The MSC Signature in Western Greece Offshore

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ABSTRACT

The current Mediterranean Sea is the remnant of a Mesozoic basin (NeoTethys), almost totally consumed as a result of long term plate convergence between Africa and Eurasia. Among other consequences this convergence created a fold and thrust belt (The Hellenic Fold & Thrust Belt) in the southern part of the Adriatic Sea, including the Ionian Islands area, described by a number of geotectonic zones. This area is mature, with 13 wells drilled and one offshore oil discovery in Katakolon. The major petroleum system of the Ionian zone is proven in Katakolon and has Jurassic “Posidonia” and Cretaceous “Vigla” shales as source rocks, with migration into the Cretaceous to Eocene carbonates/sands and the Miocene sands. The sands with provenance from continental Greece have excellent reservoir quality while evaporites and Plio-Pleistocene mudstone deposits serve as a seal. The trap is of anticlinal type formed by the uplift of the Pindos zone thrust. The pre-Apulian Zone (Paxos) is made up of Triassic to Miocene deposits – mainly neritic and hemipelagic which stand, due to shortening and Triassic evaporite detachment zone, below the Ionian zone. Work on source rocks from wells and the presence of seeps occurring along western Greece, onshore and offshore, point to an active Mid-Mesozoic hydrocarbon system, and a possible Tertiary one due to organic rich mudstones of late Oligocene to Early-Mid Miocene turbidites. Recent MC marine seismic data indicate west of Corfu, from 40°N to 38°N, the presence of an important Late Miocene morphological feature with N-S direction. It represents an elongated channel of the central pre-Apulian zone which was progressively inundated from the south after the Messinian Salinity Crisis (MSC). This process was concomitant with the deposition of sediments from the erosion of mainland coming from the east and suggests the presence of flows with crossed directions that can bear potential play types in a deep turbidite environment, buried today below 3 to 4 thousand meters of clastic sediments. Due to the lack of a well network, extend of the MSC peak and of the subsequent Pliocene reflooding remain unknown. However, in the generally admitted time interval between 5.9 and 5.4 Ma, preexisting reefal constructions (highs) suffered subaerial erosion or lack of sedimentation. These variations were the result of sea-level fall at the onset of the MSC, tectonic uplift and influence of cooling.