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TRACE FOSSIL ASSEMBLAGES AND PALAEOENVIRONMENTAL RE-EVALUATION OF MIOCENE RESERVOIR INTERVALS, OFFSHORE SARAWAK, MALAYSIA.

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This study integrates ichnology and sedimentology to re-define the palaeoenvironmenal and sequence stratigraphic interpretation of Miocene reservoir intervals in the D35 Field in Offshore Sarawak, Malaysia. The succession has been interpreted previously to reflect predominantly fluvial and lacustrine environments of deposition. Analysis of the trace fossil assemblages throughout the succession strongly suggests, however, that it is exceedingly difficult to reconcile the majority of these units with a fluvial and fresh water interpretation. Instead, the interval reflects a variety of lower coastal plain deposits, most of which were moderately to significantly affected by marine influence.

Sandstone-dominated facies contain ichnological suites that exhibit low to moderate levels of bioturbation, with assemblages consisting of structures indicative of opportunistic feeding behaviors. Stacked or "re-equilibrated" Rosselia (many of which are truncated and are preserved as allochthonous mud clasts Figs 1-2) and large, spiral-form Ophiomorpha irregulare are common. Thin mudstone interbeds and drapes within the sandstone units contain suites of opportunistic trace fossils consisting of Thalassinoides, Chondrites and Planolites.

Mudstone-dominated facies exhibit variable but moderate to low degrees of bioturbation intensity, pronounced variability in ichnogenera distributions, and the predominance of simple forms representing the simple feeding strategies of resilient trophic generalists. Ichnogenera include Planolites, Teichichnus, Thalassinoides, Chondrites, Lingulichnus and Gyrolithes. Intervals that contain higher diversity assemblages, reflecting the periodic establishment of impoverished marine suites, contain more complex structures such as diminutive Zoophycos, Phycosiphon and Siphonichnus.

The trace fossil assemblages in the sandstone- and mudstone-dominated facies represent a variety of stressed expressions of the Cruziana Ichnofacies with less common occurrences of impoverished examples of the Skolithos Ichnofacies and characterize brackish-water environments that experienced periodic, increased levels of marine influence.