

## Clay mineral diagenesis and reservoir quality of the Upper Cycle V (Late Miocene) sandstones of Baram Field, offshore Sarawak, East Malaysia

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The Late Miocene shallow marine sandstones from the Baram field (depths of ~6,700 ft to ~10,000 ft), in Baram Delta Offshore Sarawak, display a complex diagenetic texture which directly affects their reservoir quality. The main diagenetic mineral phases identified, in the order of precipitation, are: siderite, chlorite-smectite, chlorite, illite and quartz cementation. Minor occurrences of hematite pigmentation, feldspar dissolution, kaolinite precipitation and pyrite mineralisation were also recognised.

Siderite cementation in general tend to reduce and destroy porosity, by forming small acicular, pore lining crystals or rhombic, pore-filling cements. However, extensive siderite cementation are restricted only to strongly bioturbated horizons or mudstone clasts zones. Low porosity values, ranging between 10 to 15% (~1.0 to 6.0 mD), characterises these intervals.

Diagenetic clay mineralisation is pervasive and widespread within the Baram sandstones. Chlorite-smectite occurs as grain-coating "honeycomb" structure within limited zones of the reservoir. Chlorite, being the most dominant clay phase, occur as chlorite peloids, grain-coating chlorite and pore-filling mineral. The presence of the grain-coating type of chlorite appears to have inhibited the precipitation of quartz cement. Sandstone intervals with grain-coating chlorite commonly exhibit high reservoir quality ( $\phi$ : 19.3–28.6;  $k$ : 100.0–810.0 mD), Illite mineralisation is largely confined to detrital mudclasts and clayey laminations.

The presence of grain coating may have contributed to the preservation of good porosity at greater depths in the sandstones of Baram field.

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