*Poster 17*

# Structural bends of northwest Sabah: causes and implications for exploration

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From Sarawak in the southwest to Sabah in the northeast, the Cenozoic structures trend in broad waves roughly parallel to the shoreline with three notable deviations: northerly in the Limbang- Brunei area, easterly in two localities in Sabah, that is, one at approximately Tuaran and an other at the latitude of Mantanani Island. The easterly structural strikes in northern Sabah persist across land as far as the Sulu Sea. In the subsurface offshore of NW Sabah, the two changes in structural trends from NE to E are also seen as far as the Northwest Sabah Trough. The structural bend in the offshore of Sabah is especially evident in a zone containing the Bunbury-St. Joseph syncline, Mantanani south-verging thrust, South Furious-Barton fields, Tiga Papan upthrusted horst, and the Bonanza Fault. North of the Bonanza Fault, the structures resume their NNE direction to eventually assume a northerly strike in Philippine waters. Conventional field mapping complemented by interpretation of aerial photographs and radar images indicate the presence major, most probably fault, lineaments striking almost normal to the coastline.

Near Kota Kinabalu, the NW tectonic transport direction of the Palaeogene West Crocker strata is represented by asymmetric folds and thin-skinned, low-angle thrusting. At Mengaris quarry within the zone of easterly



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trends, the West Crocker beds are thrusted toward northeast which is distinctly at right angle to the tectonic vergence of structures of western Sabah. An analogue of such structural pattern is shown by the Pine Mountain Thrust system in the Appalachian at the Kentucky-Tennessee boundary of the United States. Thrusting in directions at right angles to the thrust front are shown by the Jacksboro and Russell Fork faults. Some of the folds are also perpendicular to the WNW thrust. It is now postulated that the Sabah right-angle structural bends are part of a major overthrust system that verges northwest and is flanked by major wrench faults: the West Baram Line in the southwest and the Bonanza and Balabac faults in the northeast. The Lower Tertiary thrust sheet mapped offshore in the northern Outboard Belt most probably belongs to this system This major structural event is believed to correspond with the Deep Regional Unconformity (DRU; earliest Middle Miocene or Stage IVA). The youngest known onshore beds involved are of Stage III (22.3 - 15 m.a; Kudat Formation) The Sabah structural bends suggest that the main tectonic transport of the overthrust was northwest, where inadequate accommodating space has forced the overthrust flanks to "spill over" sideways. The spillover direction has been perpendicular to and was facillitated by major flanking faults bounding the relatively faster advancing thrust slab.

In terms of hydrocarbon prospectivity, the overthrusting event disturbs maturation and expulsion of new HC, affects remigration and probably trapping/sealing integrity, and may change reservoir volumes of pre-Stage IVA petroleum systems.