A prolonged period of continental breakup and rifting affected the northern edge of Gondwana during the late Paleozoic and Early to Middle Mesozoic eras. This major tectonic event resulted in separation of the Gondwanian and Laurasian plates, the formation of smaller-scale blocks between these continents, and subsequent opening of the Neotethyan ocean system. In the Levant region rifting activity was manifested by faulting, differential movements, and magmatism in a wide area extending from central Syria in the north to the Egyptian western desert in the southwest (Fig. 1).

Neotethyan rift structures are typically found in the lower part of the sedimentary section and were previously inferred from seismic data and a few deep boreholes located inland. A set of regional, seismic reflection surveys acquired in recent years offshore Israel show these structures in the marine, Levant Basin and are used to compile a regional framework of rifting activity in the region.

The main structures found inland are sets NE-SW trending depocenters, controlled by normal faults that extend from the North Sinai Basin in the southeast through the Judea Graben in central Israel to the Asher and Hermon Basins in the north and northwest (Figs. 1, 2). These depocenters are delimited on the west by series of structural highs located near the Israeli coastline and east of it (Figs. 1, 2). The Pleshet Basin is a major, fault bounded depocenter found in the eastern part of the Levant Basin offshore. The Jonah and Leviathan are two ridges located between the Pleshet Basin and the westernmost structure of the Eratosthenes High (Figs. 1, 2).

The Neotethyan structures were active in growing intensity during three main phases. Late Paleozoic uplift is evident on the Gevim High (Fig. 2b). Triassic subsidence is identified in the Judea Graben, corresponding to subsidence in the Palmyra Trough; and in the Pleshet Basin offshore. Early Jurassic subsidence and uplift accompanied by widespread magmatic activity is observed in most of the Neotethyan structures onshore and offshore.

The overall structural configuration indicates an extension in a NW-SE direction, perpendicular to the direction of most structures and faults. Faulting took places within a continental to shallow-marine Gondwanian shelf. We speculate that rifting reached an early magmatic stage and resulted with thinning of the continental crust in the Levant Basin and possibly also in the northern part of Israel. Sea-floor spreading and the formation of new oceanic crust took place only further to the north and west of the Levant basin and the Eratosthenes seamount. Two later effects of the Neotethyan activity are: (a) the formation of a deep-marine basin and a continental shelf-edge near the elevated coastal structures in the Upper Mesozoic; and (b) the reactivation in a reverse motion of normal faults and structures during the Syrian-Arc compressional stage.
Fig. 1- Map of inferred Neotethyan rift structures in the Levant area.

Fig. 2- Regional geologic sections across the Levant Basin and margin showing Upper Paleozoic to Lower Jurassic grabens and horsts.