

OLIGOCENE-MIOCENE SEDIMENTOLOGY AND
SEQUENCE STRATIGRAPHY OF THE NORTHERN
PART OF THE MINBU BASIN, CENTRAL MYANMAR

Ph.D. DISSERTATION

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Abstract

The study area is located in northern part of Minbu Basin, Central Myanmar, bounded by Longitude 94° 15' E to 95° 00' E and Latitude N to 21° 56' N, which is mainly consists of Oligo-Miocene, mollassic clastic sedimentary rocks of Pegu Group.

The Pegu Group is divisible into Lower Pegu Group and Upper Pegu Group, which are bounded by unconformities. The Shwezetaw (Sannoisian), Padaung (Rupelian), and Okhmintaung (Chattian) are consisted in Lower Pegu Group whilst the Pyawbwe (Aquitanian), Kyaukkok (Burdiagonal), and Obogon (Vindobonian) Formation comprise in Upper Pegu Group.

In the present study, the sedimentology and sequence Stratigraphy of these rock units are attempted to deduce their evolution.

Petrographically, the sandstones of Shwezetaw, Padaung, Pyawbwe, and Kyaukkok are Lithic Arkose where as the Okhmintaung and Obogon Formation are Arkose and Lithic Arkose in accordance with Mc Bride's (1963) sandstone classification. By using the Dickinson (1979), Dickinson and Suczek (1979) and Ingersoll and Suczek (1979) triangular diagrams, the rocks of the study area show the Dissected Arc, Recycled Orogenic, Basement uplift, Magmatic Arc, Mixed Mgmatic Arc and Subduction Complexes, Collision Orogen, Rifted Continental Margin and Collision Suture Belts provenances. The provenance deviation is mostly occurred in Okhmintaung and Obogon formations compared with other units. Diagenetically, an early diagenetic stage and a late diagenetic stage can be established.

Moreover, the petrographic characterics and are also controlled by the basin tectonics, source rocks lithology, climate, and sea-level position. So, the relationship between petrography and sequence stratigraphy is acquired in the area.

At least (7) lithofacies in Shwezetaw Formation, (7) lithofacies in Padaung Formation, (8) lithofacies in Okhmintaung Formation, (7) lithofacies in Pyawbwe and (8) lithofacies in Kyaukkok and (6) in Obogon Formation consist in the area. Moreover, at least eight lithofacies association can be established and which strongly suggest that the depositional environments of Shwezetaw, Padaung

Okhmintaung, Pyawbwe, Kyaukkok and Obogon Formation as deltaic, offshore/shelf, storm dominated nearshore and estuarine, lower shoreface to offshore, fluvialtile to shallow marine, estuarine respectively.

By the facies analysis, sediment distribution strongly support the depositional systems shifting in the basin. The depocenter was mostly in southwestern part of the basin through Oligocene-Miocene.

By the sedimentation facies analysis, the area under investigation generally follows the transgressive - regressive sea level cycles which generate the sequences in different orders.

In the area, two second order sequence, and at least five third order sequences are encountered. Lower Pegu Group and Upper Pegu Group can be regarded as second order sequences bounded by unconformities (type I sequences). LST, TST, and HST of lower Pegu Group more or less coincide with the Shwezetaw, Padaung, and Okhmintaung Formation respectively. Moreover, the sequence boundaries can also be fit with global sea level curve of Haq et. al. (1987). The LST of Upper Pegu Group is not distinct enough because of the unconformity existed at Oligo-Miocene boundary, which took time generating a Lacuna in northern part and Lowstand system tracts suggest in the deeper basinal area. The TST of Upper Pegu Group is resemblance to Pyawbwe Formation which is terminated by the Highstand deltaic facies of Kyaukkok and lasted at the end of Obogon deposition.

The LST of Lower Shwezetaw Sequence started on an unconformity forming an incised valley fills (IVF) Sequence TST successively deposited as the transgressive prodelta shale and overlain by HST of deltaic sand body with coal measures.

The LST of Shwezetaw Padaung Sequence started on sequence boundary SB2 and followed by TST and terminated by the highstand tidal channels. The TST commenced at the opening of Rupelian abrupt deepening without a well developed aggradational parasequences on a ravinement surface as forced transgression. The transgression generates the condensed horizon by its maximum flooding. The onlap natures occurred in the rock record points out a marked transgression but uniform thickness of strata exhibits the low gradient of the basin.

The High stand Systems Tracts is documented by a progradation horizon upon which the forced regression taken place as a Low Stand Systems Tract of upper Padaung Sequence, which is a basinward shifting in facies as facies dislocation. The following transgression generated the Transgressive Systems Tracts which was terminated by regression of Okhmintaung deposition at the opening of Chattian, where the Highstand Systems Tracts existed. The Pyawbwe Sequence commenced at the opening of Aquitanian has a thin Lowstand Systems Tract due to the retreat of sea towards the deeper basinal site upon which transgressive System Tract occurs. The TST was terminated by highstand deltaic and fluvial depositions of Kyaukkok Formation in Burdigalian. Therefore, the rapid rising and slow falling sea level occur in this sequence.

The Obogon Sequence started deposition at the opening of Vindobonian on an erosive incised valley system, later influenced by fluctuating sea level and terminated at the Pegu-Irrawaddian boundary. The LST of Obogon Sequence is an incised valley fills and transgress estuarine system (TST) and followed by highstand of regressive shallow estuarine to fluvial deposits.

Therefore, the sequence stratigraphic analysis points out the sea level oscillation with sedimentary environment shifting in the area and formation of Systems Tracts.

The area had been interested by its petroliferous nature of the basin for a century. The oil exploration has to be practiced. The sequence analysis can support the reservoir and source rocks position and the petrographic analysis can point out the reservoir quality but the further investigation should be done.

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