OLIGOCENE AND MIOCENE MICROFOSSILS OF MYANMAR

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ABSTRACT

Myanmar has a number of sedimentary basins, which range in age from Paleozoic to Recent. The Tertiary basins are well differentiated from one another geomorphologically and tectonically and each basin also has separate microfossils and depositional histories.

From available information, the Tertiary basins in Myanmar are of nine groups, which are aligned in three north-south trends. These are the western trend, central trend, and the eastern trend. The western trend consists of the Rakhine offshore Islands, Yanbye Island, Myanaung Island and the northern coastal plains, which are made up of flysch and shallow marine sediments. The Central trend comprises the Hukawng basin, Chindwin basin, Central basin, Pyay Embayment basin, Ayeyarwady Delta basin, Ayeyarwady offshore basin and Bago Yoma basin. The eastern trend group consists of isolated basin located on the Eastern Highlands that includes Tanintharyi region with its lacustrine deposits.

On the offshore islands the Oligocene and Miocene sedimentary rocks are classified into Kalabon, Yechangyi, Yenandaung, Maragyun and Leikkamaw formations respectively. The Oligocene formation is Kalabon Formation. The Miocene formations are in ascending order Yechangyi, Yenandaung, Maragyun and Leikkmaw Formations. Among these the Kalabon, Yechangyi and Yenandaung Formations are so rich in microfossils that seven Rakhine biostratigraphic zones have been established within these formations. These are (in Kalabon Formation) Rakhine biostratigraphic zone 6; (in Yechangyi) Rakhine biostratigraphic zone 7 and 8; (in Yenandaung Formation) Rakhine biostratigraphic zone 9,10, 11 and 12.

The northern part of the Central trend group includes two intermontane basins, namely, Hukawng basin and Chindwin basin. The Hukawng basin has Langnem Bum Formation (Oligocene) and Takam Hka Formation (Miocene) which yield a number of palynomorphs (spores and pollens) by which the stratigraphic position and depositional conditions of each formation can be determined and interpreted. These formations were deposited under fluviatile conditions.

The Chindwin basin has two flanks, the west and east flanks. The west flank has Tonhe Formation (Oligocene) and three Miocene Formations which are in ascending order Letkat, Natma and Shwethamin Formations. The stratigraphic position and deposition of

these formations are established by the statigraphic ranges of spores and pollens found in them. The east flank is made up of four Miocene formations which are in ascending order Inga, Nandawbee, Shauknan and Kaungton Formations whose age are also determined by the ranges of spores and pollens found in them. Two Palynological biostratigraphic zones are in ascending order *Rhizophora / Floscheutzia levipoli* zone and *Cicatricosisporites macrocostatus, Disaccites Assemblage* zone. In the east flank two biostratigraphic zones *Rhoipites nitidus-Distaverrusporites* type A and *Disaccites* zone were established.

In the Central basin the Oligocene formations are in ascending order Shwezetaw, Padaung and Okhmintaung Formations. The Miocene formations in the Central basin, Pyay Embayment basin, Ayeyarwdy Delta basin and Bago Yoma basin are in ascending order Pyawbwe, Kyaukkok and Obogon Formations. The Shwezetaw Formation and Okhmintaung Formation are very rare in microfossils and sometimes totally absent. The Padaung Formation and Pyawbwe Formation are very rich in microfossls of foraminifera, ostracods, spores and pollens and nannoplanktons. The Kyaukkok Formation and Obogon Formation contain rare microfossils. On the basis of the stratigraphic ranges of planktonic foraminifera, four biostratigraphic zones in the Shwezetaw Formation, five biostratigraphic zones in the Padaung Formation, one biostratigraphic zone in the Okhmintaung Formation and two biostratigraphic zones in the Pyawbwe Formation have been established.

The four biostratigraphic zones in the Shwezetaw Formation are in ascending order Barren zone, *Haplophragmoides* zone, *Trochammina 5* zone and *Cassidulinoides* zone.

The five biostratigraphic zones in the Padaung Formation are in ascending order *Rotalia 28/ Cibicides 11/ Virgulina* zone, *Bolivina 3/ Loxostomum 3* zone, *Textularia 5/ Planularia 2* zone, *Quinqueloculina* zone and *Cibicides 13/14* zone.

The one biostratigraphic zone in the Okhmintaung formation is *Nonion boueanum / Globigerina ciperoensis* zone.

The two biostratigraphic zones in the Pyawbwe Foramation are in ascending order *Cibicides tapanoeliensis / Rotalia umbonata* zone and *Rotalia koboeensis / Rotalia beccarii annectens* zone.

The Ayeyarwady offshore basin has a stratigraphic succession of Oligocene, Miocene, Pliocene and Pleistocene formations. The reefal and biostromal limestones are found in the Late Oligocene and Early Miiocene sequences. The sediments overlying the

limestone are composed of marine shale, clay and sandstone ranging in age from Early Miocene up to Holocene. The stratigraphic positions of these sediments are determined by foraminifera and nannoplanktons.

The isolated basins on the Eastern Highlands generally contain lacustrine sediments of possibly Late Miocene age, which were deposited in the grabens and half-grabens. Little is known about the occurrence of microfossils in the sedimentes of these basins.

The species blooming is found in two Miocene formations in Myanmar. One is found in the Yenandaung Formation of Yanbye Island. The other is noted only in the Pyawbwe Formation occurring between the Thayetmyo and Kama-Padaung areas (typically north latitudes 18° :30' and 19° :30').

There is a fauna break which has been investigated by foraminifera evidence in the Minbu Pyawbwe section between Upper Okhmintaung Formation and basal Pyawbwe Formation. This fauna break does not exist in the southern areas (Kama-Padaung) where there is a continuous deposition between the Late Oligocene and Early Miocene. This evidence is shown by the occurrence of continuous fauna zone sequence of both planktonic foraminifera and nannoplanktons.

The Pyawbwe Formation is fully developed in the Central basin and Pyay Embayment basin. The variation study of this formation is carried out during this work based on thickness, lithology and fauna content of the sections at Salin Chaung, Chauk Deep Test Well No.1, Pyawbwe and Pyaye Well No.14. This study shows that in the northern part lying between north latitudes 20° and 21°, this formation contains little or no foraminifera fauna compared to that in the southern part lying between north latitudes 19° and 20° where the marine fauna is rich.

In this work a total of 302 important Oligocene and Miocene hypotype foraminifera species together with three new type species are listed with the original taxonomic references. The distribution of the Oligocene and Miocene species of foraminifera, spores and pollens, ostracods and nannoplanktons are shown with their range charts.

This is the author's endeavour contribution to the Tertiary stratigraphy of Myanmar.

Key words: Myamar; Tertiary basins; Oligocene and Miocene stratigraphy and microfossils; biostratigraphic zones.

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