

Hydrocarbon source rock evaluation of the middle Dariyan shale and marls, south Dezful, Zagros, Iran

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Abstract

The Dezful Embayment is a depressed area within the Zagros Folded Belt. This embayment represents a foreland basin where subsidence at the foot of the uplifting mountain front fault has resulted in the deposition of thick post-Oligocene sediments. It has been one of the most productive areas where several potential source rock units with different geological ages were deposited in this tectonically developed depression making this area as the most prolific region in the Middle East. It is divided into northern and southern parts. The South Dezful Embayment at the foreland part of the Zagros Fold-Thrust Belt is a post-Oligocene subsiding basin. To the southeast, the South Dezful Embayment is bounded to the Kazerun Fault Zone and to the west, it bounded by the hendijan Fault zone, which is an N-S trending paleo-structure. Due to its vast oil resources, it has attracted the attention of researchers during time. The Dariyan Formation-Aptian age- is known as a carbonate reservoir in the Zagros Basin. It overlies the Gadvan Formation conformably and is overlain unconformably by Kazhdumi Formation. In the studied area, the Dariyan Formation has a thickness ranging from 195 to 45 m and can be divided into three members that are as follows: Lower Dariyan, Middle Dariyan, and Upper Dariyan. The Lower Dariyan consists of thick to medium-bedded limestone. The middle part of the Dariyan Formation is the so-called Kazhdumi Tongue. This part consists of thick black to greenish-grey shale and marl layers associated with a high abundance of planktonic foraminifers. In the East-West trend thickness of this part changes from 100 To 0 m where middle Dariyan and also Upper Dariyan change to Kazhdumi facies toward Kazhdumi intra-shelf basin in central part of Dezful embayment. The upper Dariyan Formation is composed of buff to grey medium, thick-bedded limestone. Many studies have been focused on Reservoir properties of Dariyan Carbonates in Zagros basin and Arabian plate but this is the first time that hydrocarbon source rock of the Middle part of Dariyan potential is going to be evaluated. The result may help to define new Petroleum systems that middle Dariyan will important role as a source rock for Upper Dariyan and above reservoirs.

Keywords: Dariyan formation, kerogen type, source-rock richness, thermal maturity, source quality