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Sequence Stratigraphic Analysis of " XB Field ", Central Swamp Depobelt, Niger Delta Basin, Southern Nigeria

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ABSTRACT

Well logs and biostratigraphic data from six wells in the " XB Field ", central Swamp Depobelt, Niger Delta were integrated to carry out a sequence stratigraphic analysis of depositional systems in the field. The analysis revealed four 3rd order depositional sequences (SEQ1 to 4) bounded by three erosional unconformities interpreted as Sequence Boundaries (SB1 to 3). Transgressive Surfaces of Erosion (TSE1 to 3) that mark the onset of marine flooding and turnarounds from progradational facies to retrogradational facies during sequence build-up were delineated. Three 3rd order Maximum Flooding Surfaces (MFS1, MFS2 and MFS3) characterized by marker shales, high faunal abundance and diversity were also delineated and dated 15.9, 17.4 and 19.4 Ma, respectively. The delineated sequences comprised Lowstand Systems Tracts (progradational packages), Transgressive Systems Tracts (retrogradational packages) and Highstand Systems Tracts (aggradational packages), which reflect depositional systems deposited during different phases of base level changes. The Lowstand Systems Tract (LST) consists of Basin Floor Fans (BFF), Slope Fans and Channel Sands deposited when sea level was low and accommodation space lower than rate of sediment influx. Transgressive Systems Tract (TST) consists of retrogradational marine shales deposited during high relative sea levels and when accommodation space was higher than rate of sediment influx. Highstand Systems Tracts (HST) consisted of shoreface sands displaying mostly aggradational to progradational stacking patterns. The sands of LST and HST show good reservoir qualities while the shales of the TSTs could form potential reservoir seals. The above recognized sequences, were deposited within the Neritic to Bathyal paleoenvironments and are dated mid-Miocene (15.9 - 20.4 Ma) in age.

KEYWORDS

Sequence Stratigraphy; Unconformities; Progradation; Retrogradational; Aggradational; Paleoenvironments and Reservoir

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