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Please note that there is an error in **Geology Paper 23** in the Program & Abstract book of the Petroleum Geology Conference & Exhibition 2009. The correct extended abstract is printed below.

Geology Paper 23

The Middle Miocene Unconformity (MMU) in North Luconia, Deepwater Sarawak: How unconformable is the unconformity?

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Seismic and biostratigraphic data concurrently show that the Middle Miocene Unconformity (MMU) of the South China Sea is in most places neither of middle Miocene age nor an unconformity in the traditional sense (i.e. a true widespread break in the stratigraphic record).

Crustal extension during the late early Miocene resulted in listric faulting, fault-block rotation, and accelerated subsidence in a broad zone around the 'oceanic' core of the South China Sea; A combination of processes that formed the MMU. Crests of fault-blocks experienced mostly minor (probably entirely submarine) erosion and the 'mobilised' sediments were re-deposited in adjacent lows (Figs. 1,2 and 3). Only locally evidence is seen for subaerial peneplanation at the MMU and in those rare instances the MMU is directly overlain by shallow water (carbonate) facies (Figs. 4,5 and 6).

Hemipelagic sediments drape the rugged, essentially structural, topography of the MMU and at their base condensed sections above local unconformities are seen over the more prominent highs. There must have been, however, near continuous deposition at this time in the lows. The structural history of North Luconia is thus characterised by complete inactivity after the extensional event which created the MMU. The original relief of the MMU has been preserved to the present day with only minor and local erosional/depositional modification; The apparent structuration of the hemipelagic cover seems merely the effect of draping over pre-existing relief as opposed to late folding, which has important implications for the interpretation of the age of the numerous structures.

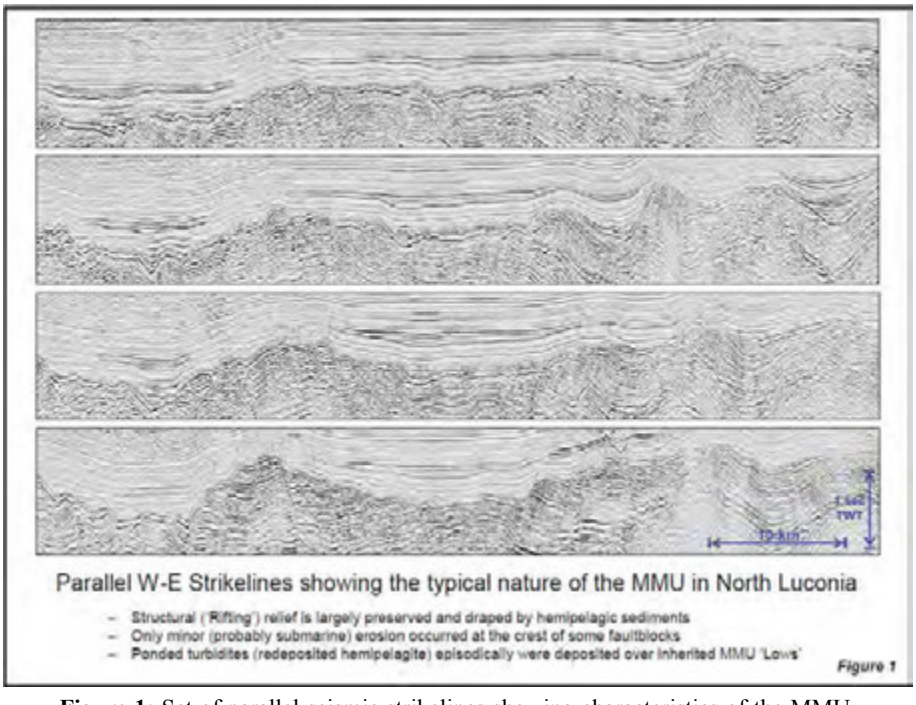

Figure 1: Set of parallel seismic strikelines showing characteristics of the MMU.

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Stratigraphic relationships across the MMU are likely to be quite variable from significant missing section to continuous, albeit condensed, sedimentation (Fig. 7)

Graphic correlation analysis of biostratigraphic data from three deepwater wells in North Luconia that penetrate the MMU reveals that it comprises variable amounts of geologic time and that it is covered by condensed sections of variable durations. The age of the MMU in all three wells is late early Miocene. In the Well "B" (Fig. 8) and Well "A" (Fig. 9), drilled on paleo-highs, the MMU comprises about 4 Ma and 2.5 Ma, respectively. The condensed sections atop the MMU in both wells comprise equivalent amounts of geologic time, about 10 Ma (middle to late Miocene). Well "C" (Fig. 10) was drilled on the flank of a MMU high-block, and in this well, the MMU comprises only about 2 Ma and is covered by an interval with abundant reworked microfossils interpreted to represent erosional debris from adjacent highs. A condensed section of about 8.5 Ma rests upon this interval. A comparison of these well results (Fig. 11) indicates that the pre-MMU section in all wells accumulated rapidly during the mid-early Miocene and is underlain in Wells "A" and "B" by thinner sections of Oligocene-Lower Lower Miocene rock. MMU erosion was most extensive on the paleo-highs drilled by Wells "A" and "B" and was less along the flank drilled by Well "C". Deposition of hemipelagic sediments in Well "C" began about 1.5 Ma earlier than in Wells "A" and "B".

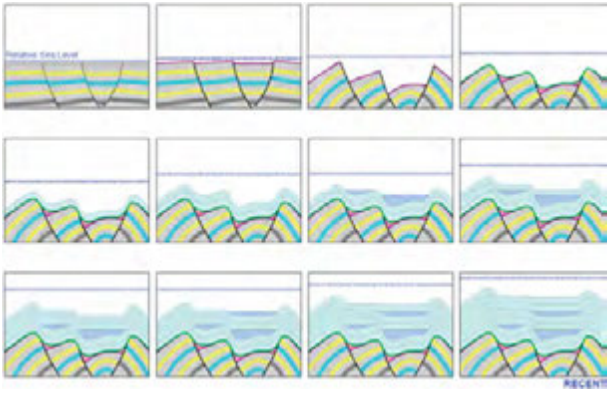

Figure 2: Schematic reconstruction North Luconia: Early Miocene to Recent (1).

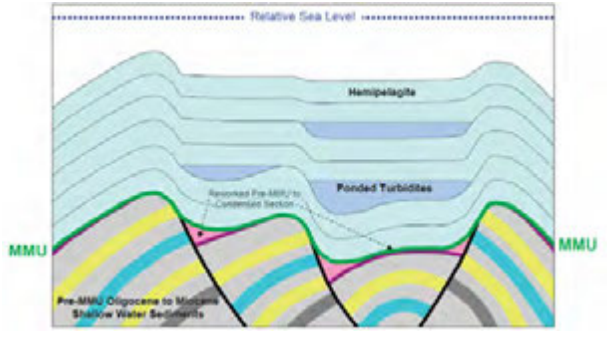

Figure 3: Schematic Geological Cross-Section North Luconia (1).

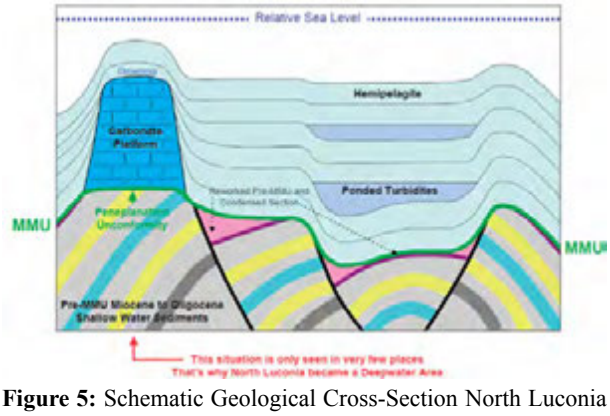

Figure 5: Schematic Geological Cross-Section North Luconia (2).

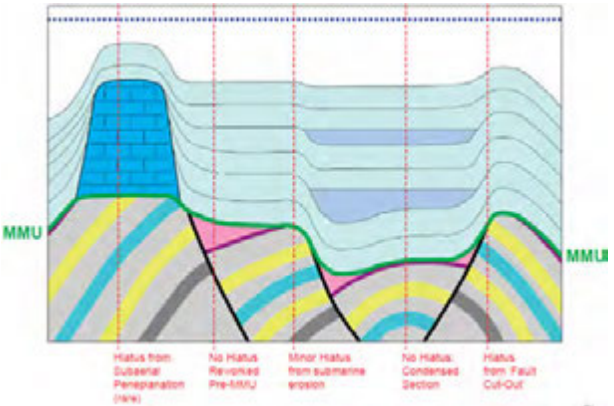

Figure 7: Schematic representation of variable stratigraphic relationships across the MMU.

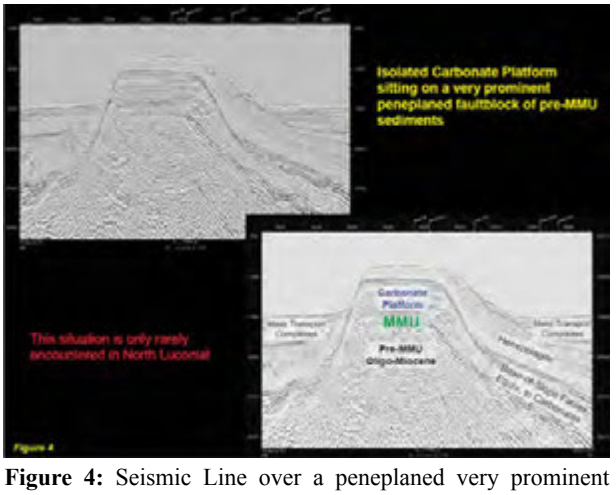

Figure 4: Seismic Line over a peneplaned very prominent pre-MMU Faultblock.

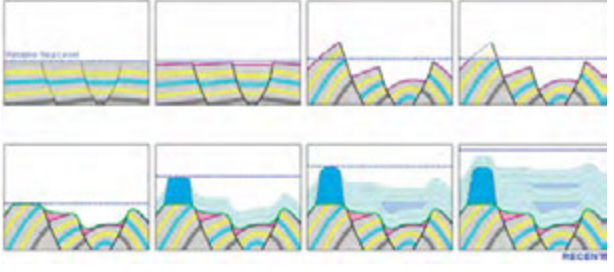

Figure 6: Schematic reconstruction North Luconia: Early Miocene to Recent (2).

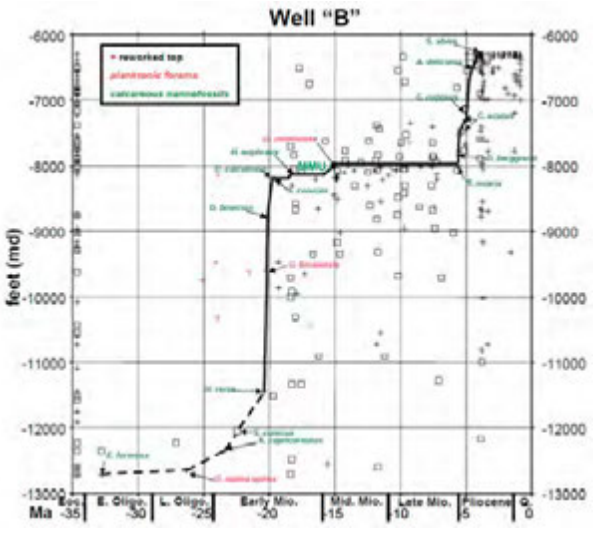

Figure 8: Graphic correlation plot of Well "B".

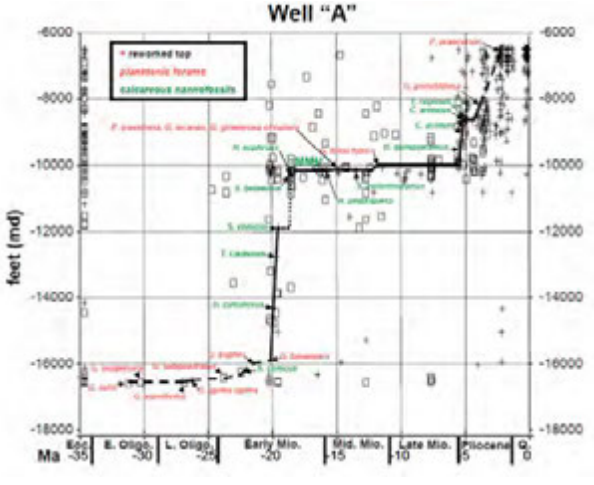

Figure 9: Graphic correlation plot of Well "A".

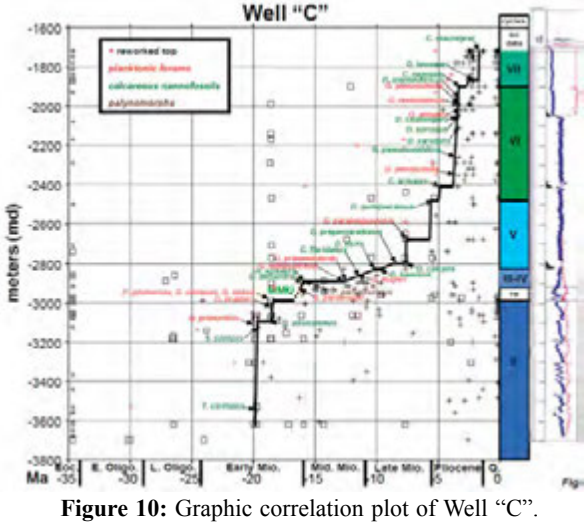

Figure 10: Graphic correlation plot of Well "C".

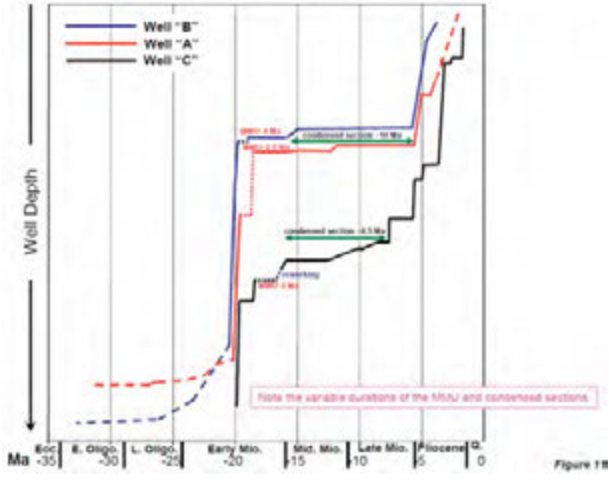

Figure 11: Nomogram of graphic correlation results of Wells "A", "B" and "C".