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Structural framework and trap styles in southwestern offshore Sabah

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On the basis of different tectonic and depositional history, the Tertiary sedimentary sequences in southwestern offshore Sabah are divided into three tectono-stratigraphic provinces: Inboard Belt, East Baram Delta and Outboard Belt provinces.

The Inboard Belt province is characterised by intense compressional wrench features. The dominant feature is the NE-SW trending Hankin-Tulak High, continuing northward as the Saracen High. The Hankin-Tulak High is a tight, crestally-collapsed anticline. Two deformation phases are evident: a major regional Late Miocene phase, and a Late Pliocene phase. The Saracen High is affected mainly by the Late Miocene deformation phase, with fault closures associated with wrench-related 'pop-up' structures. The stratigraphy can be simplified into an early Middle Miocene regression, a late Middle Miocene transgression and a Late Miocene to Pliocene regression.

The sedimentary succession in the East Baram Delta province consists of a regressive sequence of Middle Miocene and younger sediments expanding basinwards towards the northwest. This province is characterised by delta growth tectonics and dominated by two NE-SW trending megastructural trends: Champion-Padas and Nosong-Tapir. The former consists of the Champion, Timbalai, Samarang and Padas growth fault-related rollover macrostructures. This trend was subjected to two deformation phases: a Late Miocene phase with some degree of basement-controlled wrenching and uplift forming collapsed anticline fault-traps, and a Late Pliocene phase forming simple fault- and dip-closed traps. The Nosong-Tapir trend is dominated by NW-hading growth faults which were active from Late Miocene to Late Pliocene.

In the Outboard Belt province, Late Miocene to Pliocene regressive sediments prograde northwestward over shale-prone deep marine Late Miocene sediments. Within this prograding sequence, deformation is essentially extensional, marked by large NE-SW trending down-to-basin normal faults at the shelf/slope breaks. The underlying shale-prone sediments exhibit compressive deformation and result in high relief anticlines with shale cores, e.g., in the Kinarut area.

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