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## **Pre-Tertiary structural patterns: implications for formation of the Malay and Penyu basins**

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Present geological knowledge suggests that many of the NW-SE and N-S faults in Peninsular Malaysia were active in Cretaceous and pre-Cretaceous times. Seismic data in the offshore areas off the east coast of the Peninsula indicate that there appears to exist some relation between the basement fault systems of the Malay and Penyu basins, and the NW-SE and N-S faults in the Peninsula. The major basement faults in the basins are predominantly NW-SE and E-W, but in the northern half of the Malay basin, the N-S faults are more dominant. This N-S fault system has been reported to dominate in pre-Tertiary basement in the north and central part of Sumatra.

The N-S faults are considered the oldest pre-Cretaceous regional faults based on field evidence. Their origin, however, is unknown. But the NW-SE faults seem to have formed as strike-slip faults, and are associated with regional Mesozoic stress that formed the dominant structural features on the Peninsula. The E-W faults are originally extensional fractures believed to be genetically related to the NW-SE faults. The dolerite dykes in Terengganu, east Pahang and on the Tenggol Arch may have intruded into pre-Tertiary basement along these weak fracture zones.

The E-W and NW-SE faults were active in the Malay and Penyu basins throughout much of Oligocene and Miocene, during which very thick sediments, probably continental, were accumulated. The faults in the offshore areas constitute major growth faults. During late Miocene to Pliocene, the area experienced compressional stress in the NW-SE direction. Subsequent basinal readjustment resulted in displacement along some of the E-W and NW-SE faults. Associated structural features related to this adjustment are structure inversions and anticlinal folds.

The Pliocene to Holocene was a period of general tectonic quiescence and although the Malay and Penyu basins continue to subside and receive sediments, localised residual stress within the basins caused some of the tectonic structures to grow.