

Prediction of Variations in Sequence Stratigraphic Geometries in X-Field Offshore Niger Delta Using Stratigraphic Forward Modelling Technique

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The sequence stratigraphical depositional model has concentrated primarily on eustasy and tectonic subsidence as the dominant controls on sequence development, with variations in other factors such as sediment supply playing only a modifying part. Using sedsim stratigraphic forward model it is possible to reproduce the basic geometries of type 1 and type 2 sequences. This stratigraphic forward-modelling approach suggests that fluvial profile behaviour is a first-order control on sequence geometries.

In this technique, attention is paid to the forward modelling of sequence stratigraphic architecture with special interest in stratal thickness variations within the various system tracts in the study area. Currently, variations in accommodation space and local subsidence are seen as the major control on facies stacking patterns and stratal geometries as generated from four sedsim simulations. Variable sediment supply with its associated gravity tectonics thus has a number of implications for sequence stratigraphic interpretations, one of the most important being that spatial variability in sediment supply may yield a wide range of contemporaneous stacking patterns.

This analysis yielded the three system tracts with a marked thinning of system tract towards the North of the offshore oil field revealing that in Niger Delta clastic wedge, lithic variations can be recorded through complicated changes in subsidence and sediment and sediment supply.