

Transverse Structural Segmentation of the Northwest Borneo Deepwater Fold Thrust Belt

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The petroleum system of NW Borneo extends from onshore to a Neogene deepwater thrust belt. A regional unified structural and stratigraphic framework from the shelf to deepwater reveals 4 linked structural domains influenced by the geology beneath a mid-Miocene decollement that corresponds to a regional unconformity.

Domain A has listric growth faults on the shelf and detached folds in deepwater, as well as a subbasin between the decollement and an older "rift" sequence. Domain B has counter regional faults on the shelf. In deepwater, low angle piggy-back thrusts form fault-bend and fault-propagation folds. Domain C consists of high-angle normal faults on the shelf. This system appears to be linked to simple reverse faults in the deepwater that form long linear ridges. Domain D is characterized by inversion structures inboard. The fold belt is extremely telescoped with complex structures (duplexes and reverse faults) above a flat to seaward dipping decollement. In places the leading edge of the fold thrust belt is colliding with large structural highs (carbonate / volcanics) on the lower plate.

The boundaries between these domains are coincident with regional lineaments defined by integrating gravity, magnetic, and satellite radar data with surface geology. Several major fields and recent discoveries overlie these boundaries. The C-D boundary very well expressed and appears to have been a long-lived deepwater sediment entry point. Whether considering fold evolution or shelf to basin turbidite delivery systems, NW Borneo offers a striking example of "basement" control on a deepwater fold-thrust belt.