

Turbidite Systems - Depositional Architecture from 3D Seismic Data and Net-to-gross Sand Evaluations, Offshore, West Africa

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The ever-increasing efforts for oil exploration and development in the deep-water areas at present require a thorough understanding of turbidite systems. In the subsurface offshore West Africa, recent extensive 3D seismic attribute displays have revealed large turbidite systems with a high variability of depositional architecture. Essential to the rock-volume estimates of these turbidite systems, the different architectural elements, channel- overbank- and lobe- forms constituting them are identified and mapped. A variety of means—amplitude, coherency and curvature attributes, peeling techniques etc. are utilized to map the architectural elements in the subsurface. High sinuosities, meander cutoffs, avulsions on various scales, lateral and vertical migrations characterize the channel forms, their geometries and reservoir extent in the subsurface off West Africa. Several types of lobeforms are associated with these sinuous channels and develop at their termini and along their flanks. These architectural elements occur, vertically and laterally stacked in a melange. It is essential to unscramble the individual elements, utilizing the recent deep-water meander channels (such as the Amazon, Indus and Zaire Fan channels) as analogs and map them as such. These different architectural elements are then assigned net-to-gross values, not only based on amplitudes (corrected for fluid and wedge effects), but also on the differences in compaction, seismic geometries, facies associations, drillings and analogs. The high sinuous channelforms of the type encountered in the subsurface off Africa have not been well documented and explored in the ancient turbidite systems in the past.