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THE UNIQUE BARAM DELTA

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The Baram Delta is a unique triangular-shaped oil province, second in importance in Southeast Asia to the Central Sumatra Basin. Its ocean-ward toe is formed by the NE-trending NW Borneo Trough, its land-ward margins by the NNW-trending West Baram Line and the curved N to NE-trending Morris Fault.

The West Baram Line is commonly shown on maps as a fault, perhaps because of its parallelism to the onland Tinjar Fault. However this is a misrepresentation of its actual geological nature and significance. From the Late Oligocene to the Late Miocene, it was in fact the continental slope of the Balingian-Luconia Province (micro-continent), and land lay to the WSW in the Penian High and east Natuna area.

Likewise, the Morris Fault, and its landward continuation the Jerudong Line, is shown on maps as a major left-lateral fault. This obscures its real identity, and in the Middle to Late Miocene it also was a major continental slope, lying close to the coastline, sloping steeply W and NW to bathyal depths exceeding 1 km. The landmass extending only as far W and NW as the Morris Fault-Jerudong Line was constructed of the Crocker Formation fold-thrust belt.

The proto Baram Delta site was therefore a deep water (bathyal) re-entrant into the Borneo landmass. It was sedimented by Setap Shale and starved of sand until the Crocker Formation was uplifted and exposed to rapid erosion during the Middle and Upper Miocene (Shallow Regional Unconformity of Sabah). Only then did abundant sands find their way fluvially across the narrow coastal plain and shelf and poured down over the steep slope to begin filling up the bathyal Proto-Baram Delta site. Probably its beginnings were turbiditic, but with filling up of the bathyal site, shallower water conditions prevailed offshore as the continental slope was draped over, and the delta began prograding ocean-wards, eventually as far as the NW Borneo Trough. As the delta grew, it draped over both the West Baram Line the Morris Fault scarp.

The bathyal Lower to Middle Miocene pro delta muds (Setap Shale) must have been of good source rock characteristics, and the dumping of abundant sands, off the continental slope, into the initially bathyal area caused a fortuitous juxtaposition of reservoir sands and source rocks, an ideal situation for an oil-prolific delta. Of course the sand dominant Late Miocene formations also contained source material, but the Baram Delta had an excellent beginning by initially being bathyal.

Because the landward margins are both continental slopes, and because the geothermal gradients are low, it may be inferred that the Baram Delta, between the West Baram Line and the Morris Fault, is not underlain by normal thickness continental crust, and may even be a re-entrant floored by oceanic crust.