

Onshore Niger Delta: The Key to Unravelling the Eocene / Oligocene Play in the Deep Water

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A regional framework study for the Niger Delta has been undertaken incorporating the geological knowledge of the Onshore, Shelf and Deepwater settings. Erosional canyons along the paleo-shelf edges and shorelines spanning Eocene to Oligocene in age have been identified in the Northern and Greater Ughelli Depobelts and have been interpreted, as conduits for sediment transport into the Deepwater.

Turbidite sedimentation beyond the prograding delta is dominated by shales and punctuated with pulses of sand deposition during relative sea-level lows. The loci of sedimentation is largely controlled by the slope profile at the time of deposition, that in turn is shaped by the evolution of the paired extensional- contractional gravity sliding over overpressured marine shales.

The Eocene/Oligocene section is penetrated by several wells onshore especially within the Northern and Greater Ughelli Depobelts (e.g Biniwei-1, Benin West-1 and Ngwa-1) where they constitute proximal to distal shelf/upper slope sediments. The time equivalent sections in the deepwater are turbidite fan, channel and apron complexes, encased in thick shaly sequences.

Using sub-regional condensed zones (equivalent to maximum flooding surfaces, MFS on the shelf and onshore) the Eocene/Oligocene deepwater penetrations in Onigun-1 and Bosi-6 wells has enabled a better understanding of the depositional link between the Eocene/Oligocene penetrations in the Deep water with the onshore.

Following the established progradational depositional model of the Niger Delta and the proven link of the Miocene Turbidite Fan of the deepwater to the Onshore Niger Delta, two new plays are highlighted - The Oligocene Fan Play (marginally tested by wells like Onigun-1 and Bosi-6) and the Eocene Intra Akata Fan play which can be structurally and (now) stratigraphically linked to the Onshore Eocene system.