

Tectonic Evolution of the Prolific Levant Basin and Emerging Pre-Pliocene Giant Gas and Condensate Plays, Offshore Egypt

Ahmed Abdel Aal¹, Eleanor Rowley¹, and Hossam Salah¹

¹Dana Gas

Abstract

The East Mediterranean Levant Basin was controlled by complex evolution of the southern Tethyan margin and interaction of the African, Eurasian and Arabian Plates movement through Mesozoic to Cenozoic events. The tectonostratigraphic framework is controlled by deep-seated basement structures with distinct gravity and magnetic expressions, and by the interaction of the NW-trending and NE-trending fault zones. The deformational pattern is largely the result of multiphase tectonic movements along the pre-existing fault systems on the continental margin of the Neo-Tethys Ocean.

The Levantine Basin is a rapidly emerging giant gas basin with over 40 Tcf discovered since 2009. The majority of the discoveries are in Mid to Lower Miocene and Oligocene turbiditic slope and fan sands plays, which are sourced from the proto-Nile Delta to the south and trapped in fault bound structures that have been modified during the Late Cretaceous to Early Tertiary Syrian Arc compression. To date, the discoveries are located offshore Israel and Cyprus, but the plays extend north into offshore Lebanon and Syria, and south into the easternmost part of the Nile Delta Basin.

The Levant and Nile Delta basins are both part of the southern Tethyan margin, and have shared the same geological evolution through Mesozoic rifting, passive margin formation, and compression during Syrian Arc events. In the post-rift, both basins have been filled with deep water clastic sediments and submarine canyon and channel systems are well developed. These mass transport systems are relatively well documented in the Nile Delta Basin, and some models suggest long distance mass transport of sediment from Egypt into the Levantine Basin.

Recently, a giant gas discovery from the Miocene carbonate build-up reef facies overlain Cretaceous older structural high trend along the Eratosthenes Sea Mount, emphasized the significance for focusing exploration activities into the Oligo-Miocene targets in the easternmost part of the Nile Delta and the Levant basins. Two large prospective blocks on trend with the Levant discoveries were awarded in the 2013 EGAS offshore bid-round in Egypt. Together the blocks total greater than 5,500 sq km with only one failed test of the Mesozoic carbonate play. Attention is now turning to the Oligo-Miocene clastics and carbonate plays potential as the next phase of exploration in the area begins.