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GEOLOGIC EVOLUTION AND PALEOCLIMATIC CHANGES OF PENINSULAR MALAYSIA

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The geologic and climatic histories of the eastern and western blocks of Peninsular Malaysia strongly differed till the Rhaetian. Zircon and isotope studies indicate that the age of the Pre-Cambrian basement of both blocks differ. The eastern block exhibits bimodal magmatism, whereas in the western block basic magmatism is apparently rare or absent. Granites in both these blocks differ in various aspects including their age, size, enclave types, isotopic composition, major and minor trace elements, mineralogy, textures and levels of emplacements. In addition, Cretaceous and Cenozoic magmatic activities appear to be concentrated in the eastern belt though the abundance of hot springs is greater in the west.

Throughout the Paleozoic, the western belt appears to have been representative of a passive rifted margin. Sedimentation occurred in a shallow marine deltaic continental sequence in the Cambrian. Probably because of the absence of vegetation, weathering intensity was less in spite of higher temperatures. Eolian activity must have been extensive but has been masked by aqueous reworking, suggesting a humid climate. During the Ordovician – Early Devonian, sedimentation in the Langkawi Islands occurred in a slowly subsiding oscillatory basin dominated by carbonates. In the mainland, similar Lower Paleozoic sequences are reported, but more basinal sediment types are represented in areas where subsidence outpaced carbonate deposition. Intermittent volcanic acitivity prevailed in various places during this period.

Folding and deformation of the Lower Paleozoic took place sometime in the Devonian. However, they did not produce any major significant topographic relief. By Late Paleozoic, a return to a stable, slowly subsiding basin is envisaged.

To date, no Lower Paleozoic has been proven in the eastern belt. As such, correlation is attempted with the geology of its Indochinese counter-part. During the Upper Paleozoic to Rhaetian times, the eastern belt consisted of vegetated volcanic landmasses with carbonate reefs and atolls on submarine highs. In the more basinal areas, sediments from these volcanic islands were deposited by debris flows, turbidity and tractive currents on deltas, submarine slopes and basins.

Subsequently, orogeny and union of both blocks convened during late Late Triassic. Essentially extensional tectonics with deposition of continental molasse and volcanism in many basins around the peninsula ensued. Deformation of these molasse basins appeared to have been dominated by injection folding due to probable diapiric uprise of thick plastically deformed fine sediments. Alternatively, the basins and their foldings may be the products of wrench faulting. Thus, both syn-sedimentary and post-sedimentary deformations and folding were prevalent. This probably explains particularly the conflict in the interpretations of the structural historybof these basins.

Widespread late Cretaceous and Cenozoic magmatic activities are noted with some continuing even late in the Tertiary and Quaternary. Subsequent movements along faults during these periods are recognised.

An attempt is made in correlating sedimentary and faunal characteristics of the Paleozoic of the western belt with the global sea-level curves as this region has basically been tectonically stable.

The paleoclimate of the Peninsula has varied greatly from humid desert, semi-arid, cool periglacial, savannah type to humid tropical of the present day. The present distribution of salt licks suggest that salt deposits may be present at depths below the level of groundwater circulation. These are precipitates from oversaturated solutions of beds, especially of the molasse facies. Similarly, black shales occurrences suggest probable correlation with world-wide sea-level and climatic changes.

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