lithostratigraphy.
- Sedimentary Petrology.
- Sedimentation.
- Structural Geology.
- Geotectonic.
- Statistical Geology & Computer.
- Field Geology & Geologic maps.

He has successfully passed the final examinations in these courses.

In fulfilment of the language requirement of the degree, he also passed the final examination of a course in the English language.

Prof. Dr. W. M. Abdelmalik

Head Department of Geology.

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ABSTRACT

Analysis of the recent benthonic Foraminifera from the Gulf of Suez revealed 115 different species identified from 30 sea floor samples spanning a depth ranging from 3 to 291 feet.

The distribution of these species is analyzed in terms of bathymetry and distance from the shoreline.

A series of maps showing the distribution of the common families (Miliolidae, Soritidae, Textulariidae,....etc.) within the studied area are constructed.

Miliolidae generally form about 41 % of the identified species, the Rotalina forams form 40 %, while the Agglutinated individuals form about 19 %.

Variation of the abundance ratios with depth of some different groups (Benthic / Total Forams, Benthic / Ostracods, Agglutinated / Total Benthic ....etc.) are presented in cross plot curves, tables showing the distribution and abundance of all species as well as scan photographs are also included.

INTRODUCTION

1 - Purpose of the study :

Thirty sea floor samples are collected along the Gulf of Suez (Figure 1) and examined in order to establish an ecological model for the distribution and frequency of recent Foraminifera (species and families). This model was needed for the paleoecological studies which were carried out during the last few years in the Gulf of Suez Petroleum Company (GUPCO). These studies assist in exploration for stratigraphic traps and to figure the geometry and paleodepositional environments of the discovered reservoirs to minimize the high cost of off-shore drilling and exploration.

2 - Previous work :

Few researches have been done on the recent benthic Foraminifera from the Gulf of Suez.

In 1949 and 1950a Said described the Foraminifera from the northern Red Sea, Gulf of Suez and Gulf of Aqaba, this study was based on materials collected during the Egyptian preliminary expedition to the northern Red Sea by the R. R. S. Mabaheth ship in 1934 - 35.

Said (1950b) made an attempt in a pioneer study, to discuss the ecological factors that control the distribution of recent Foraminifera obtained from the above mentioned study. Among his conclusions he mentioned that the Foraminifera of the Gulf of Suez is uniform, this may be due to the small number of the studied samples from the Gulf of Suez (three samples) with minor variation in water depth (59,62 and 64 meters).

In 1978 El Deeb re-examined the same samples of R. R. S.Mabaheth expedition (1934-35) and made a comparative study

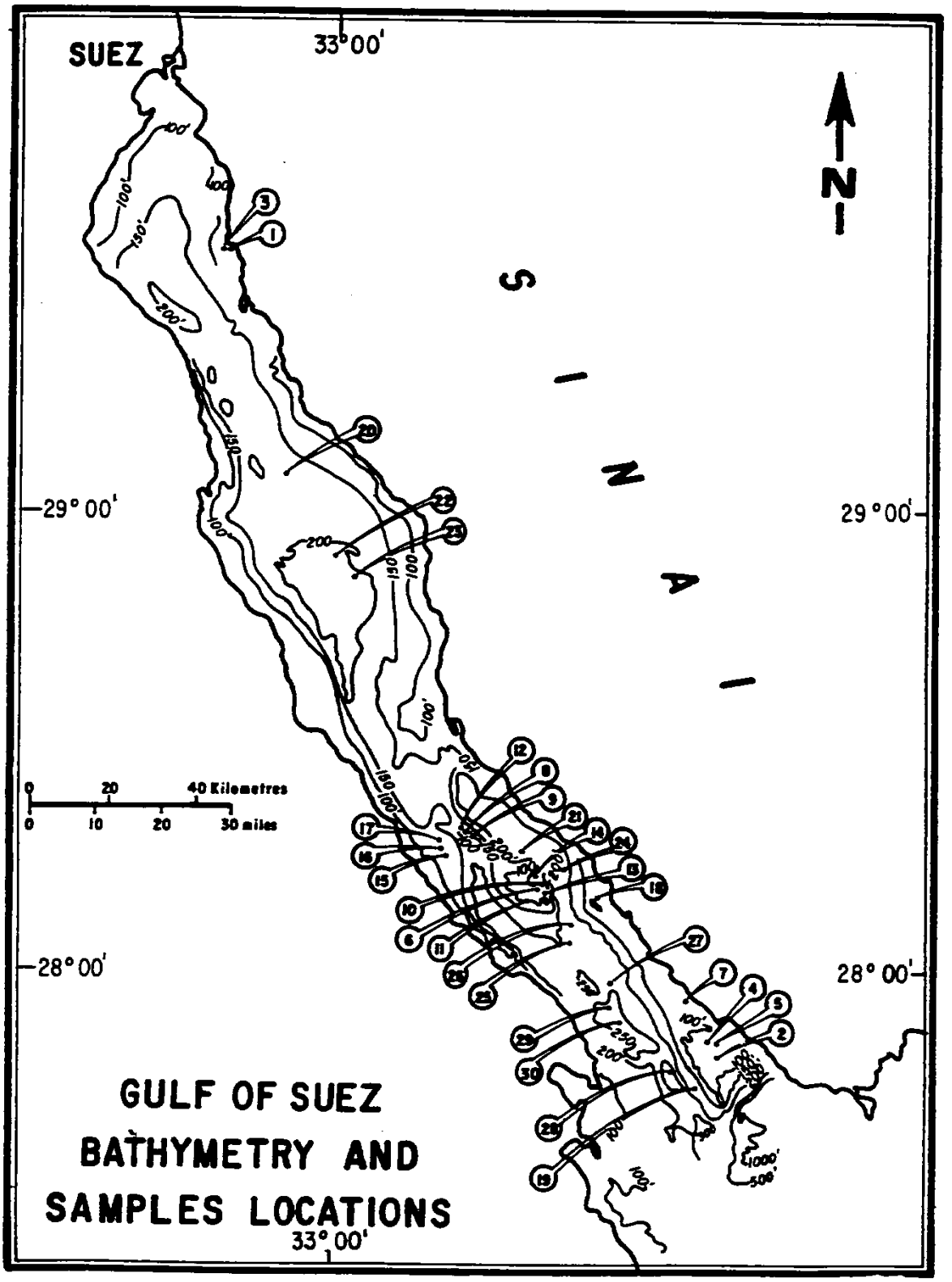

FIGURE 1

between the Red Sea and Mediterranean Sea fauna but he did not mention any remarks on Said's conclusion concerning the uniformity of foraminifera in the Gulf.

Recently, Mohamed, M.A. et. al. in 1985 studied 27 sea floor samples collected from the Gulf of Suez by the Russian research vessel (Ichthyology) in 1966. They concluded that the benthic forams are concentrated in front of Wadi system at shallower depths, but they did not discuss the bathymetric distribution of these forams.

MATERIALS AND TREATMENT

1 - Collection of the samples :

The sea floor samples of the present study are provided by divers during the rigs movements in the Gulf of Suez through six years (1984-1989)in a none systematic way and not along chosen traverses. The shallowest depth is recorded in station number 1 (3 feet), while the deepest sample is recorded in station 30 (291 feet).

The collection has been made by scooping up the top thin layer from the sea floor sediments, but unfortunately the rose bengal staining method (Walton, 1952) was not used to differentiate between living and dead Foraminifera because the samples took a long time from the rig location to the lab in the main office, but since the paleoecological investigations are based mainly on the total populations (living and dead foraminifera), so this disadvantage did not affect the main objective of this study.

2 - Laboratory treatment :

The collected samples are washed in the lab by fresh water shower only through a 200 mesh sieve then dried. Some samples are treated after that by hydrogen peroxide to remove all undesired materials, the coarse fraction over than 2mm. is discarded, then the dry residue is divided by a microspliter several times to obtain one gram for each sample, and from this weight the number of each identified species and the benthic population as well as the planktonic and the ostracoda specimens are counted.

- III -

GEOLOGY AND NATURE OF THE GULF OF SUEZ

1 - General features and bathymetry

The Gulf of Suez is a rift basin consisting of pre - miocene normal faulted blocks of different structural elevations forming horests and grabens. The water depth varies from about 100 to 200 feet in the northern and central parts, and from about 100 to 300 feet in the southern part. The depth increased abruptly at the Red Sea entrance to reach about 1000 feet (Figure 1), therefore the Gulf of Suez is considered by some authors as a shallow continental shelf for the Red Sea.

The banks of the Gulf of Suez are mainly composed of igneous and sedimentary rocks while the bottom sediments consist mainly of carbonate mud with some sands, gravels and organic matter which does not exceed 0.055 % as measured by nitrogen content. The silica content of the sediments varies from 14.07% to 23.33% (Said 1950b). Some coral reefs are present on the shallowest areas adjacent to the shoreline specially in the east southern part (Shoab Ali).

2 - Physical properties :

The water salinity slightly differs according to the time of measurement, where it is around 42 0/00 in summer and about 41 0/00 in winter. On the other hand the salinity increases by depth and the difference between surface and bottom salinities ranges from 0.15 to 0.50 0/00.

The water temperature of the Gulf is about 20° C in winter and around 26°C in summer. This temperature, as in salinity,