

# PALEOECOLOGY OF HOLOCENE FORAMINIFERA SPECIES IN SMART ISLAND, MYEIK TOWNSHIP, TANINTHARYI REGION, MYANMAR

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## Abstract

The study area is located in Myeik City, the Tanintharyi Region of Myanmar. It is situated in the extreme south of the country on the coast of an island, the Andaman Sea. Myeik Archipelago lies off the far south coast of Myanmar. Samples from the Smart Island and Two-Face Island generally contained medium sand and fine sand, with minor silt, lime, and mica flakes. The (3) specimens are collected from Smart Island and Two-Face Island. All the dried residues were sieved into three fractions with mesh sizes of 30, 60, and 90. After sieving the samples, the dry samples were examined under a binocular microscope, and all the foraminifer specimens were found to be well preserved. The present study aims to focus on the distribution of foraminifer assemblages in the Andaman Sea, which is part of the complex geological setting. This result is mainly focused on the paleoecology of Holocene Foraminifers. The study areas reveal that (116) genera have been recorded belonging to (145) species. There are (36) Holocene index fossils that occurred in the study area. *Textularia conica* occurred in the area between 1000 and 3500 m of water depth, and *Eponides* sp., *Lenticulia* sp., and *Textularia* sp. arise in the deeper inner shelf to middle shelf. *Bolivina* sp and *Bulimina pupoides* are befallen in the outer shelf. Smart Island is the most populated and diverse area in the study area. According to this evidence, Smart Island is deeper than Two Face Island. Therefore, the western part of the study area is deeper than the eastern part of the study area. An attempt has been made to correlate the Bengal Basin fauna with the known Holocene fauna from the Atlantic and Pacific regions. This research has implications for the paleoceanography of Andman Sea.

**Keywords:** Smart Island and Two-face Island, 36 Holocene index species, brackish to abyssal plain.

## Introduction

Myeik is a city in the Tanintharyi Region of Myanmar, located in the extreme south of the country on the coast of an island on the Andaman Sea in figure (1). Myeik Archipelago lies off the far south coast of Myanmar. It's comprised of hundreds of islands that have coral reefs and beaches. Myeik is the largest city in the Tanintharyi Region and is the regional headquarters of Myanmar Navy's Tanintharyi Regional Command. The area inland from the city is a major smuggling corridor into Thailand. The results of this study indicate a significant ongoing change in the water environmental characteristics of the Andaman Sea. benthic foraminifers are abundant around the Smart Island and the Two Faces Island.

## Purposes of Study

The main purpose of the study areas are as follows:

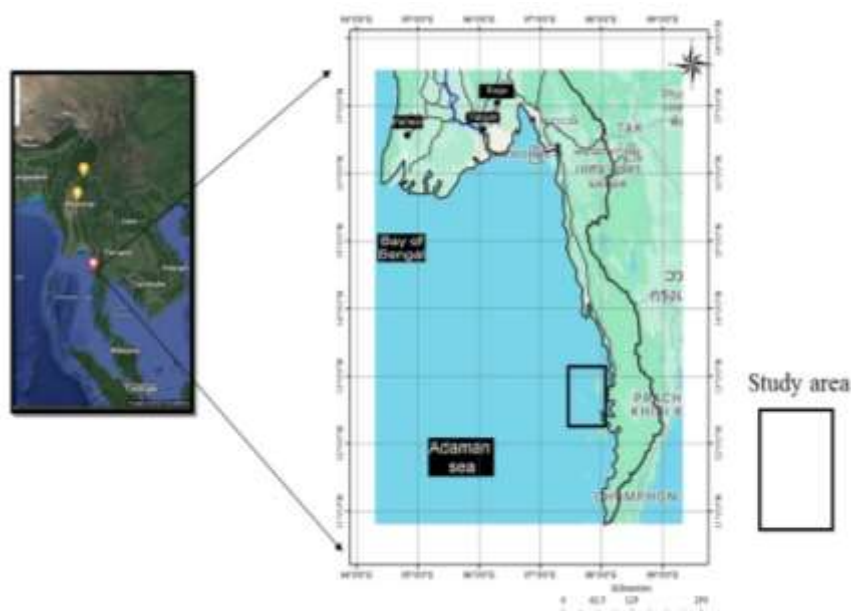
- (1) To identified the Foraminifera species
- (2) To interpret the relationship between the distribution of benthic foraminifera and environmental conditions
- (3) To determine the age of the Foraminifera
- (4) To reconstruct the Holocene paleoceanography and sedimentary environments

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**Figure 1.** Location Map of the study area

### Previous Works

Chit Saing and Tin Myint (1971) studied a total of (157) foraminifer species collected from the shallow water sediments of the Zalattaung area, located about a mile west of the Thandwe (Sandoway), Bay off Bangle of Rakine Coast. The samples were grab samples, all of which were collected by personnel from the Burma Navy Hydrographical Department on board “Thutayti”.

Ko Yi Hla (2009) carried out several studied on surface sediments of the Ayeyarwady continental shelf, such as sediment distribution, sediment dispersion, the relationship between tidal influence and sediment supply. He mainly focused on the detailed study of recent foraminifer species present in the seafloor sediments based on 22 grab samples.

Khin Mar Than (2023) carried out a marine survey along the Bay off Bangle the Rakhine Coast, Ayeyarwady Delta Shelf, and Tanintharyi Coast, and collected 26 sediment sample of Kasten Core. A total of (175) species had been identified and described in her Ph.D thesis.

### Methods of Study

The beach samples were collected at low tide during the daytime from the constant depth (1.5m). The beach samples were collected from the east to west of the Smart Island and Two face Island in figures (2 and 3). All the wet samples were (about 50g) treated with water containing a little amount of soda ash and detergent and left for a day. These samples were again washed over the steel sieve of 150 mesh thoroughly. The residue obtained was dried and stored into sealing plastic bags. The dried residue with a weight of 10 gm was sieved again through mesh 30, 60, and 90 respectively. The beach sand samples from northern most part including Smart Island are rich in a larger number of Holocene foraminiferal fossils, all of which are well preserved. Handling by means of a sable hair brush is convenient in picking the residues under binocular microscope.



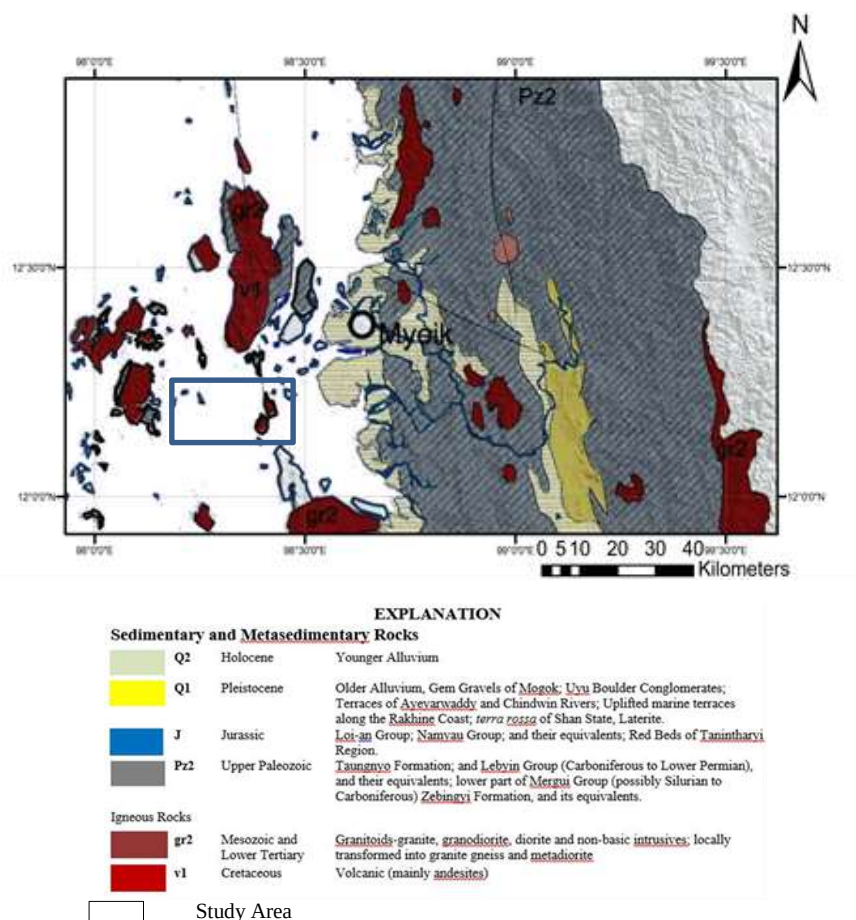
**Figure 2.** Field group photo in Smart Island (Par pant Kyun)



**Figure 3.** Location of the smart island

### Regional Geologic Setting

Tanintharyi Region is composed of a north-south trending, narrow, mountainous, coastal stretch of the mainland part of Myanmar. The territory is about 150 km (93 miles) north of Aceh in Indonesia and is separated from Thailand and Myanmar by the Andaman Sea. It comprises two island groups, the Two-Face Island (Two Sand Line Beach) and the Smart Island (Par Pant Kyun) islands. Two Face Island is located 46 miles away from Myeik City, and Smart Island is located 51 miles away from Myeik City. The study area lies in the Shan-Tanintharyi Block and the southern continuation of the Tanintharyi Ranges. The regional geological map of the study area is shown in figure (4).



**Figure 4.** Regional Geological Map of the Study Area (after MGS, 2014)

### Faunal Analysis

The present study has revealed that (116) genera have been recorded, belonging to (145) species in Table (1). The sediment in the areas are mostly composed of medium sand, although some sample collected near the shore contain mixtures of detrital grains such as silt, lime and mica flakes. An impressive form of the specimens contain 22%, with cylindrical form and lenticular form species dominating at about 60%, followed by arenaceous fauna at approximately 10%, and fusiform foraminifers at about 25%. The biserial foraminifera are founded minor amount. Some arenaceous species are *Bolivina robustus bardy*, *Bolivinita quadrilateral Schwager* and *Textularia fuliacea*, *Elphidium advenum*, *Quinqueloculina cultrate*, *Ammobaculites agglutinans*. These have also occurred in the study area, with a high salinity and Ph value.

### Populations and their Distribution in Relation to Environmental Factors

The study report that *Hanazawa nitidula* var.1 is the highly populated in the smart island. *Nonion stelligerum*, *Quinqueloculina seminulum linnefcus*, *Rectoglandulina glans* are the lowest populated in the study area. The total population of species in Smart island is (141) species, northern part of Two-face island is (93) species and (58) species is in the southern part of Two-face island in Table (1). The total diversity of species in Smart island is (67) species, northern part of Two-face island is (64) species and (39) species in the southern part of Two-face island. All of the above evidences, Smart island is the most populated and diversity in the study area in figures (5) and (6). According to the Isreasky (1949) described that, if the continuous decrease in species number basin becomes continuously shallowing and continuous increase in species number, basin becomes continuously deepening. According to this evidence, Smart Island has deeper than Two-face Island. Therefore, the western part of the study area has deeper than the eastern part of the study area.

*Quinqueloculina Lamarchia* is abundant in the study area between 0-20 m water depth and occurred in inner shelf. *Nonion stelligerum* is also occurred in inner shelf. *Elphidium crispum* is dominates in the area between 0- 100 m water depth. *Bolivina antiqua* is dominates in the area between 100-1000 m water depth and found in outer shelf. *Textularia conica* occur in the area between 1000- 3500 m water depth.

In the study area, 41 species occurred in the shallow marine. *Quinqueloculina*, *Nonionella*, *Textularia*, *Lenticulina*, *Eponides* and etc. occurred in the inner continental shelf. Some species such as *Lenticulina*, *Bulimina*, *Bolivina* etc. occurred in the middle continental shelf to outer continental shelf. *Pygro* species sentient in abyssal plain (by Berggren and Boersma, 1978). So, all of the above species are distributed from outer continental shelf to abyssal plain in figure (7).

Table 1. Showing the distribution of foraminifera species in Andman Sea, Myeik Township

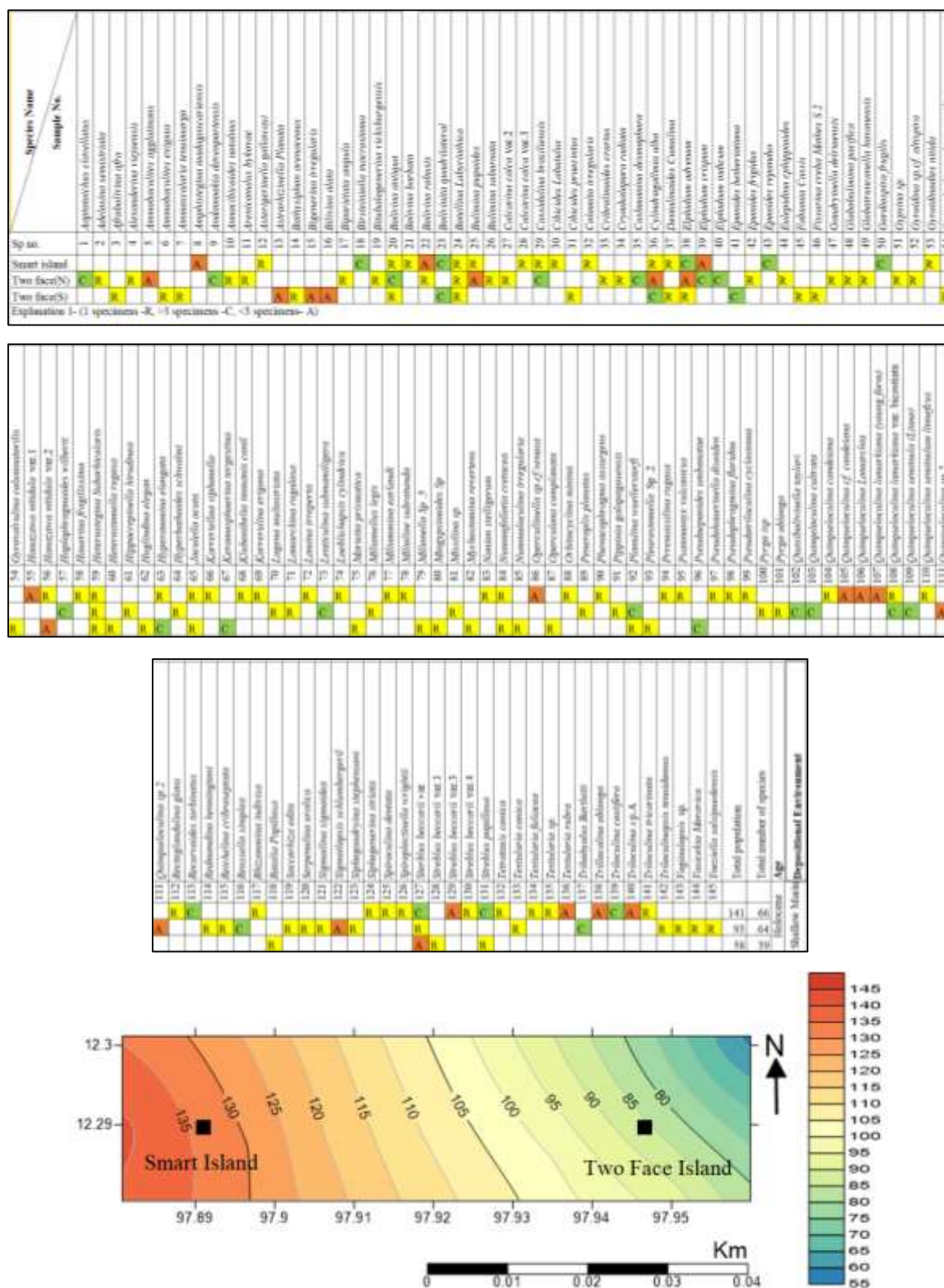


Figure 5. Population density of the Smart Island and Two Faces Island





### Conclusion

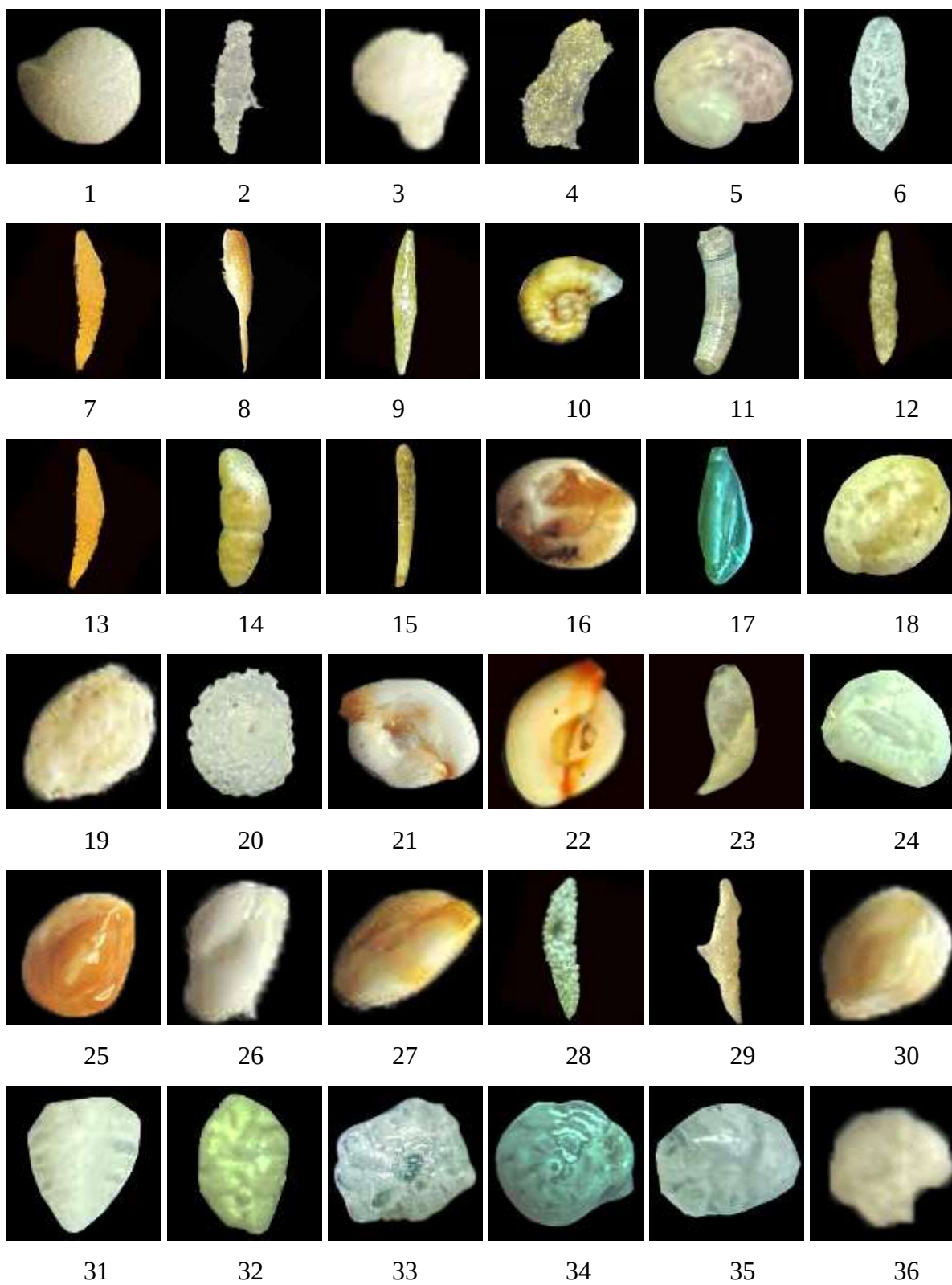
Myeik is a city in the Tanintharyi Region of Myanmar, located in the extreme south of the country on the coast of an island on the Andaman Sea. The research aims to improve understanding of the taxonomy and paleontological aspects of foraminifers in the study area. There are (116) genera, belonging to (145) species. There are (36) Holocene index fossils are recorded in the study area. Smart Island is the most population and species diversity in the study area. According to this evidence, Smart Island has deeper than Two-face Island. Therefore, the western part of the study area has deeper than the eastern part of the study area. *Textularia conica* occur in the area between 1000 to 3500 m water depth and *Eponides* sp., *Lenticulia* sp., *Textularia* sp. are occurred in the deeper inner shelf to middle shelf. *Bolivina* sp and *Bulimina pupoides* are occurred in the outer shelf. In the study area, most of the species are occurred in inner shelf to abyssal plain. An attempt has been made to correlate the Adman Sea fauna with the known Holocene fauna from the Atlantic and Pacific regions.

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### References

- Berggren Boersma, (1978). Trend in Bathymetry and fossil content of sediments from the shelf to the abyssal.
- Chit Saing and Tin Myint, (1971). The shallow water sediments of the Zalattaung area located about a mile west of the Thandwe (Sandoway), Bay of Bangoff Rakine Coast.
- Israesky, M.C., 1949. Oscillation Chart. American Association of Petroleum Geologists Bulletin, vol.33:92-99.
- Khin Mar Than, (2023). Quaternary Foraminifers from the Ayeyarwaddy Delta Shelf with special Emphasis on Biostratigraphy, Paleoecology and Paleoclimate.
- Ko Yi Hla., (2009). Sediment dispersal and accumulation off the Ayeyarwady Delta, tectonic, and oceanographic controls.
- Rifardi, (2002). Ecological analysis of living benthic foraminifera in surface sediments from the south Yatsushiro Kai (sea), southwest Kyushu, Japan, *jour-coastal Development*, v.5, 1410-5217.



1mm



### Explanation of Plate I

1. *Alexanderina viejoensis*
2. *Ammoscalaria tenuimargo*
3. *Annocibicoides notalhus*
4. *Astrorhizinella planata*
5. *Birsteiniolla macrostoma*
6. *Bolivinita quadrilutera*
7. *Botellina labyrinthica*
8. *Cushmanina desmophora*
9. *Cylindrogallmia alba*
10. *Gordiospira frugilis*
11. *Hippocrepinella hirudinea*
12. *Hyperammina elongata*
13. *Jaculella acuta*
14. *Korrerulina erigona*
15. *Loeblichopsis cylindrica*
16. *Miliamellus legis*
17. *Miliammina earlandi*
18. *Milioline subrotunda*
19. *Missilina* sp.
20. *Mychostomina revertens*
21. *Pippinia galapagosensis*
22. *Prremassilina rugosa*
23. *Psammonyx vulcanicus*
24. *Pseudohauerinella disoiden*
25. *Pyrgo* sp.
26. *Pyrgo oblonga*
27. *Quinqueloculina seminula*
28. *Rhizammmina indivisa*
29. *Saccorhiza edita*
30. *Sigmoilina sigmoidea*
31. *Spiroplectinella wrightii*
32. *Streblus beccarii* var
33. *Streblus beccarii* var.3
34. *Streblus beccarii* var.4
35. *Streblus papillosa*
36. *Trihohyalus Bartletti*