

Source rock and hydrocarbon geochemistry, offshore NW Sabah, Malaysia

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A subsurface geochemical study has been undertaken on Miocene and Pliocene sediment and hydrocarbon samples from wells in the northern Sabah subbasin of the Brunei-Sabah Basin. The objectives of this study were to identify source rock intervals and hydrocarbon families, to attempt a correlation of oils and source rocks, and to gain an understanding of the maturation and migration of the area.

All oils in the region belong to one family and characterised by the presence of oleanane and resin triterpane biomarkers. Source rocks are typically lean and dominated by vitrinite kerogens. These terrestrial kerogens dominate marine as well as

fresh water palaeo-environments. Stratigraphic variations occur in the biomarker content of the source rock extracts. These variations can be correlated between marine and fresh water environments as both are dominated by terrestrial kerogens.

The correlation of biomarkers obtained from source rock extracts and reservoir oils, indicate that essentially all northern Sabah subbasin oils have been derived from Middle Miocene sediments. Analysis of the maturation of these sediments indicates that the onset of oil and gas generation with extensive expulsion typically occurs at around 15,000 to 17,000 ft. However, early oil generation, but with no effective expulsion, can occur as

shallow as 3,000 ft. Gas but no oil also appears to be derived from the less deeply buried Upper Miocene sections.

In the outbound areas Middle Miocene-derived oil and gas has often vertically migrated up faults and fractures to charge Upper Miocene reservoirs. In the inboard areas, migration has

been primarily along Middle Miocene reservoir conduits. Inboard traps are mainly shallow and faulted such that gas is preferentially leaked to the sea-floor. This situation has led to Sabah retaining relatively little gas versus oil when compared to neighbouring Sarawak.
