MIDDLE SHELF ZONE FORAMINIFERAS OCCURRED IN THE SEDIMENTS OF NORTHERN PART OF THE ANDAMAN SEA

Ko Yi Hla[1], Day Wa Aung[2], Tun Tun Zaw[3]

Abstract

The sample collection sites are located in the northern part of the Andaman sea. Ayeyarwady continental shelf is a part of Andaman Sea. There are five zones of Ayeyarwady continental shelf are recognized; Near shore zone, Inner shelf zone, Middle shelf zone, Outer shelf zone and Upper slope zone.Very low to high diversity of twenty four foraminiferal species are found in the Middle shelf zone environment. Faunal distribution and population are different in the study area and distinct genera of foraminiferas are observed in specific condition. It is noteworthy that faunal diversity and species diversity are encountered in different areas. By studying of the foraminiferas, *Osangularia bengalensis* species are dominant in the Middle shelf zone environment.

Keywords: Ayeyarwady continental shelf, Middle shelf zone, foraminifera, *Osangularia bengalensis.*

Introduction

Location and size of the study area

The study area is located in northern Andaman Sea. It is bounded by latitudes 13º 25´ N and 15º 40´ N and longitudes 93º 15´ E and 97º 45´ E, occupying the south and southwest oceanic area of Myanmar. The area extends N-S in 225 km and E-W in 450 km respectively. The area extent of study area is approximately 101250 km^2. The study area is bounded by southern part of Ayeyarwady delta and Gulf of Martaban, and western part of Tanintharyi coast. Therefore, the area occupies the oceanic area around the Myanmar coast of northern Andaman Sea. The location map and sample collection sites of the study area are shown in figure (1).

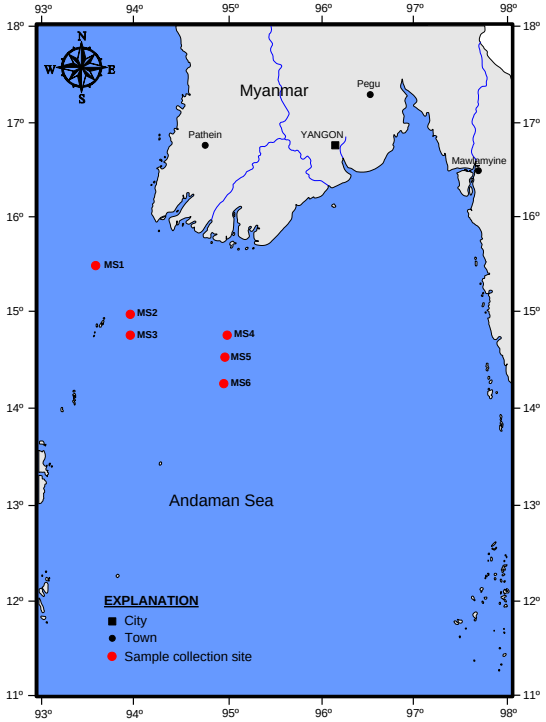

Figure 1 Location map of the study area with sample collection sites.

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Materials and methods of study

Data Source

The 125 specimens of surface-sediment were collected during the India-Myanmar joint Oceanographic research programme in April - May 2002. The located specimens were acquired from the stations along the geophysical line (Fig.1). The research is mainly focused on (10) specimens of the area.

Field method

In April-May 2002, India and Myanmar have organized a joint multidisciplinary oceanographic cruise to study oceanographic and geological aspects of the northern Andaman Sea of Myanmar waters, particularly in the Bay of Bengal, off the Rakhine coast, in the Ayeyarwady continental shelf area, including the Gulf of Martaban, and off the Taninthayi coast and offshore. The acquired specimens were carefully packed, labeled and stored in a cold storage to minimize the decaying. The spacing between sampling stations are generally 25 km.

Laboratory Method

The dried samples were dissolved in a quarter of gallons of water containing a little amount washing soda (soda ash) and a small amount of detergent. The samples were left for a day. The samples were completely disintegrated after a day. The samples soaked with water were washed over the sieve with the opening size of mesh 200, and dried in an aluminum bowl under the temperature of 60°C, especially within an electric oven. The dried samples are called “Residues". The dried sieving of the residue was done over brass sieves with the openings of mesh 30, 60, 90 and 100. The fractions obtained by dry sieving were examined under a binocular microscope. The foraminiferal specimens were extracted and picked up by means of soft sable hair brush with a size of 0.00. The foraminiferal specimens were identified with the literatures and manuals by Cushman (1959), Le Roy (1941, 1944, 1964), Bermudez (1949), Grahan and Militante (1959), Postuma (1971), Barker (1960), Cushman, Told and Bronnimanr (1957), and finally Loeblich and Tappen (1985). A detailed description of each species was taxonomically made with revelant taxonomic references. The distribution of each species was determined in terms of frequency symbols, such as VR for very rare occurrence (1 specimen), R for rare occurrence (2-5 specimens), C for common occurrence (6-10 specimens) and A for abundant occurrence (11-15 specimens) and F for flooded occurrence (> 15 specimens).

The Study of Recent Foraminifera

Distribution of Foraminiferal Species

There is a very large continental shelf, which is situated due south of the Ayeyarwady Delta Division, according to the figure by Curry (*et al*, 2003). No classification of the marine has been defined based on bathymetry as yet. The author is to follow the classification of marine environments established and defined by Hedgpeth (1957), Tipsword (*et al*, 1966) (Fig. 2), and Ingle (1980) (Fig. 3) from the model of the Gulf of Mexico. Accordingly, the seafloor from the low tide to 20 meters of depth is termed as “Inner shelf” (Inner Neritic), the depth between 20 meters and 100 meters is called Middle shelf and the depth between 100 meters and 200 meters is the area of continental shelf, i.e Outer shelf (Outer Neritic). The depth beyond 200 meters to 500 meters is named as Upper slope (Upper Bathyal). By the occurrence of distinct species, there are (5) marine zones, which are nearly fitted with the depth zones, as adopted by Hedgpeth (1957), Tipsword (1966), and Ingle (1950) (Table 1).

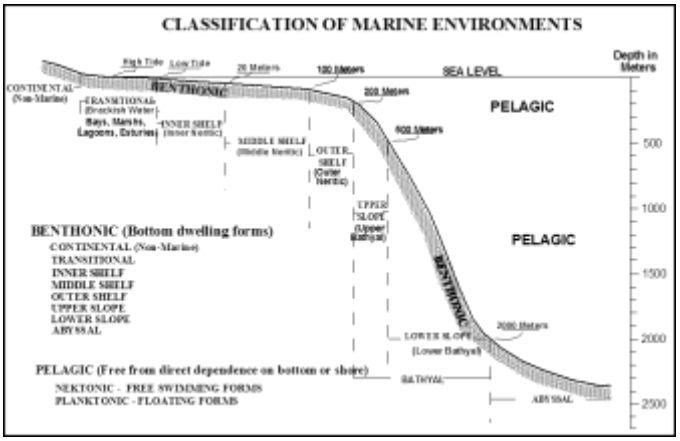
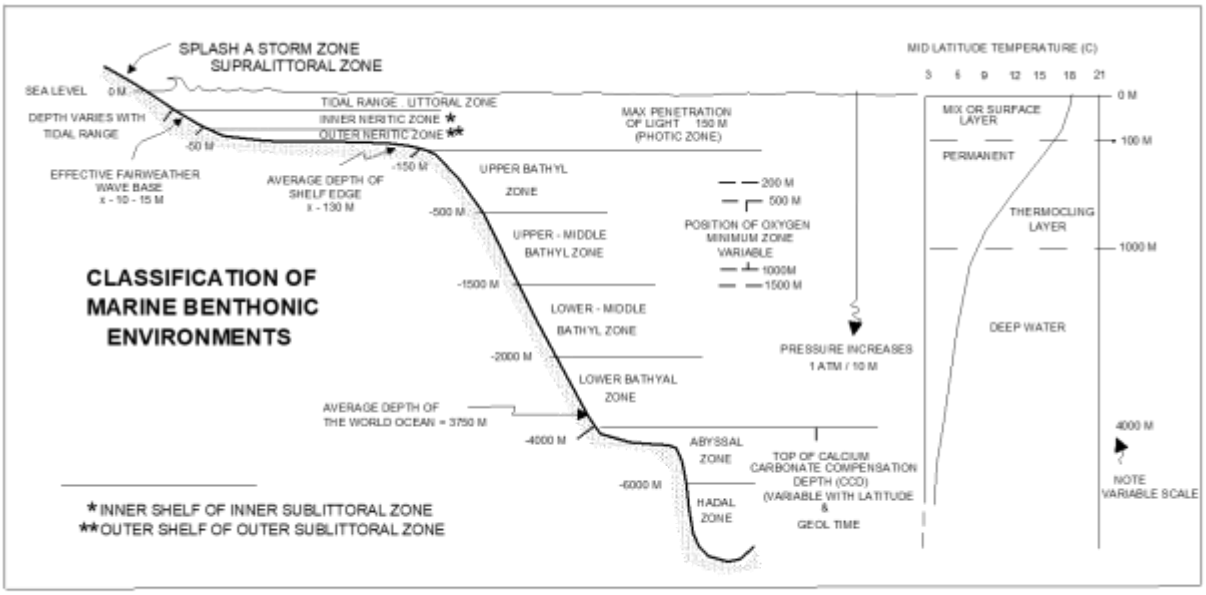


Table 1 The classification of the Ayeyarwady continental shelf and slope

Names	Depths
Near shore zone	16-25 meters
Inner shelf zone	27-32 meters
Middle shelf zone	50-90 meters
Outer shelf zone	beyond 105 meters
Upper slope zone	290-600 meters

Figure 2 Geographic zonation of Gulf of Mexico (After H.L. Tipsword et al., 1966)



Classification of benthonic marine environments in terms of depth and positions of critical oceanographic boundaries of transitional zones in the modern world ocean. Note that water depths are given in meters. This classification is a modification of that presented by Hedgpeth (1957): from Ingle (1975a).

Figure 3 Bathymetric zonation of environments (After J.C. Ingle, 1980)

Middle shelf zone

The middle shelf zone is in the middle part of the main shelf. The inner shelf is in the north, and the outer shelf is in the south. Therefore, this zone is characterized by more numbers of total numbers of species, as shown by the specific diversity, which ranges from 35 to 43 (i.e from sample no. 28 to 27 or from sample no. 90, 33, 34). The depths range from 50 meters to 90 meters. There are 24 foraminiferal species, which have been recorded only from the middle shelf. *Sigmolopsis schlumbergeri* and *Globorotalia menardii cultrata* are very rare in population.Abundant species *are Rotalia annectens, Globorotalia tumida tumida, Pulleniatina obliquiloculina, Osangularia bengalensis , Globigerinodes quadrilobatus,*and *Hastigerina siphonifera.Globorotalia tumida tumida* are flooded occurrence in the study área. The diversity of foraminíferas species are ranges from very rare to abundant in the middle shelf zone environment (Figs. 4 to 9).

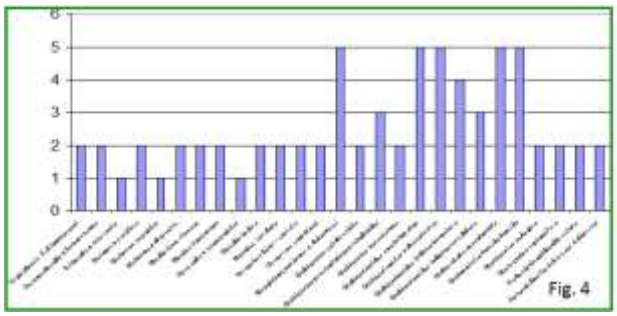


Figure 4 High diversity of foraminifers in MS1

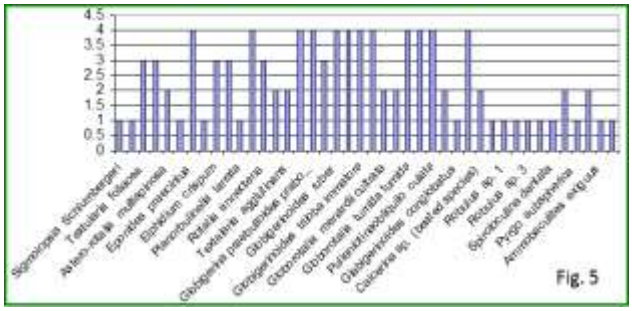


Figure 5 Very high diversity of foraminifers in MS 3

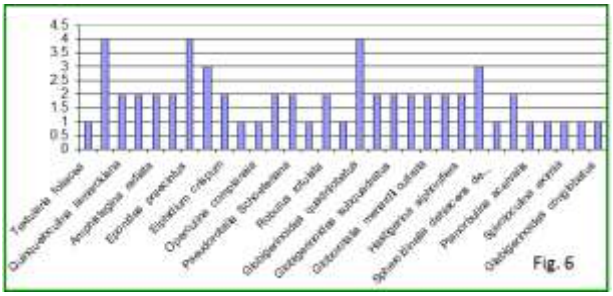


Figure 6 Very high diversity of foraminifers in MS2

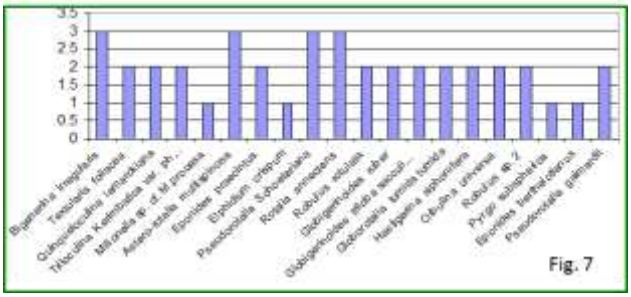


Figure 7 High diversity of foraminifers in MS 4

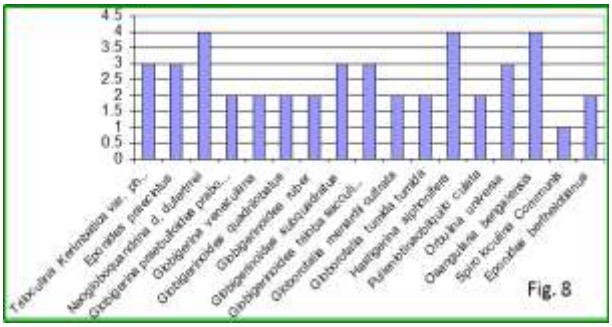


Figure 8 High diversity of foraminifers in MS 6

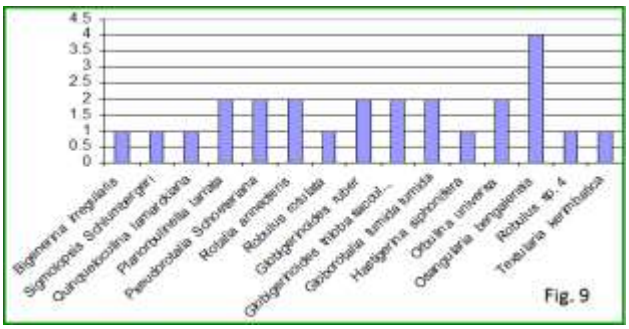
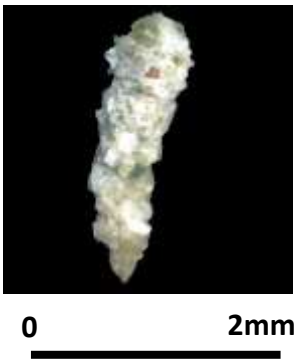


Figure 9 High diversity of foraminifers in MS 5

Systematic Description

Bigenerina irregularis Phleger & Parker
Bigerina irregularis Phleger and Parker, -Bandy, 1954 p.135, pl.29, fig. 8-9

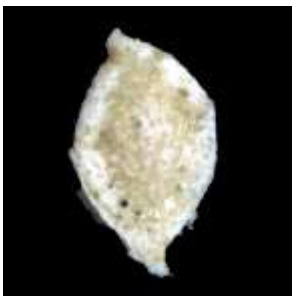
Test very small, chambers arranged biserially initially, later chamber rounded, uniserially; wall arenaceous, coarse grains: sutures, distinct, depressed. horizontally; aperture, a little rounded opening, terminal in position. Dimension is 0.25 mm in length and 0.10 mm in width. This species has been recorded from MS 4 and 5, where it occurs from very rare to commonly.



Textularia foliacea, Heron-Allen-Earland
Textularia foliacea, Heron-Allen-Earland Graham & Militante, 1959, p.28, pl.2, figs. 4a-b

Test free, medium to small, about three times as long as broad, the apical end pointed, the test becoming wider and wider in the apertural end, periphery slightly rectangular, angular and sharp, slightly truncate on both sides of the test, chambers arranged biserially throughout; wall arenaceous with coarse grains; suture distinct, wide and depressed; aperture slight slit, narrow at the base of the last chamber. Dimension is 0.75 mm in length and 0.45 mm in width. This species has been recorded form MS 2, 3 and 4, where it occurs very

Sigmoilina schlumbergeri (Silverstri)
Sigmoilina schumbergeri (Silverstri)-Barker, 1960 p.16, pl.8 fig. 1



Test small to medium in size, flattened shape, chambers arranged following the Spiroloculina type, ie, at angle of Quinqueloculine like finally spiroloculine type, wall typically arenaceous, with fine and medium grains, prephery rounded, thin; suture, distinct nearly in final chamber arrangement; aperture like spiroloculina type with phialine type, bottle shape with defined lip. Dimension is 0.25 mm in length and 0.14 mm in width. This species has been recorded from MS 1 and 3, where it occurs rarely to very rarely. Preservation is fairly good.

Quinqueloculina lamarckiana d' Orbigny
Quinqueloculina lamarckiana d' Orbigny Todd & Bronnimann, 1957, p.27, pl.3, figs. 12 a-b

Test free, small to medium, nearly as broad as long, test section nearly triangular, the angles subacute, not carinate, chambers distinct, arranged in a quinqueline type; wall ealcareous smooth and shining; aperture end of two chamber slightly extended forming an ellipitical neck without defined lip, but a narrow elongate tooth. Dimension is 0.55 mm in length and 0.50 mm in width. This species has a wide distribution, occurring in MS 1, 2, 3, 4 and 5, from rarely to commonly.

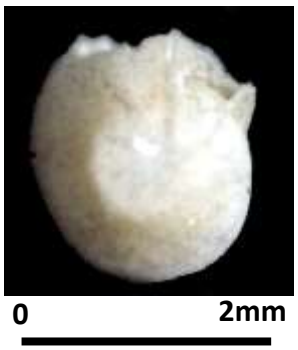
Triloculina kerimbatica Heron Allen& Eartlend var. *reticulostrata*.
Triloculina kerimbatica Philippinensis Cushman var.3 Graham & Militante, p.55, pl.8, figs. 13

Test free, small to medium in size, oblong shaped, as long as broad, generally triangular in test section, chambers arranged in typically quinqueloculine type, periphery subrounded, with strong, deep strips, and ribs all around the chambers; wall calcareous, porcellaneous milky; suture, indistinct; aperture with a narrow neck, and a tooth. Dimension is 0.65 mm in length and 0.55 mm in width. This species has been recorded from MS 2, 5 and 6, where it occurs rare to commonly.

Pyrgo subspherica d' Orbigny
Pyrgo subspherica d' Orbigny, - Le Roy,
1964, p. 21, pl.12, figs. 34-35

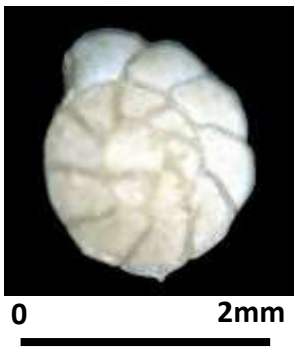
Test small, spherical shape, with carina, strongly inflated into a ball like test, chambers, spherical, arranged biserially, wall calcareous, porcellaneous, vitreous, shiny, with a strong sharp carina; suture distinct between two chambers, all of which inflated like a ball; aperture, an elongated, curved, bent opening with a bifid tooth. Dimension is 0.25 mm in length and width. This species has been recorded from MS 2and 4, where it occurs very rarely in the main shelf.

Robulus rotulatus (Lamarck) = sp.1
Robulus rotulatus (Lamarck) Bermudez,
1949 p.130, pl. 8, figs. 3-4



Test free, small to medium in size, chamber shape lenticulate, compressed from the periphery side, and inflated in the umbo-centre, about 5-6 chambers, plamispirally coiled, involute, periphery subacute, without a keel, wall calcareour, hyaline, shining suture curved, and slightly bent towards earlier chambers, with a small umbo, which is slightly rounded with shell material; aperture, peripheral, radiate. Dimension is 0.40 mm in length and 0.38 mm in width. This species has been recorded from MS 2, 4 and 5, where it occurs rarely to very rarely in the main shelf.

Rotalia annectens Parker & Jones
Ammonia annetens (Parker & Jones)-Huang,
1964 p. 50, pl. 21, fig. 3, figs. 1-3, Text fig. 3



Test free, small to large, biconvex, chambers distinct 16 to 17 in number, arranged trochospirally, with a low height, size increasing gradually and added, wall calcareous, smooth, and ornamented with cannas, sutures distinct, raised or devoted, sometimes beaded, limbate, ventrally, limbate, periphery slightly lobulote, ocute and carinate, aperture interiomarginal, placed between the periphery and umbilicus, without any spines. Dimension is 0.50 mm in length and 0.37 mm in width. This species has been widely distribution, recorded from MS 3, 4 and 5 in the Main Shelf.

Pseudorotalia schroeteriana schroeteriana (Parker & Jones)
Pseudorotalia schroeteriana scliroeteriana (Parker & Jones),
Huang, 1964, 10(1), p. 60, pl. 1, fig. 12

Test free, small to medium, some large, dorsal side flat, and ventral side very curried, chambers about 18 coiled trochospirally with a very high, 12 chambers in the last whorl periphery very acute, with thin keel, wall calcareous, hyaline, vitreous, rough; suture, strongly raised and beaded on the dorsal side, some fused in the earlier chambers, suture on ventral side strongly limbate pores or keeds arranged on both sides of limbate suture, umbilical plug forms a rounded ball like beads 8 in number; aperture a slit, interiomarginal, between the periphery and umbilicus. Dimension is 0.82 mm in length and 0.80 mm in width. This species has a wide distribution, recorded from the sample MS 2, 3, 4 and 5, where it occurs very rarely to abundantly.

Osangularia bengalensis d' Orbigny
Osangularia bengalensis d' Orbigny-Le Roy,
1964, p. 38, pl. 9, figs. 32-33

Test free, small to medium in size, dorsal side slightly flat or slightly convex, ventral side convex to slightly conical, chambers, distinct, thick, 12-15 chamber coiled in a trochospirally, with a low spire, 8 chambers in the last whorls, periphery thick, forming a thick carina, wall calcareous, porcellaneous in most of specimens with full and crowded small beads all over the dorsal side; suture, distinct, sometimes, flush with surface: aperture a narrow slit, at the base of the last chamber. Dimension is 0.62 mm in length and 0.59 mm in width. This species has a wide distribution, recorded from MS 2, 5 and 6, where it occurs very abundantly in the main shelf.

Eponides berthelotiana d' Orbigny
Eponides berthelotiana d' Orbigny-Barker.
1960, p. 218, pl. 105, figs.1, Le Roy, 1944, p. 39, pl. 2, figs. 15-17.

Test free, small ventral flat ad dorsal side typically conical, 20 chambers, distinct, arranged trochospirally with a high spire, 8 chambers in the last whorl, periphery, sub-acute, wall calcareous, porcellaneous, sometimes shiny; suture, very thick, depressed, on the dorsal side, sometimes, thick, and ventral side thick, straight, radiate from the umbilical centre, aperture at the base of the last chamber. Dimension is 0.35 mm in length and 0.30 mm in width. This species has been recorded from MS 3, 4 and 6 in the main shelf, where it occurs fairly rare.

Eponides praecintus (Karrer)
Eponides pracintus (Karrer)- Le Roy, 1944
p. 34, pl. 2, figs. 31-33

Test free, small to medium in size, biconvex, ventrally and dorsally nearly flat, ventrally conical or convex, chambers numerous 12 to 14m in number, arranged trochospirally with a low height periphery sub-acute, not rounded; wall calcareous coarsely perforate flush with surface, suture slightly limbate dorsally curved back to earlier ones, spiral suture distinct, raised, quite visible aperture a slit at the base of the last chamber, with a medium sized umbilical plug, which is smooth and rounded. Dimension is 0.68 mm in length and 0.65 mm in width. This species has a wide distribution, recorded from MS 2, 3, 4 and 6, where it occurs rare to abundantly.

Asterorotalia multispinosa (Namura)
Asterorotalia multispinosa (Namura)-Huang,
1964, p. 58, pl. 2, fig. 4

Test free, small to medium, chambers distinct, about 11 to 15 chambers arranged trochospirally with a low height, periphery very acute, bearing short spines from each last chambers, the shape is rounded, not in triangular shapes; wall calcareous, smooth hyaline, shiny, suture distinct, depressed on dorsal side limbate on the ventral sides; aperture, interiomarginal, umbilical. Dimension is 0.50 mm in length and 0.45 mm in width. This species has been recorded from MS 2 and 4, where it occurs rare to commonly.

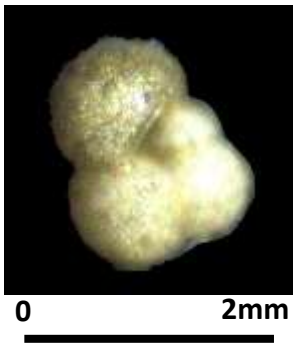
Planorbulinella larvata (Parker & Jones)
Planorbulinella larvata (Parker & Jones) Graham & Militante, 1959, p. 118, pl. 19, figs. 17a-b

Test free, small to medium in size, disc-shaped, rounded, with a lobulate periphery formed by interspaces between the chambers of the last formed whorl and whose surface are wholly covered with beaded likes cells, surrounded regularly a thick periphery, wall rough with assorted materials; surface around the periphery, aperture, not seen. Dimension is 0.30 mm in length and 0.28 mm in width. This species has been recorded from MS 2, 3 and 5, where it occurs rare to very rarely.

Orbulina universa d' Orbigny
Orbulina universa d' Orbigny-Blow, 1959, p. 200, pl. 13, fig. 5

Test free, spherical, and composed of single chamber, primary developed from *Globigerinoides triloba*, from stage to *Orbulina universa*; aperture are over the all surface; well calcareous, perforate, radial in structine. Dimension is 0.55 mm in diameter. It has a wide distribution recorded from MS 2, 3, 4, 5 and 6, where it is occurring rarely to commonly.

Globigerina preabulloides praebulloids. Blow
Globigerina preabulloides praebulloids. Blow Bolli and Sounders, 1985, p. 198, figs. 13-14a-c

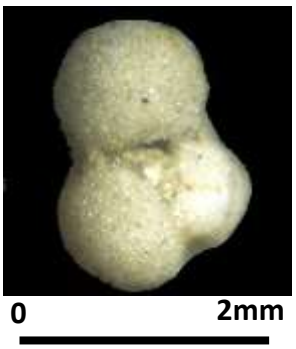


Text free, typically trochospiral, of 2½ whorls, a chambers in the last whorl, chambers are spherical, to radial in structure; wall calcareous, finely perforate, and pitted periphery strongly lobulate; suture depressed, radial; aperture semicircular, a large opening, interiomarginal, umbilical. Dimension is 0.30 mm in diameter and 0.25 mm in minimum. This species has been recorded from MS 1, 3 and 6, where it occurs rare to abundantly.

Globigerinodes triloba sacculifera (Brady)
Globigerinodes triloba sacculifera (Brady) Bolli, 1957, p.113, pl.25, figs. 5a-c; Bolli & Saunders, 1985, p. 196, Figs. 16a-b

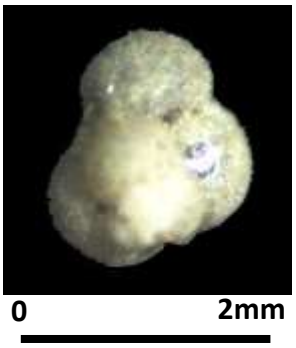
Test free, large, typically trochospirally, chambers, distinct, earlier chambers slightly globuler, to ovate; later slightly elongate about 10 to 12 coiled into two whorls trochospirally, 4 chambers, in the last whorl, the last chamber larger, sac like shaped, surface perforate and pitted; wall calcareous, primary aperture, on arched, umbilical, supplementary apertures, placed between the last three chambers, sutural in position. Maximum diameter is 0.60 mm and minimum is 0.45 mm. This species have a very wide distribution, recorded from MS 1 to 6, where it occurs rare to commonly in the main shelf.

Globigerinodes quadrilobatus d' Orbigny
Globigerinodes quadrilobatus d' Orbigny-Bolli and Saunders, 1985, p. 193, fig. 20-17



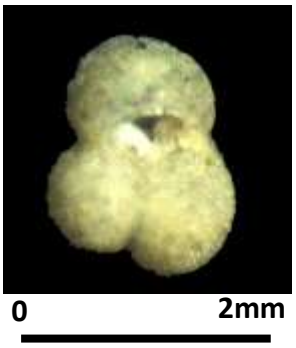
Test free, medium to large typically trochospiraly globular, chamber globular, slightly ovate, 10 to 12 chambers arranged trochospiraly 4 the chambers in the last whorl, lobulate; wall calcareous, perforate, and pitted; suture radial on both dorsal and ventral side, the primary aperture an arched opening interiomarginal, umbilical, supplementary aperture slightly wide placed between three last chambers. Maximum diameter is 0.50 mm and minimum is 0.49 mm. This species has very wide distribution, recorded from MS 2, 3, 4, 5 and 6, where it occurs rare to abundantly.

Globigerinodes rubra d' Orbigny
Globigerinodes rubra d' Orbigny
Bolli, 1957, p.113 pl.25 , figs 9a-c; Bolli and Saunders, 1985, p. 192, figs. 20-1-2



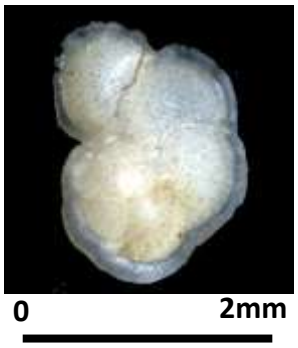
Test free, small to medium in size, typically trochospiral chambers globular to ovate, about 10 arranged in a very high trochospical of 2½ whorls, the last whorl contains three chambers; wall calcareous, finely perforate, smooth, sometimes surface hispit; suture distinct, depressed, and radial, primary aperture opening to umbilicus, smaller supplementary apertures on the spiral side, one or more apertures confined to the chambers and two other near chambers. Maximum diameter is 0.70 mm and minimum is 0.35 mm. This species has a very wide distribution, recorded from MS 2, 3, 4, 5 and 6, where it occurs rare to abundantly.

Globigerinodes subquadratus Bronnimann
Globigerinodes subquadratus Bronnimann, Bolli & Saunders, 1985, p. 192, fig. 20-6



Test free, small in size, typically trochospnal, globular chambers, about 10 arranged in a tightly trochogural, only three chambers in the last whorl, wall calcareous, smooth, very finely perforate, suture distinct, radial, one primary aperture, a rounded opening placed at the junction of the last chamber and other penultimate chambers, supplementary aperture, not distinct. Dimension is 0.28 mm in maximum and 0.20 mm in minimum diameter. This species has been recorded from MS 2, 3, 4 and 6, where it occurs commonly to abundantly in the main shelf area.

Globorotalia tumida tumida (Brady)
Globorotolia tumida tumida (Brady)- Bolli & Saunders, 1985, p. 227, figs. 33.8; 34-11-13



Test free, medium to large, biconvex, compared with its ancentral form G. *merotumida* and G. *plesiotrmida*. G. *tumida tumida* is still more biconvexly coiled, tumid and it walls and peripheral keel more robust. In equatorial view, the taxon is more elongate. All base features as well test size are subject to considerable conditions. Dimension is 2.95 mm in length and 1.50 mm in width. This species is a deeper marine species, widely recorded from MS 1 to 6, where it occurs flooded in the main shelf.

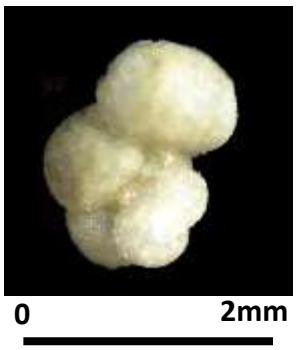
Globorotalia menardii cultrata d' Orbigny
Globorotalia menardii cultrata d' Orbigny- Bolli & Saunders, 1985, p. 226, figs. 23.3, 34.10.

Test free, very trochospiral, biconvex, compressed, equatorial periphery lobulate, axial periphery acute with a pronouned keel, wall finely perforate, surface of the earlier chambers slightly rugose, near shoulders, later ones smooth; chambers strongly compressed, arranged into 3 holes, the five to seven chambers to the last whorl, increase regularly in size; sutures dorsal curved and ventrally, radial to slightly curved, depressed umbilicus fairly wide open, shallow; aperture interiomarginal, extraumbilical, a low slit bordered by distinct lip. Dimension is 0.80 mm in length and 0.70mm in width. This species has wide distribution recorded from MS 2, 3 and 6, where it occurs rarely.

Pulleniatina obliquiloculina Parker & Jones,
Pulleniatina obliquiloculina Parker & Jones, Bolli, 1957, p. 33, pl. 4, figs. 3-5

Text free, typically trochospiral to streptospiral, early chambers arranged like *Glonigerima* with open umbilicus, later chambers completely enveloping the entire umbilical side of the previous open umbilicus and thus even appear involutely coiled, wall calcareous, perforate, radiate in structure; aperture interiomarginal in the young, a broad umbilical area, in the adult a broad low extraumbilical and at the base of the final enveeping chamber bordered above by a thickened lip, but not directly open into the earlier umbilicus, because of the streptospiral plan of growth. Dimension is 0.35 mm in maximum and 0.30 in minimum diameter. This species has been recorded from MS 1, 2, 3 and 6, where it occurs rare to abundantly in the shelf.

Hastigerina siphonifera d' Orbigny
Hastigerina siphonifera d' Orbigny Banner & Blow, 1960, p. 20, pl. text., figs. 2a-e
Bolli & Saunders 1985, p. 251, fig. 42, 1a-3b.



Test free, typically planispirally, totally evolute, chamber distinct, completely in a planispiral coil, chambers increasing in size and added; the last camber embraces earlier chambers; wall calcareous, perforate, or hispid; suture depressed, radial in structure; aperture a large opening interiomarginal, peripheral.Maximum diameter is 0.55 mm and minimum is 0.45mm. This species has a wide distribution, recorded from MS 1 to 6 in the shelf area.

Summary and Conclusion

The study area located in the northern part of Adman Sea; bounded by latitudes 13º 25´ N and 15º 40´ N and longitudes 93º 15´ E and 97º 45´ E occupies the south and southwest oceanic area of Myanmar. The area extent is approximately 101250 km^2. In the present study, the sedimentological studies and foraminifera aspects was focused in various ways. 125 specimens of surface sediments were collected from the India-Myanmar joint oceanographic research

programme. Ayeyawady continental shelf is part of an area of a complex geological setting in Andman basin, located in the south of Ayeyawady delta surrounded by land area in north and east. Ayeyawady continental shelf has a tidal range between 4m-7m is located in tropical climate and the Ayeyawady, Thanlwin and Sittaung rivers flow into the study area. A total of 6 specimens were systematically studied for microfaunal aspects. Owing to the distribution of different sediments in the studied area, water depth, turbidity, influence the distribution of fauna. By the ecology, the conspicuous scenario is that faunal distribution is mainly governed by the types of sediments where they lived and bathymetry which they need for flourished. In the present study, the faunal distribution and population are somewhat different in localities. Some fauna cannot be occurred in some area, whereas some lived in a specific region which favoured the dominance of distinct genera. It is a noteworthy that faunal population and species diversity occurred in different areas. Moreover, in some localities the species diversity is very low, which is thought to be stressed areas, where the fauna accept the specific conditions to live. Besides, some depth assemblages brought by current circulation should be differentiating with living fauna. By the occurrence of biospecies the high diversity of foraminifera is also occurred in the western part of the study area. This means that on the open continental shelf which is far from the influence of near shore physiographic and geographic barrier (Imbrie and Newell, 1904). The low species diversity encountered in the Gulf of Martaban is quite different from high species diversity of western area. Moreover western part of the area bounded by clear water is though to be favoured the occurrence of highly diverse biospecies than the turbid martaban gulf area.

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