Abstract

An integrated study of the Arabian Plate was conducted on regional scale based of several NW-SE seismic traverses to understand the tectonic evolution and sediment interaction. This study uses continuous flattening techniques to restore the tectonic evolution history and to understand the stress phases and deformation through time. Part of this study covers the area of Qatar Arch and Wajid Graben that is investigated in details here.

The study material consists of eight seismic traverses that runs east to west, each traverse is a combination of several lines from different seismic survey groups in order to reach an extended line running all the way from the Arabian Gulf to the Arabian Shield. Each line is interpreted across 10 seismic horizons that are regionally mapped. Faults were interpreted across the seismic sections to define basins, grabens and highs. This is a vital step to define the activity and reactivity spots during extensional and compressional regimes.

Three main phases of tectonic major systems were defined, starting with a rifting extensional regime evolving into a passive margin and ending with compression and tilting. Within the area of interest is a line that passes through Western and Easter Rub-Alkhali including Qatar Arch and Wajid Graben. The central Arabian Gulf is traversed by the NE-SW trending Qatar-Sanam Arch Bounded by the Zagros Mountains in the north through the Qatar peninsula and into the Western Rub Alkhali Desert in the south. The Northern and Southern Gulf Salt Basins are two regions of the Arabian Gulf basin that are distinguished by significant Proterozoic Hormuz salt diapirism, and the Qatar-Sanam Arch is a first-order structure that divides this basin. The South Pars-North Field, located offshore and across Iranian and Qatari waters, is the largest gas and condensate field in the entire world.

The result of this regional study unravels the complex tectonostratigraphic history derived from structural framework and growth history. The Qatar Arch and Wajid Graben are crucial parts of understanding the Western and Eastern Rub Alkhali basins’ petroleum systems.