High Resolution Sequence Stratigraphy of the Deepwater Miocene Reservoirs of the Chinguetti, Banda, and Tiof Fields, Offshore Mauritania

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One of the biggest uncertainties in the development of the Miocene reservoirs from this region has been the understanding of the stratigraphy at a sub-seismic level. The complexity of these systems has been anticipated since the early appraisal drilling in 2001/3 and has been confirmed with the extensive 2004/5 development drilling programs. The reservoir units can vary radically in both thickness and electric-log character between wells, and this is consistent with the interpreted highly channelised, deep-water depositional settings.

A key tool for understanding the depositional setting and spatial distribution of the reservoirs has been the high resolution studies of foraminifera and calcareous nannoplankton, and they have been carried on all wells. High resolution nannoplankton studies have been particularly useful for fine scaled, time-related subdivision of the sequences and have been the primary tool for reservoir correlation. The main reservoirs are Early-Middle Miocene [CN1-5 nannoplankton zones], and those at Chinguetti appear slightly older than those at Tiof. Detailed foraminiferal studies have been key for defining the predominantly a middle bathyal depositional setting, zones of shelfal reworking, and potential flooding surfaces.

One of the biggest challenges in the development of a sequence stratigraphic model for the region is that most stratigraphic information is concentrated in Miocene canyon systems on the continental slope. There are only sparse datasets from the deeper water settings and from the interpreted Miocene shelf. Despite this limitation, there appears to be an essentially complete Early-Middle Miocene stratigraphic record preserved. A key component of the evolving sequence stratigraphic model has been the integration of the well-based stratigraphic information with 3-D seismic data from the region, especially the detailed architecture derived from a flattened semblance volume.