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Regional Framework and Exploration Potential of the Deepwater Tarfaya-Agadir Basin, Offshore Morocco

The stratigraphic framework of the Tarfaya-Agadir basin is characterized by six major mega-sequences that correspond with the major tectonic episodes that shaped the Mesozoic-Cenozoic history of the basin. These mega-sequences document the development of the major phases of source, reservoir and trap development in the deepwater Atlantic Margin, offshore Morocco. An extensive database of 2D and 3D seismic and well control has allowed definition of multiple terrigenous-clastic reservoir intervals in the Jurassic, Cretaceous and Paleogene sections of the deep-water basin. Multiple source intervals spanning the same sequences provide opportunities for charge, with numerous migration pathways defined by abundant deep and shallow salt structures.

The overall structural style of the basin is controlled by its original rift-margin architecture, while the timing of the defined salt structures broadly spans the entire Jurassic to Recent depositional history of the basin. Development of isolated salt diapirs, with a central belt of more laterally connected salt stock canopies that have produced local salt overhangs, characterizes the structure of the bulk of the deep-water basin. A regionally extensive salt nappe was transported more than 10 km basinward over the toe-of-slope to abyssal plain setting along the distal, seaward edge of the original salt basin. The up-dip margin of the basin is characterized by a series of salt-cored rollers and inversion structures developed during convergent to transpressional movements along the steep, northwestward-facing structural edge of the basin. These later movements are associated with the Atlas orogenic episode, beginning during the late Cretaceous and extending into the Tertiary.