

SIGNES OF BASIN CONFIGURATION AND TECTONIC INVERSIONS ON HYDROCARBON EXPLORATION OF THE EGYPTIAN WESTERN DESERT

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The subsurface basins of the Western Desert of Egypt (WD) have a complex structural evolution that has been shaped by both extensional and compressional tectonics and major sea-level fluctuations of the southern Tethyan. This has resulted in a variety of different structural traps for hydrocarbons, including anticlines, fault traps, and stratigraphic traps with thermogenic charging from different stratigraphic intervals. Recognizing the basin configuration in terms of structural geometry and basin development, the age of sedimentary packages and source rocks in addition to the degree and types of the tectonic inversion have a great impact on the hydrocarbon exploration programs in the WD.

The WD is now considered to be a very prospective province for hydrocarbon exploration of deep Jurassic-Paleozoic targets, not only the Cretaceous ones. However, it is important to note that the region is also very challenging to explore, due to its complex geology, limited data coverage for Jurassic/ Paleozoic basins and deep harsh desert environment. The talk will demonstrate some specific examples of how surface and subsurface mapping and updated concepts can be integrated to fully recognized the variability in the architecture and tectonic evolution of some major prolific basins and fields in the WD and its reflection on future hydrocarbon exploration. These cases will include 1) the styles of inversion structures in the Horas field from the Alamein Basin, 2) the structural evolution of the Mesozoic Faghur Basin 3) the surface expression of the oblique inversion of Kattaniya basin at Abu Roash area, 4) the major stratigraphic play in hydrocarbon trapping mechanism in Abu Sennan brownfield, the southern part of the prolific Abu Gharadig basin.

Dr. Hammed is a professor of structural and applied geology at Cairo University. He was awarded his doctorate on the extensional tectonics of the prolific Gulf of Suez rift basin in 2001 under ETH-Zurich and Cairo University the channel program. For more than 30 years, he has been working in the oil and gas industry as a consultant, field advisor, and upstream technical trainer. His research is in the field of surface and subsurface mapping for energy resources (hydrocarbon and geothermal energy). He published about 30 scientific articles in international and Egyptian geological journals in addition to his supervision of 21 MSc and 12 PhD projects at Egyptian and European universities (ETH Zurich, Gottingen, and Grenoble). Currently, he is also working as Global Project Manager for the hydrocarbon exploration project of the interior basins in Angola.