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# An appraisal of the Tectonic Evolution of Borneo, SE Asia - Constraints from Petrotectonic Assemblages and Geophysical Gravity Anomaly

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Based on petrotectonic assemblages and terrane pattern three morphotectonic zones of Borneo Island has been proposed. Three morphotectonic divisions of Borneo are i) West Borneo (Borneo Core) of the continental basement and widespread igneous rocks of Lr Cretaceous to Miocene, metasedimentary rocks of mostly Tertiary period occur in the Schwaner Mountains; ii) North Borneo characterizes Tatau-Mersing sinistral transform trench, Tatau high and Lupar thrust zone of the Meso-Cenozoic sediments intruded by the intense igneous intrusives; iii) East Borneo is characterized by dominantly metasedimentary rocks of Cretaceous to Miocene in the Sabah orogen and metasedimentary rocks of Jurassic to Miocene in the Meratus Mountains (Fig. 1). Evidences derived from petrotectonic assemblages signify that the Borneo Core (West Borneo), being the oldest, has evolved from depleted basaltic to enriched andesitic composition of subduction melts. A tectogenetic model of the Borneo basement is proposed here based on the model of Precambrian crustal development wherein subcrustal lithosphere has undergone delamination and sinking through spontaneous instability due to rupture and resulted downwarping. Due to intrusion and lateral spreading of hot upper mantle, crust has undergone heating and partial melting resulting extrusion of primitive tholeiitic magma into overlying basins. In addition, hot lower crust has undergone attenuation due to ductile spreading (Fig. 2). Occurrence of tectonically transported oceanic assemblages viz., turbidites, chert, serpentinite, pillow basalt, sheeted basalt and other oceanic assemblages in parallel with the Lupar Thrust zone between Sri Aman in the east and Lundu in the west mark a suture zone (Sarawak Suture). Sarawak Suture marks the zone of collision between Luconia block in the north and foreland shelf of West Borneo in the south. Makassar Strait and Celebes Sea of East Borneo are the remnant paleo-ocean basins that have undergone late-Cretaceous partial closure, accretion and exhumation; and Cenozoic rifting and extension.

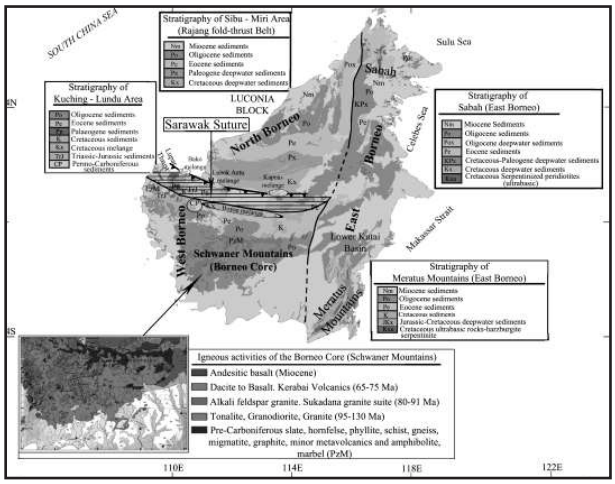


**Figure 1:** Morphotectonic zoning and petrotectonic assemblages of Borneo.

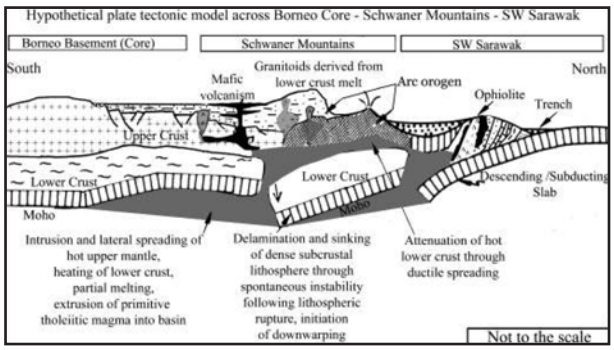


**Figure 2:** Proposed geotectonic model and crust-mantle configuration along North - South cross-section of Borneo Core.



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