
Mesozoic and Neogene Sedimentary Rift Basins of Yemen: Lithostratigraphic Correlation and Hydrocarbon Potential

Mustafa As-Saruri¹, Ahmed Abdillah¹, and Rasoul Sorkhabi². (1) Ministry of Oil & Minerals, Petroleum Exploration and Production Authority, San'a, Yemen, phone: 77773657, msaruri@fulbrightweb.org, (2) University of Utah, Energy and Geosciences Institute, 423 Wakara Way, Suite 300, Salt Lake City, UT 84108

This paper describes the updated stratigraphy, tectonic history and petroleum systems of the Mesozoic and Neogene rift basins of Yemen with a particular attention to integrating the existing knowledge to provide a play concept for each basin. Following the separation of India/Madagascar from Afro-Arabia, major sedimentary extensional basins formed Yemen during the Late Jurassic/Early Cretaceous. The location and orientation of these basins, including the Sab'atayn, Say'un-Masilah, and Jiza'-Qamar basins, were controlled by Precambrian structural grains within the Arabian shield. The well-explored Sab'atayn and Say'un-Masilah basins, filled with syn- and post-rift sediments share many similarities in source and reservoir rocks, but the Tithonian evaporate is absent in the latter. The sub-salt turbidites offer significant oil accumulations in the Sab'atayn basin. The less explored Jiza'-Qamar basin has good discovery potential on its eastern onshore sector which continued its subsidence during the Paleocene and is fed by the Upper Cretaceous coal-shale source rock and marly-limestone reservoir. Neogene rift basins of Yemen are related to the Oligocene/Miocene rifting phases of the Gulf of Aden (the Mukalla-Sayhut, Hawrah and Aden-Abyan basins) and the Red Sea (the Tihamah basin). Most of the offshore wells drilled in the Mukalla-Sayhut basin have encountered oil shows in the Cretaceous and Neogene layers. In contrast to the Neogene rift basins of the Gulf of Aden and the Red Sea, no volcanic activity was associated with the formation of the Sab'atayn and Say'un-Masilah extensional basins. We also identify two relatively small basins (the Ad-Dali' and Balhaf grabens) running from onshore southern Yemen to the buried Jurassic petroleum system well before the Gulf of Aden rifting.
