

A MESOZOIC FOSSIL EDGE OF THE ARABIAN PLATE
ALONG THE LEVANT COASTLINE

Gdaliahu Gvirtzman and Amos Bein
Oil Research Division, Geological Survey of Israel
30 Malkhe Yisrael Street, Jerusalem Israel

As a result of data accumulated from drilling and seismic surveying for oil exploration in the Coastal Plain and Continental Shelf of Israel, and from compilation of data from neighboring countries, a depositional hinge-line during the Cretaceous, the Jurassic and probably the Triassic along the present Levant coastline has been postulated (Gvirtzman and Klang, 1972; Bein, 1974; Druckman *et al.*, 1975). This line separates between shallow-marine and continental sediments on the Arabian Platform to the east and the continental slope sediments in the Levant Basin to the west. While platform carbonates and rudist reefs were deposited during the Cretaceous on the Arabian Platform, a contour current shaped sedimentary prism of calcareous detritus derived from the platform was accumulated at a high rate of deposition on the continental slope and continental rise of the Tethys Ocean along the Arabian Platform (Bein, 1974; Bein, 1976; Bein and Weiler, 1976). Submarine canyons, cut by turbidites, were formed during Early Cretaceous times on the platform edge (Cohen, 1976). Though the Jurassic sediments are less known, it was possible to distinguish the transition from shelf carbonates on the platform, through shelf-edge reefs on the platform edge, possible basin slope and basin marginal sediments, and basinal sediments (Friedman *et al.*, 1971; Derin and Gerry, 1972; Derin, 1974). Triassic sediments were not penetrated along the hinge-line, however Late Triassic carbonates and evaporites were deposited on the platform and Late Triassic oceanic sediments (including radiolarites, nodular limestones and cherts together with ophiolites) were found in allochthonous blocks in Cyprus and northwest Syria (Druckman *et al.*, 1975). It is therefore assumed that the depositional hinge-line existed also during Late Triassic times.

The prism of Mesozoic sediments along the hinge belt of the Levant, especially the Cretaceous sediments, closely resembles the recent analogue of

contourites and nephroids in the NW Atlantic Ocean along the continental margins of the eastern side of North America (Heezen *et al.*, 1966). Both represent, in our opinion, a typical sediment along a hinge belt of a fossil trailing-edge of a plate.

On the basis of findings of ultrabasic rocks of mantle origin, which are surrounded by sheeted intrusives, outcropping in the Troodos massif in Cyprus (Gass, 1968; Moores and Vine, 1971; Greenbaum, 1972; Gass and Smewing, 1973) and in the massifs of Bassit and Baër in NW Syria (Lapierre and Parrot, 1972; Parrot, 1974a, 1974b), these authors postulated a mid-Tethyan ridge and a fossil spreading center. In Cyprus, umbers (iron, manganese and trace-metal enriched mudstones of volcanic exhalative origin) associated with veined and fragmented pillow-lavas, also indicate mid-oceanic spreading centers (Robertson and Hudson, 1973; Robertson, 1975). Similar umbers were also found in Syria (Parrot and Delaune-Mayère, 1974).

The finding of allochthonous blocks of oceanic sediments of Late Triassic to Jurassic age associated with volcanics, around the massifs in Cyprus (Robertson and Hudson, 1974) and in Syria (Delaune-Mayère, 1974), and the finding of autochthonous Cretaceous ocean floor pelagic ooze deposited on pillow-lavas below the carbonate compensation depth in Cyprus (Robertson and Hudson, 1974), indicates that the mid-Tethyan spreading center was active at least during the Late Triassic - Late Cretaceous time span (about 200-70 my B. P.). This spreading center separated between the African-Arabian plate and the Turkish-Iranian plate.

The oceanic crust between the Levant depositional hinge-belt and the original position of Troodos-Bassit-Baër, which was accreted to the African-Arabian plate during the Mesozoic, today forms the crust of the Levant Basin. Since Late Cretaceous (Campanian-Maastrichtian) times a new tectonic regime prevailed, in which the Tethyan spreading was terminated and the collision between the African-Arabian plate and the Iranian-Turkish-Aegean plate, along the Zagros-Taurus-Mediterranean Ridge subduction zone became dominant. Most of the oceanic crust that was formed during the Mesozoic between the mid-Tethyan ridge and the Turkish-Iranian plate was probably consumed later during the Tertiary subduction.