

Sedimentation and tectonics of Paleogene sediments in Central Sarawak

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The deposition of the Paleogene sediments in Central Sarawak occurred in four successive stages, its axis of depocentre generally advancing and younging to the northeast in response to progressive southwest subduction-accretion of a Mesozoic oceanic lithosphere and its sedimentary cover under West Sarawak. The younger sediments were deposited on top or in front of an older accreted sediments. The timing of deposition and accretion is uncertain due to lack of precise age indicators. However, based on regional considerations, the accretion is interpreted to have occurred sometimes during the Middle Paleocene, Middle Eocene, Upper Eocene and Upper Oligocene, respectively, along major fault zones, producing four tectono-chronostratigraphic units. The older sediments were subjected to polyphase deformation as younger units were accreted.

The oldest unit of Upper Cretaceous-Lower Paleocene age, comprising mainly of dark argillites, slates and phyllites with thin beds of sandstones and rare conglomerates, outcrops mainly in the Batang Layar-Bukit Sebangkoi belt. The unit is estimated to be 1–2 km thick and was deposited in a shallow to deep water environment, in an accretionary fore-arc basin, slope apron and abyssal plain settings. The unit exhibits upright and vertically plunging refolded fold and folded cleavage with their axial plane trending $N90^{\circ}$ – 120° E. The plunging fold shows a dextral vergence and the folded cleavage produces vertically plunging crenulation lineations on bedding surfaces. Folded quartz veins trending $N120^{\circ}$ E with horizontal fold axis are cut through by younger sets. The unit is also intensely thrust and sheared to the north.

The second unit of Upper Paleocene to Early Eocene age, comprising mainly of grey and reddish shale and thick sandstone beds, with local development of slates and phyllites, and the rare occurrence of limestone lenses and conglomerates, outcrops in the Engkili, Sarikei-Kanowit (and Balingian) belts. The unit is estimated to be 2–3 km thick and was deposited in a shallow to deep water environments in an accretionary fore-arc basin and abyssal plain settings. The unit also exhibits steeply plunging refolded fold and folded cleavage with their axial plane trending $N90^{\circ}$ – 120° E. Extensional quartz veins and intense northward thrusting are also common.

The third unit of Middle-Upper Eocene in age, comprising mainly of sandstones and greyish dark shales of various thickness with minor occurrence of conglomerates, outcrops in the Sibu-Selangau belt. The unit is estimated to be 2–3 km thick and was mostly deposited in a shallow to deep water environments, in an accretionary forearc basin setting. The unit exhibits minor axial cleavage, tight upright folds with associated thrusts verging to the north.

The youngest unit of Upper Eocene-Middle Oligocene in age, comprising mainly of sandstones and shales; with minor occurrence of conglomerates, limestones, marls and volcanic rocks, outcrops in the Balingian-Tatau belt. The unit is estimated to be about 3 km thick and was deposited in a shallow to deep water environment, in an accretionary fore-arc basin, slope apron to abyssal plain settings. The unit exhibits open to tight upright folds trending east-west with associated thrusts verging to the north.