

## Sequence Stratigraphy of 'Liberty' Field, Western Onshore Niger Delta, Nigeria

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It is recognized increasingly that sequence stratigraphy provides an excellent means of correlating within paralic succession. However, the ease with which paralic succession can be correlated is highly variable, being strongly dependent upon both the depositional environment and the mechanism that generates the relative sea-level changes. Successful sequence stratigraphic studies are founded on Facies analysis, an approach based on the study of continuous uninterrupted succession deposited at the same time interval.

A sequence stratigraphic approach was applied to the stratal study of the western Coastal swamps Depobelt of the Niger Delta using wireline log (gamma ray and resistivity) of the well 1, 2, 3, 4 and 5 and biostratigraphic data of well 2.

The middle Miocene strata were formed by the interaction of subsidence, eustatic changes in sea-level and varying sediment supply. Two Sequence Boundaries (12.1 m.y and 13.1 m.y.) and one Maximum Flooding Surfaces (Cassidulina 7) was identified from globally and locally recognizable foraminifera and pollens bioevents. The strata in the study area are divided into Lowstand System Tracts, Transgressive System Tracts and Highstand System Tracts. Biostratigraphic analyses reveal that the sediment were deposited in Coastal deltaic to middle neritic environment. The identified MFS was utilized in carried out stratigraphic correlation within the field. Sand distribution in the reservoir characteristic and predictable in each system tract. The sandstone reservoir was deposited in the basin floor fan, the lowstand wedge deposits and Highstand System Tract. They are hydrocarbon bearing reservoirs with porosity of 25 to 35 percent and permeability of 1.147 to 3.153 darcy. The distal shale toe of the prograding wedge and transgressive shale formed seals for the (potential) stratigraphic traps in the area.

The integration of this correlatable and well-dated horizon with well logs, biostratigraphic data and other geological data provides a powerful integrated tool for hydrocarbon system study such as improved stratigraphic correlation and continuity, source rock prediction etc and most importantly, identification of areas of play prospectivity.