

Petroleum Prospects of Lebanon

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Recently, important discoveries of natural gas were reported from offshore Israel (Tamar and Dalit wells; Noble Energy). Such events led some petroleum companies to re-evaluate the prospects of the eastern Mediterranean region. This contribution revisits the subject of petroleum prospects of Lebanon. Data presented and discussed here, are based on excellent previous studies that benefited from lessons learnt during the actual onshore exploration work (e.g. Renouard, 1955; Beydoun, 1977 and 1981) and more recent studies involving regional correlation and diagenesis (Nader and Swennen, 2004). To these, the discussions on the recent offshore seismic surveys and their results (Roberts and Peace, 2007; Per Helge Semb, pers. comm., 2008) are added in order to update the working petroleum model earlier proposed by Nader and Swennen (2004). The tectono-sedimentary history and related occurrence of interesting structures and diagenetic features were placed within the framework of the broader geological province of the Levant.

A quick overlook on the distribution of major oil and gas fields in the Eastern Mediterranean region highlights certain consistencies with respect to major source rocks. The main stratigraphic units hosting source rocks are Triassic, Jurassic, and Upper Cretaceous. Recent studies have confirmed that the Chekka Formation (Senonian, Late Cretaceous), which consists of organic-rich mudstone and is well exposed in southern Lebanon (Hasbaya), includes two types of asphalt: the first one is related to in situ maturation of organic matter in the rock matrix, and the second type is fracture-related, and attributed to deeper sources (probably, Devonian/Silurian).

The presented conceptual petroleum model incorporates both offshore and onshore potential prospects. Offshore prospects will be highlighted through the discussion of seismic profiles (after Roberts and Peace, 2007; and new PGS 3D seismic sections; courtesy of Per Helge Semb, 2008). Here, the focus will be chiefly dedicated to the Oligocene and Miocene rock units, underlying the Messinian salts. Insights into the prospectivity of Triassic potential reservoir units in onshore central-northern Lebanon are presented, where the "Qartaba" structure has been investigated.