AAPG Datapages/Search and Discovery Article #90254 ©2016, GEO-2016, 12th Middle East Geosciences Conference & Exhibition, Manama, Bahrain, March 7-10, 2016

Oligocene-Miocene Rifting and its influence on Siliciclastic Reservoir Distribution and Exploration in the Gulf of Suez, Clues from Recent Sub-surface Analyis, Eatsern Desert, Egypt

Sharna Dronamraju[1]

[1]AKD Professional Solutions Inc. , Katy, Texas, UNITED STATES

ABSTRACT

Gulf of Suez is a prolific petroleum province and probably has the most unique geological setting to study sedimentary responses to tectonics. The short source-to-sink distance (less than 30km) and active rifting provides ample opportunity to study the rapid sedimentary response to the interaction between rifting, accommodation space and rate of sediment supply. The earliest evidence of rifting in the Gulf of Suez is documented to be the Oligocene-Miocene, which is responsible for the present-day shape of the Gulf. Much of the rifting was influenced by the structural grain established during the Late Proterozoic to Cambrian.

Late Cretaceous Limestone member (Brown Limestone) is considered to be the predominant source of hydrocarbons, with millions of barrels in recovered in classical fields such as Gemsa, Ramadan, and few other well-known fields. These fields produced predominantly from the pre-rift clastics and carbonate sequences, in well-defined faulted-block structures. However, much of the future exploration in the Gulf of Suez will depend on understanding the sedimentation trends in syn-rift and post-rift sag periods (Oligocene-Miocene), in highly complex fault systems in the regionally extensive Nikhul, Rudeis, and Kareem formations. These reservoirs are poorly imaged due to thick overburden of evaporites with sparse well coverage, which adds to subsurface uncertainty.

Recent work on the Yusr Field, Eastern Desert for an enhanced oil recovery project provides new exploration ideas. This study suggests that locating field-scale transfer or accommodation zones by applying the knowledge gained in East African Rift System and other similar intra-cratonic rifts, and through experimental deformation on scaled, physical models could supplement and possibly compensate for the poorly imaged 3D seismic and help delineate exploration targets. This study focuses on the Rudeis fm. and its hydrocarbon potential. Carefully extracted seismic attributes (Ant Tracking* and Coherence attributes) illuminates fault patterns that are previously not recognized.
Preliminary observations indicate that depocenters are created between the transfer zones, with high chance of up-dip stratigraphic terminations and lateral seals. While better imaged 3D seismic is imperative, intuitive application of analogue knowledge is essential in these challenging areas.