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ABSTRACTS OF POSTERS

Poster 1

Facies organization and depositional environments of some selected outcrops of Sandakan Formation (Upper Miocene), Sandakan, Sabah

T.A. HODAIRI[1], A.R. ABDUL HADI[2] AND A. WAN HASIAH[1]

[1]Department of Geology, University of Malaya
50603 Kuala Lumpur, Malaysia
[2]Geophysics Group, School of Physics, University of Science Malaysia
11800 USM Penang, Malaysia

This paper discusses sedimentological aspects of fieldwork carried out at several localities in central Sabah Sub-basin, the onshore extension of the offshore Sandakan Sub-basin, which contains several hydrocarbon-bearing reservoirs. The sedimentology and facies organization of several well-exposed successions of the Sandakan Formation and the interpretations of their depositional environments are described.

The study area is situated within the NE Sabah basin, which is located along the east coast of Sabah. This basin has been divided into the Central Sabah Sub-basin and the Sandakan Sub-basin (Leong and Azlina Anuar, 1999). The sedimentary succession within the basin has been dated to be of Miocene to Pliocene in age, and can be found exposed in the Sandakan Peninsula and the Dent Peninsula, which lie between Labuk Bay and Darvel Bay.

In the low-lying areas south of Sandakan town, roadcuts along a new bypass road from Jalan Ulu Batu Sapi to Kampong Bahagia expose several thick, well-preserved outcrops of mud-dominated, sand-shale successions. The background shale is dark gray to black in color; the sandstones are irregularly thin-bedded, characteristically channelised layers. The sandstone Layers are interpreted as load cast or gutter cast formed by wave scour on shelf mudstone bed.

Near the hilltop army barracks along Jalan Thunyne, Taman Samudera, thick hummocky cross-stratified sandstones are found interbedded with thin shale. These fine to very fine-grained sandstones have been interpreted as storm deposits, and they represent part of a prograding storm-dominated shorefaces. Two large and very thick, coarsening-upward sandstone-shale successions occur at the hilltop areas near the IOI Oil Mill–Kampong Bahagia site and along Cecily Road. Both hill-cut outcrops display similar facies organization. At the Cecily Road outcrop, more than 100 meters of upward — coarsening, upward-sanding coal-shale-sandstone successions are exposed.

The succession can be separated into three units:

i) Lower Unit- this is a coal-bearing, mud-dominated sequence. The base comprises of laminated to lenticular-bedded, brownish gray mudstone with large, cobble-sized coalified wood fragments, capped by two, thin layers of coal. The upper part of the unit is marked by the presence of thicker, wavy- to flaser-bedded sandstones and rippled sandstone lenses, encased in flaky, carbonaceous mudstone. Plants debris are found scattered within the unit. This unit probably represents a lagoonal-estuarine deposit with a well-developed swamp.

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ii) Middle Unit- this unit is a thick, sandstone-shale succession punctuated with several thick, trough cross-bedded sandstone. The interbedded sandstones are wavy- to flaser-beded, with well-developed mud-drapes while the mudstones are laminated to lenticular bedded. They both represent deposition in a broad tidal flat environment. The thick, trough cross-bedded sandstones are sub-tidal, channelised deposits.

iii) Top Unit- this uppermost unit is dominated by thick (50-200 cm) clean, cross-bedded sandstones, frequently displaying rippled top. These sandstones possibly represent a broad sandy tidal flat environment, most likely with some fluvial influence.

The geographic locations of the outcrops and the structural geology of Sandakan Formation imply a simple organization for the different outcrops. The thick mudstone unit with ubiquitous presence of gutter cast sandstone lenses represents the lower part of the investigated Sandakan Formation. This unit may be succeeded in places by thick, hummocky sandstones. The tide-dominated, lagoonal-estuarine and tidal flat deposits of Cecily Road and IOI-Kg Bahagia represent the uppermost part of the succession. The organization of the different sedimentary facies of the Sandakan Formation suggest a gradual, upward-shallowing of the environment and a marked change in the depositional regime: a change from a lower shoreface to shoreface, wave- and storm-dominated environment to a tide-dominated, lagoonal-estuarine to tidal flat environment with appreciable fluvial influence.