

# **Using Traces Fossils in Deepwater Deposits to Interpret Palaeoenvironments and Facies Distributions: Examples from Angola Slope Deposits, Block 15, West Africa**

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Trace fossils are an invaluable tool for understanding better the local and regional depositional environments of reservoir and non-reservoir rocks in higher order sequences. Although lithofacies analyses are used to interpret depositional environments, many are not well constrained because most lithofacies can occur in multiple settings and associations. Trace fossils can be used as proxies to understand paleoenvironmental and paleoecological conditions in deep-water settings. The diversity, abundance, tiering depth, and ichnofabric indices of trace fossils can be used to evaluate the (1) frequency and magnitude of deep-water depositional and erosional events, (2) surfaces of erosion and amalgamation that produce dewatered, compacted substrata, (3) relative duration(s) of hiatuses, (4) bottom water oxygenation and turbidity, (5) overall rate of sedimentation, and (6) depositional environments in slope and basin settings.

Trace fossil associations demonstrate the presence of unique paleoenvironmental settings and bottom-water conditions. For example, deep-water firm grounds assigned to the more typical shallow-water Glossifungites ichnofacies are easily recognized by burrows with sharp walls and spreite excavated in dewatered and compacted sediments. These burrows remain open and are later filled, often with multiple fill episodes by sediments of various grain sizes. In other instances, areas with high, episodic rates of muddy turbidity current deposition have little or no penetrative bioturbation. Most traces in these environments are small, fine surface trails. On the other hand, environments where sedimentation was lower, in event frequency and magnitude, have trace fossil associations that are more diverse, penetrative, with higher ichnofabric indices.