

## Neogene geology and exploration challenges of the NW Black Sea region, offshore Romania

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Pre-Oligocene structural plays have been the traditional exploration targets in the Black Sea region and to-date provide all the Romanian offshore oil and gas production. The exploration focus is, however, gradually switching towards the Neogene – mainly Miocene - plays. Recent, dry gas discoveries on the Romanian shelf show the exciting potential that this play might yield. Exploration of the Neogene plays is nevertheless, in its infancy compared to the pre-Oligocene plays; this holds true not only for offshore Romania but also for the entire Black Sea region.

The Neogene sequence in the north-western part of the Black Sea defines a passive margin and reaches a thickness of up to 5-6 km. The deposits are fed by the largest paleo-drainage systems of the Black Sea region (i.e. paleo-Dniestr, -Dniepr, -Prut, and -Danube). The present day regional architecture forms an embayment zone inherited from the pre-Neogene tectonic framework. The embayment is bound to the North by the Scythian Mesozoic platform and to the West by the Moesian Mesozoic platform. Its geometry has played a big role in sediment preservation and in subsequent structural deformation.

The Neogene (Miocene to Pliocene) deformation is mainly the result of gravity-driven tectonics. Faulting occurs predominantly via gravitational sliding, strongly controlled by the underlying Mesozoic morphology. Deformation is confined to an area which appears to be the eastward continuation of the Histria Trough that is defined by two major, long-lived faults: The Sfântul Gheorghe Fault (SGF) in the North and the Paceanaga-Camena Fault (PCF) in the South. The pre-Neogene strata consists of thick, partially overpressured Oligocene shales providing detachment surfaces along the platform margins for the growth faults, roll-over anticlines and the toe-thrust structures.

Within the Romanian passive margin, two distinct tectonic areas are distinguished:

- 1) the 'Western Margin', characterized by on-going extension, and
- 2) the 'Eastern Margin', where a combination of extension and toe-of-slope compression (folds, backthrusts, toe-thrusts etc.) have created structures favourable for hydrocarbon exploration.

The main exploration challenges in the Romanian Black Sea area are related to complexity caused by the interplay between reservoir deposition and ongoing tectonics during the Neogene. From now onwards 3D seismic will be increasingly used to address these issues. As a result of this there will be increased emphasis on quantitative geophysical techniques to confirm hydrocarbon fluid fill prior to drilling.