Sirte Basin, situated in the north-central part of Libya, is the largest oil producer in Africa. It was developed as a series of NW-SE trending horsts and grabens (platforms and troughs) by the collapse of the Sirte Arch in Lower Cretaceous time. Sirte Basin covers more than 500,000 square kilometers of north-central part of Libya with recoverable reserves of 50 billion barrels of oil and about 40 TCFG, considered as the most prolific basin in Libya. Exploration activities of Sirte Basin commenced during late 1950s followed by the first commercial discovery in 1958 (Well A1-32). During the first half of 1960s most of the giant fields were discovered bringing Sirte Basin among the most oil productive basins in the world.

This paper is the results of combining available geological, geochemical, and basin modeling studies carried by the National Oil Corporation of Libya (NOC) and other companies, all indicating the presence of several thick formations of organic facies of different age from Triassic to Paleocene. There is also a possibility of deeper source rocks which have not been penetrated yet. Various depositional and environmental conditions as well as different thermal maturities, organic matters, and richness are reported in these source rocks.

Oil generation in the Sirte Basin started in Eocene time and still continuing in the shallower parts of the basin. And hydrocarbon migration commenced in Oligocene. Hydrocarbon generations are mainly in the trough areas as the oil kitchens. Migrations were vertically along the trough bounding major faults up to the platform areas and further migrations were up-dip into the present structural positions.

Two major discoveries (North Gialo and Block NC98) were made by Waha Oil Company in the deep areas of the Sirte Basin recently. These are very encouraging indications that still high hydrocarbon potential exists in the deep trough areas to be discovered by the applications of 3D seismic and detailed sequence stratigraphy. The estimated hydrocarbon generations and expulsions of the multiple source rocks of the Sirte Basin are by far exceeding the estimated hydrocarbons found so far (oil in-place 140 billion barrels and estimated gas in-place 60TCF). Therefore, further hydrocarbon discoveries are expected in forms of structures and/or stratigraphic traps particularly in the deep trough areas.
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