A high-resolution MCS study of the Western Alboran Sea evolution (SW Mediterranean Sea)

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More than 800 k of high-resolution multichannel seismic profiles were gathered in the western Alboran Sea onboard B/O *HESPERIDES* during the first 1991 testing cruise. The profiles were oriented to cut the major structures observed during previous seismic cruises (MALDONADO *et al.*, 1992). Two different morphostructural domains identified in the deep sectors, bounded by the continental margins of Spain and Morocco, include basins and structural highs (CAMPILLO *et al.*, 1992). The three deep basins characterized are limited by structural blocks of the acoustic basement. The western Alboran Basin is the largest showing the thickest depositional sequences, while Malaga Basin and south Alboran Basin are less developed and they have thinned depositional sequences. The faults limiting the basins trend roughly NW-SE and NE-SW and they show a normal to strike-slip component, with the exception of the faults that bound the Alboran Ridge and south Alboran basin which show an inverse to strike-slip component from Pliocene to recent times (BOURGOIS *et al.* 1992; CAMPOS *et al.*, 1992). The structural highs are largely attributed to metamorphic rocks of the Alboran Domain, although local intrusions of volcanic rocks may be important, such in the Alboran Ridge and Djibouti Bank.

The western Alboran Basin was initiated in the early Miocene by normal faults which have subsided the basin until present time. The seismic profiles show one of the most impressive sequence of Neogene deposits reported in the western Mediterranean Sea, with more than 4 seconds (twtt) of terrigenous sediments. These deposits are disrupted in the axis of the basins by deep-seated diapirs of undercompacted muds. Seven sequences from Tortonian to Quaternary deposits bounded by unconformities are identified in the basins, which can be correlated with major tectonic and paleoceanographic events. Two unconformities correspond to large erosive events, which developed major channels (fini-Messinian and intra-Pliocene channels), trending westward from the Strait of Gibraltar and deeply entrenched in the underlying deposits (CAMPILLO and others, 1992).

Malaga Basin starts the opening to the SW and it was affected by important subsidence during the Tortonian within a transtensional regime, probably in favour of strike-slip faults. During the Pliocene time the most important tectonic activity in the basins has ceased. South Alboran Basin was, in contrast, developed as a synclinal related to the positive flower structure of the Alboran Ridge (BOURGOIS and others, 1992).

The stress regime in the western Alboran Sea seems to be at present transpressional, with the deformation accumulating along the structural highs, the continental margins and Alboran Ridge, while the basins are undergoing active subsidence.

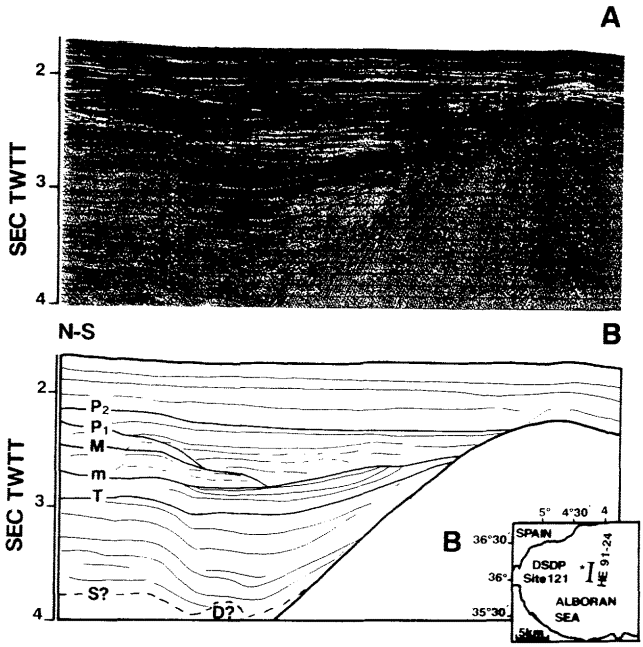

Figure 1.- High resolution MCS profile after Z-Stack (A), and line drawing interpretation of the profile (B). Key horizons: S, top of Serravallian sequence; T, top of Tortonian sequence; m, top of lower Messinian sequence; M, Late Messinian unconformity; P_1, top of lower Pliocene sequence; P_2, top of upper Pliocene sequence; B, basement; D, diapir.

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