

## **Seismostructural Study of the Safi Offshore Block: Towards an Identification of a Mesozoic Petroleum System**

Salim LAHSINI, Bouchra CHERRADI, Abdellah AIT SALEM

Office National des Hydrocarbures et des Mines (O.N.H.Y.M.), Rabat, Morocco

The Safi block represents the offshore extension of two structural domains recognized by their geological characteristics in onshore: The Doukkala basin characterized by a thick Paleozoic basement, structured during the Hercynian orogenesis; and the Essaouira basin which represents the continuity of the Mesetien domain.

The interpretation of 2316 km of seismic 2D and 2200 km<sup>2</sup> of seismic 3D, combined to the outcrop studies and the analysis of the available well data, allowed us to a better understanding of the geometry of this basin.

The preliminary interpretation of the Safi area was focused mainly on the Cretaceous.

The petroleum system of the Safi area is composed by a reservoir represented by the clastics and turbidites of the lower Cretaceous. Such deposits are developed in the deep offshore by bypassing over the Jurassic platform. The presence of the cretaceous reservoir can be shown by several outcrops in onshore, and samples from DSDP wells (416). The petrographic study of these samples shows good values of porosity and permeability.

The source rock is from Jurassic, whose presence is confirmed in the adjacent basin of Essaouira, where Jurassic samples have a TOC up to 12%. This source rock is confirmed also in many offshore wells.

Through the preliminary interpretation of 2D and 3D seismic data, it was possible to identify many play concepts, resulting from the combination of stratigraphic and structural events, closely related to an important salt mobilization, which created several mini basins inside the block.

Identification of the main regional horizons: top of Jurassic, base of Aptian, Albian, Cenomanian, and Tertiary, was allowed by the geometry of the sedimentary bodies and their spatial organization, as well as by major discontinuities that can be correlated through the basin. These regional reflectors correspond to eustatic events, which have controlled the sedimentary influx and distribution.

**Keywords:** Lower Cretaceous, petroleum system, offshore, sequence stratigraphy.