The Emerging Deepwater Province of Northwest Egypt*

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Abstract

The offshore basins of Northwest Egypt represent an underexplored region in the Eastern Mediterranean Basin. The Matruh Trough is located along this segment of the Egyptian offshore and covers an area of about 10,000 km². This trough, trending almost perpendicular to the coastline, is located west of the Nile Delta province and north of the Western Desert and its offshore part extends across a relatively narrow shelf into deepwater.

The Obaiyed Offshore block, covering most of the Matruh Trough, is considered a prospective undrilled deepwater block downdip from the numerous gas and oil fields of the Western Desert petroleum province. At least five deepwater play types have been identified in the block. Most of them are related to a large shale detachment system and therefore are considered unique to the Matruh Trough. The numerous listric-fault bounded supra-detachment structures, providing repeatability and consequently low finding costs, are very similar to the classical raft play of the Lower Congo Basin.

Outside the offshore Matruh Trough, another important untested deepwater play type is related to a prominent syn-rift hinge-zone striking obliquely to the coastline. A recently acquired 1,500 km² 3D seismic survey images this trend very well with prospects appearing analogous to some significant discoveries in equatorial West Africa.

In the ultra-deepwater of Northwest Egypt, the Messinian subsalt play also remains untested. However, its exploration potential is
considered very similar to other deepwater regions of the Eastern Mediterranean, including the area of the recent discoveries of Tamar and Dalit.

References


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Regional setting, offshore NW Egypt

Deepwater play types in NW Egypt
  - Rafts
  - Hinge zone (marginal ridge?)
  - Messinian subsalt

Seismic examples

Analogues

Conclusions
Sedimentary basins and petroleum provinces of Egypt

After Dolson et al. (2001)
Obaiyed Block and Western Desert petroleum province
Regional onshore/offshore 2D seismic transect

Note difficulty of onshore/offshore stratigraphic correlation due to lack of offshore wells.
Composite map of 2D leads, Obaiyed Offshore

- Rafted domain
- 3D survey
- Coastline

20 KM
Play types, shelf and upper slope
3D Seismic character of rafts

North

Messinian

Mega-seq. A: Sheetforms & amalgamated lobes

Mega-seq. B: Channels & channel-lobes

Mega-seq. C: Upper slope – sand bypass, locally ponding along growth faults

Top Jurassic

South

15km
3D seismic example of a typical raft target
Multiple low-angle normal faults, Block 0, Cabinda, Angola

Figure 7. (a) Dip-oriented line C from Kali 3D survey, with horizon and fault interpretation. Line shows several stacked low-angle listric faults. (b) Same line as (a) without interpretation.

Figure 15. Lithotect depth reconstruction of line A from Kali 3D survey.

Chimney and Kluth (2002)
Composite map of 2D leads, Obaiyed Offshore
Play types, hinge zone, lower slope and abyssal plain
Typical seismic character through Omega

Laterally extensive, highly reflective aggradational packages alternating with non-reflective intervals (shales)

Thickening of reflective package into small growth faults
Seismic expression of the Omega Lead on 3D seismic
Evidence for gas charge based on a chimney cube

A large gas cloud can be seen over the crest of Omega and along the hinge zone trend to the NW.
Hinge zone or marginal ridge in the deepwater?

After Longacre and others (2007)
Sub-Messinian potential, offshore Obaiyed

- Base salt
- Outboard hinge
Analogue plays from offshore Syria

Roberts and Peace (2007)
Conclusions

- Offshore NW Egypt is a practically unexplored part of the Mediterranean

- A variety of untested deepwater play types exist which are proven and "traditional" in the wider region
  - rafts in Angola
  - hinge zone(s) in equatorial West Africa
  - Messinian subsalt in the East Mediterranean (Levant)

- Numerous large leads and play types can be defined and offer repeatability in case of success
Beach at Mersa Matruh, NW Egypt