PESGB SEAPEX Asia Pacific E&P Conference
Olympia Exhibition Centre, London
27th – 28th June 2018

ORAL PRESENTATION

Reservoir Characterization of Deep Marine Sediments, Northern Borneo

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The Northwest Borneo margin and the NW Borneo Trough are related to the opening of the South China Sea. The proto-South China Sea was subducted beneath the Sunda Shelf from Late Cretaceous times. The cessation of subduction occurred in the Miocene, where large blocks of continental shelf blocked the Subduction trench. Subsequently collision occurred between the leading edge of the South China Sea continental realm and the Crocker-Rajang accretionary margin of Northwest Borneo. The uplift and erosion of this accretionary margin provided abundant sediment supply to form the Baram Delta. Both modern day and ancient sediments deposited in deep-marine settings, offshore Brunei, are characterized by large scale submarine landslides, which have been well documented in the literature. The deposits of the landslides are known as Mass Transport Complexes (MTC's) or Mass Transport Deposits (MTD's) and provide valuable information on sediment dispersal patterns, palaeoslope and reservoir development. They are particularly significant when reservoir sands are devoid of any indication of paleocurrent direction and seismic data quality is poor.

The modern-day shelf is 50 to 70 km wide and characterized by the Baram river and delta system connected via a canyon to the NW Borneo Trough. A steep sided escarpment rises 1km from the basin floor, separating the shelf margin from the trough. The seafloor morphology is defined by elongate mini basins parallel to the coastline, separated by shale-cored ridges. Observed on the modern basin floor are giant submarine landslides. The size of these slides (volume of 1200km^3, covering an area of 5300 km^2, with a thickness of approximately 240 m) are some of the largest ever observed. These features are commonly observed in the subsurface and are thought to be a result of the tectonically active margin and the large sediment supply from the Baram Delta.

Miocene sediments appear dominated by quiescent sedimentation, with medium thick bodies of conformable sediments with consistent structural dip, interspersed with sheet sands and sporadic debris flows, forming the majority of the sediment. However, interspersed in this uniform sedimentary environment, is massive structural failure, initially slides, slumps and debris flows, followed by post depositional creep, similar to the modern-day seabed. Related to these deposits are thick, massive sands, probably deposited as canyon–fill, suggesting that these slope failures are sea-level driven, with failure initiated by sea-level fall and the sand reaching the outer slope during a sea-level low-stand.