

Section «Innovative natural resources management»

**Petroleum systems analysis and structural characterization of concession 47,
Dor Mansour and Bu Alawn fields.**

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The goal of my work consisted in the study of petroleum systems analysis and structural characterization of concession 47 within the Dor Mansour and Bu Alawn fields that will be concluded in hydrocarbon prospect generation of the study area. The study area is located in the western-central part of the Sirt basin occupying the area of about 3500 Km². This study is based on geological and geophysical data (seismic 3D cube, well logs). The Sirt basin is the youngest pericratonic sedimentary basin in Libya covering 600,000km² in central Libya. The sedimentary sequence reaches 7500m.

The interaction between African and Eurasian plates formed the structural features of the Sirt basin. During formation of the basin multiple subsidence events caused a number of troughs along E-W trending basement fault during Early Cretaceous and NW-SE trending basement fault during late Cretaceous. The Sirt basin consists of horst and graben systems. It is considered to be a type of continental rifting (extensional) area referring to a part of Tethyan system.

The Sirt basin contains 89% of all hydrocarbons discovered in Libya. This is primarily due to the young age (Mesozoic-Cenozoic) of the basin, presence of very rich hydrocarbon generating source rocks in Upper Cretaceous sirt shales. 18 petroleum systems are identified within the Sirt basin, although we focus on the western petroleum system comprising tectonic elements Dur al Abd trough, Zallah Trough, Al Kotla Graben, Abu Tumayam Trough and Amin High.

Concession 47 occupies most of the southern part of Dahra Platform area where intersected in N-S direction by the Kotla Graben. Kotla Graben divided the concession in three tectonic elements: Amin High to the east, the Kotla Graben in the center and Dahra Platform in the west. There are six oil fields in the concession 47: Haram, Dor-Mansour, Bu Alawn, and Kuff fields (Upper Cretaceous reservoirs), Beda, Warid and labiba fields (Paleocene reservoirs). Although the main source rock in this area is Sirt shale (Tagrifet Shale) it is mature only in the Kotla Graben and Zalha Trough, so hydrocarbons in Dor Mansour and Bu Alawn fields are supposed to have migrated from this source. The main target in these oil fields is Lidam formation which is main producer reservoir in both of them, so the new proposed will be in Lidam Formation in F-structure it is not far from Z-47 which is producer well from Lidam Formation. Formation is predominantly represented by dolomite with some limestone, shale and anhydrite. Lidam Formation is overlain by the impermeable shale/anhydrite and argillaceous limestone of the Etel Formation. This Formation is the effective caprock on top of Lidam reservoir. The type of trap in the study area is structural trap bounded by a fault of NE-SW direction. The well has been drilled near the F-structure but it was out of the closure and did not result in hydrocarbon discover. So my work will help determining a good location for further drilling.