

Sedimentary Characteristics and Chronostratigraphy of Upper Miocene to Pliocene in Rakhine Basin, Bay of Bengal

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Abstract

As an active continental margin basin, Rakhine basin can be divided into the submarine plain in the west and the Rakhine fold belt in the east. It experienced three evolution stages: the embryonic stage (Late Cretaceous-Paleocene), collision stage (Eocene-Oligocene) and quick collision stage (Miocene-Pliocene). Drilled wells show that the strata are mainly Miocene-Pliocene. Lower part of Upper Miocene develops dark grey calcareous mudstone with thin-bedded grey-greenish grey siltstone, sandstone interlayers. Upper part of Upper Miocene develops grey-greenish grey siltstone with dark grey mudstone interlayers. Lower part of Pliocene is mainly grey-dark grey mudstone, and occasional sandstone interlayer/mudstone interlayer. Middle part of Pliocene is thick-bedded siltstone with thin-bedded grey mudstone interbed. Upper part of Pliocene is light grey medium-bedded sandstone with medium-thin-bedded grey mudstone interbed. Lower part of Pleistocene develops thick-bedded grey mudstone. Upper part of Pleistocene develops thick-bedded sandstone. Based on cores, debris, thin sections, logging and 3-d seismic explanation materials, it is found that small-scale littoral-shallow sea deltas, turbidity fans, incised valley, bathyal continental slope and bathyal plain sedimentary systems developed in study areas. The reservoir rocks are mainly developed in the littoral-shallow sea, delta and turbidite fan sedimentary systems. The small-sized trench-slope basins may be host to the medium-or small-sized block oil-gas pools dominated by natural gas. More than 300 samples from 6 wells were used to analyze the microfossils (Calcareous nannofossils, foraminiferas, dinoflagellates and sporopollens) in order to study the chronostratigraphy and the paleoenvironments. Twenty-six foraminifera genera (55 species), 23 calcareous nannofossils genera (43 species), six dinoflagellates genera (10 species) were identified. More than 50 palynomorphs were identified and the palynomorph quantitative distribution charts were established in every well. Fossil assemblages were established in every kind of microfossils. Symbolic elements were found to ascertain the strata boundary. Benthic foraminifera *Pseudorotalia* were found to confirm the bottom of Miocene. Calcareous nannofossil *Cyclicargolithus floridanus* were found to confirm the boundary of Miocene and Pliocene. Calcareous nannofossil *Discoaster* sp., *D. pentaradiatus*, *Reticulofenestra minutulawere* were found to confirm the boundary of Pliocene and Pleistocene. According to the fossil community characteristics, it should be hot and humid tropical paleoclimate in Miocene - Pleistocene in Rakhine basin. The assemblages of the above 4 kinds of microfossils can reflect the change of sedimentary environment from littoral sea – inner shelf of shallow sea - littoral sea - inner shelf of shallow sea – littoral-shallow sea - inner shelf of shallow sea – middle shelf during Miocene to Pleistocene. The assemblage predominated by contracted dinocyst like *Tuberculodinium vancampoeae* and the presence of some microforaminifer linings reflect the warm water sedimentary environment.