

## **Tectono-Stratigraphy and Reservoir Development in Offshore Sierra Leone Basin**

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The offshore deepwater Sierra Leone Basin is a frontier exploration area which is attracting increased exploration effort. This basin is located at the junction between the central West African Coastal and Gulf of Guinea Petroleum provinces. From a geological perspective, this basin straddles a major tectonic transition zone (the Sierra Leone Transform).

A tectonic megasequence stratigraphy has been developed with 5 major megasequences related to pre-transform, syn-rift/transform and post-rift/transform phases. Syn-transform sequences (late Early Cretaceous) show influence of normal fault related subsidence and uplift, modified by localised transpressional deformation. The basin bounding faults and half-grabens are oriented at a high angle to the ensuing passive margin slope strike. Post-rift sequences (Late Cretaceous to Present) are dominated by major phases of slope failure and development of extensive lowstand submarine fan systems.

A model of slope failure and synchronous development of submarine channel and canyon systems has been developed for this basin. Extensional slope failure is controlled by pre-existing structural trends. Submarine canyons developing in the hanging-walls of these fault-blocks became the site of rapid headward expansion of turbidite filled channels parallel to growth faults. The temporal development of these systems is expected to profoundly affect the distribution and quality of key-play elements such as reservoirs and stratigraphic traps in slope marine settings, and the distribution of sands to deeper water base-of-slope plays.