MIOCENE OF THE GULF OF LIONS (FRANCE): A PASSIVE MARGIN?


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Two processes have played a major part in preserving or eroding the Upper Miocene series on the continental shelf:

1. The Messinian event is responsible for intense erosion (Fig. 7), which has locally removed the Upper Miocene and part of Middle Miocene deposits (Fig. 3).
2. A tectonic event is at the origin of the preservation of Middle and Upper Miocene series (Nectrase and Hore, 1991). It is possible to follow Miocene units beyond the continental shelf (LUGO profiles, Fig. 5).

An upper Miocene unit (yellow) shows a chaotic facies at the transition between the continental shelf and the basin (Fig. 5 and 6). The Burdigalian unit (green) shows a progradational configuration toward the basin (Fig. 4 and 6).

Thermal contraction of an initially hot lithosphere is widely accepted as the main cause of tectonic subsidence in sedimentary basins. The thermal contraction mechanism predicts the rapid beginning of subsidence (tectonic subsidence) which will then slow down with time (thermal post rift subsidence).

The study of Miocene sedimentation helps us to understand the tectonic processes which affect the Gulf of Lions margin and its evolution. This approach gives us new elements to study post rift subsidence and basin formation.

Successive migration of the break of margin during Burdigalian (green unit) reveals that margin morphology and subsidence pattern changed after the rifting (Fig. 5).

This interpretation is important because the model usually adopted to explain the formation of passive margins does not apparently fit the subsidence history of the Gulf of Lions. For the margin, the major part of subsidence occurs after the rifting.

The post rift subsidence is clearly asymmetrical in the Gulf of Lions, and doesn't fit models of thermal contraction. It is now necessary to understand the reasons why subsidence remained high after the rifting and which mechanisms other than thermal contraction can intervene in the formation of passive margins.