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Prospectivity of Ultra-Deep Offshore Kwanza Basin, Angola

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The ultra-deepwater area (generally >1500 m water depth) of the Kwanza Basin of Angola offers exploration opportunities over some 40,000 km² of salt-structured terrain located between the proven hydrocarbon province of the Lower Congo Basin (Blocks 14 to 18) and a recent oil discovery in Block 24. The deep-water area remains un-drilled except for two DSDP sites. More recently with a seismic database of 10,000 km² 2D survey and 14,000 km² 3D survey tied to coastal zone wells it has been possible to identify and map the distribution of reservoir-prone sequences over large areas of the deep-water basin.

The acoustic impedance characteristics of Tertiary sand reservoirs facilitate their identification on seismic data and enable recognition of their wide spatial and stratigraphic distribution. Typically, they display meandering and cross-cutting channel geometries, together with lateral splays and terminal lobes or fans. Cretaceous sand reservoirs are more vertically restricted than those in the Tertiary, but studies of coastal wells have demonstrated the occurrence of significant clastic input during the Cenomanian and Turonian corresponding with the 94 and 90 Ma lowstand episodes. Seismic mapping has shown that these surfaces are associated with reflection characteristics indicative of porous facies development in the basinal areas.

Both Cretaceous and Tertiary sedimentation occurred under conditions of continuing salt withdrawal; in some areas sufficiently dramatic to allow Miocene sediments to touch down on residual Albian or Aptian carbonates and evaporites, thus allowing migration of pre-Salt derived hydrocarbons. Complementary diapirism of the salt has been the main structure-producing process in the basin.