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# Carbonate -platform Basin systems evolved through compression tectonics: Examples from the Mediterranean region

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Carbonate platforms have been a subject of research for more than twenty years. Much research work has focused on the effects that sea-level change, oceanographic factors and climate have on carbonate platform stratigraphic characteristics. In this contribution we aim to better understand the tectonostratigraphy of Carbonate platforms by showing examples from the eastern (Levant Basin) and the western Mediterranean (Offshore Greece; Papadimitriou et al., 2018). In particular, we propose that by comparing the evolution and the geometries of carbonate platform we can have a better of Carbonate platform basin systems.

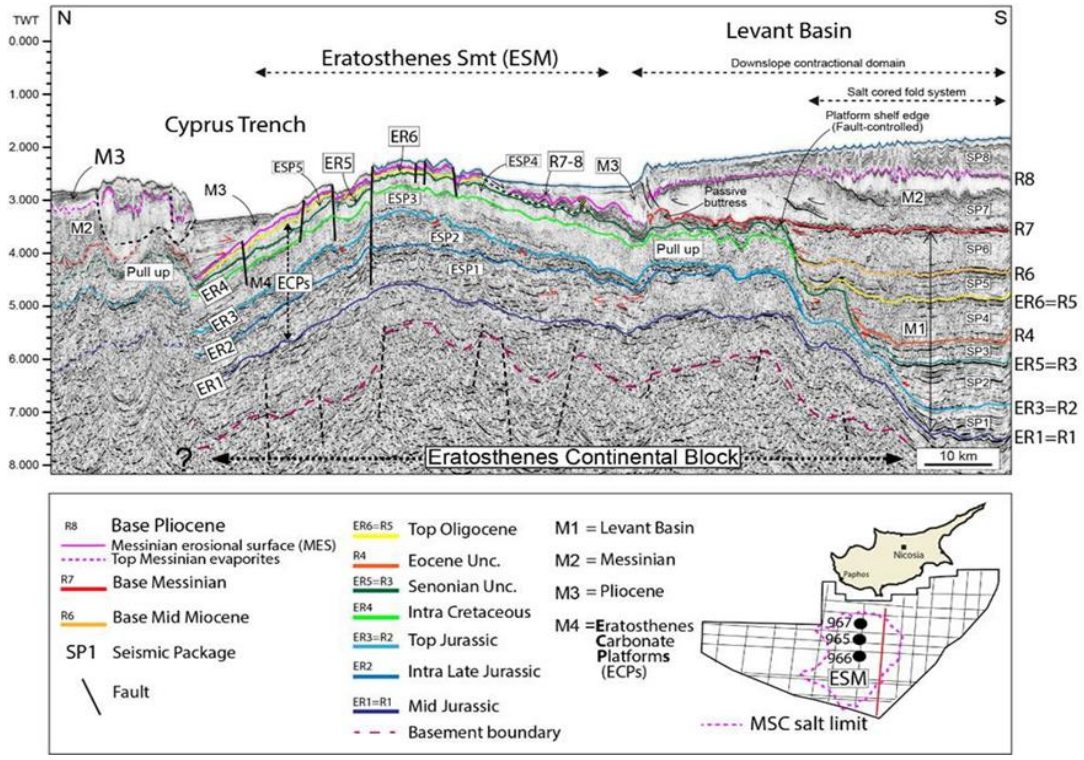


**Figure 1: Interpreted seismic profile that intersects the Eratosthenes Seamount and illustrates the four mega-sequences (M1-M4) and the main seismic boundaries identified in the western part of the Levant Basin.**

Four carbonate platforms (three Mesozoic and one Cenozoic) separated by main seismic surfaces have been identified on top of a basement high at the western margin of the Levant and western Greece (Figs. 1 and 2). The main seismic boundaries identified on top of carbonate platforms refer to erosional truncations, major flooding surfaces, downlap surfaces and slope onlap surfaces, whereas the seismic sequences in the deep basin are marked only by flooding and geometric unconformities (marine onlaps).

The Tethyan Carbonate platform shows a lot of differences. For instance, to the east the Egyptian and the Levant platforms were invaded by terrigenous siliciclastics during the Jurassic- Cretaceous interval (Fig 3; Hawie et al., 2013; Tassy et al., 2015a). In contrast, the Eratosthenes and Apulia platforms located in a long distance from the continent were free from the continental influence (Fig. 3; Borgomano, 2000). Finally, the Mesozoic carbonate pile within the Cretan margin, is more likely associated to the Gavrovo-Tripolitza carbonate platform, which is well- known from studies in western Greece showing reservoirs in Early Jurassic and Cretaceous limestones. The seismic interpretation offshore Crete shows isolated carbonate buildups which appeared beneath the Messinian salt.

The Tethyan carbonate platforms seem have been developed on basements highs. The position of basement-high is controlled by structures inherited from the Tethyan rifting (i.e., transform faults and a different crustal thickness between the Eratosthenes Seamount and the Levant Basin; Sagy et al., 2015; Granot 2016). Furthermore, the distance of the paleo-relief from the continent has a fundamental role in the evolution of a carbonate platform. For instance, these platforms have either been isolated (e.g., Apulia platform) or attached to the continent (Levant and Egyptian platforms).

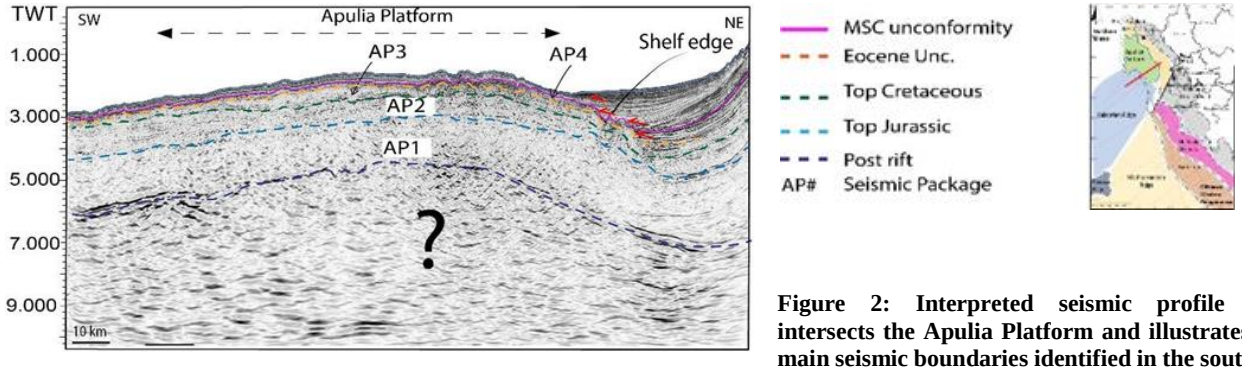


**Figure 2: Interpreted seismic profile that intersects the Apulia Platform and illustrates the main seismic boundaries identified in the southern Part of Hellenides thrust belt.**

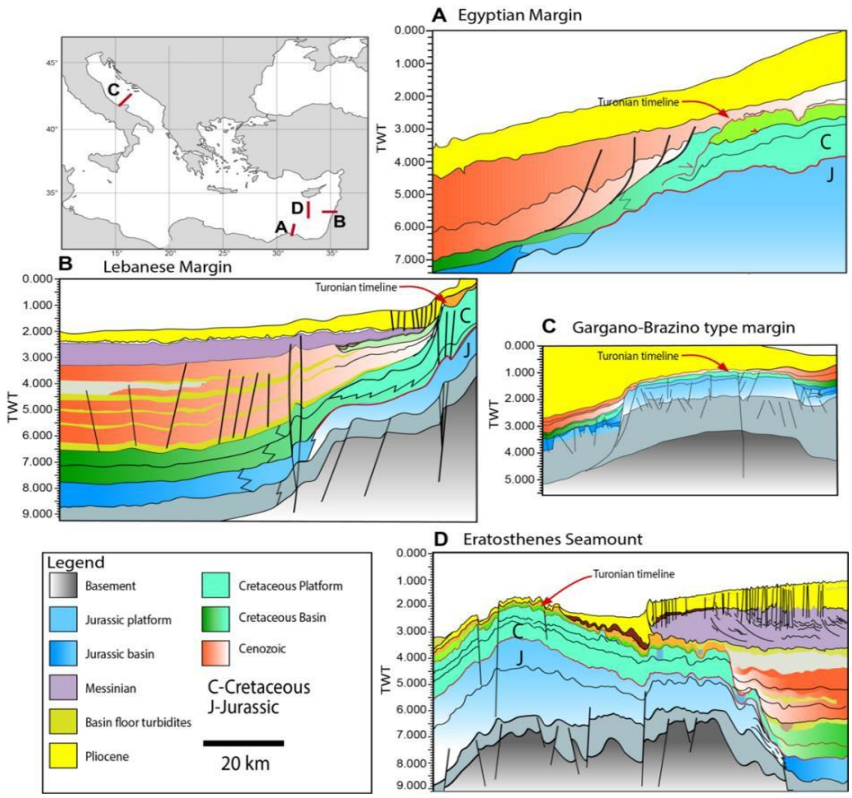


**Figure 3: Seismic profiles of four Tethyan carbonate platforms: (A) Egyptian margin (Tassy et al., 2015a); (B) Lebanese margin (Hawie et al., 2013); (C) Apulia platform (Santantonio et al., 2013); (D) Eratosthenes carbonate platform.**

Despite their differences, the Tethyan carbonate platforms show some similarities. They were all drowned during the Late Cretaceous. The drowning of the carbonate platforms coincided with the global reorganization of the oceans depicting that the demise and the onset of the carbonate factory are depended on the global sea level changes in response to long-term, deep processes such as rifting collision and not only by the eustatism (Robertson, 1998).

Hence, this study can be used as a paradigm for further understanding of the predominant factors that control carbonate factories for other Carbonate platforms that can be found in the region.

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