



## **Shoreline Migration and Land Exposure of the SE Levant (Israel) During the Closure of the Neo-Tethys (Late Eocene and onward)**

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Since the Late Eocene, along with the closure of the Neo-Tethys Ocean, the paleogeography of the north Arabian Peninsula changed significantly. The uplift and exposure of the continental region, today occupying Iraq, Syria, Jordan, Israel, and Lebanon, disconnected the Mediterranean basin from the Mesopotamian basin. This changed the contours of Arabia and the shoreline that had previously extended from Egypt towards the Persian Gulf, changed its course northwards towards Turkey along the present day Mediterranean coasts.

Reconstruction of the gradual land exposure and migration of the shoreline throughout the past 37 million years is important not only for the regional paleo-geography and paleo-oceanography, but also for the understanding of geodynamic processes that controlled the inland vertical motions south of the Arabia-Eurasia convergence zone.

Israel is located in a key area where late Tertiary shorelines of the Levant continental margin can be traced. A series of abrasive platforms, capped by shallow marine sediments, extend along the western foothills of Israel and form stepped morphological surfaces. These surfaces can be traced all the way from the Negev desert in the south to Mt. Carmel in the north, mark the positions of the paleo-shorelines and record the uplift history of the mountainous backbone, which began in the late Eocene or early Oligocene.

The present study reconstructs the late Tertiary shorelines from central Israel northwards, applying morphometric analysis of the foothills relief and subsurface analysis of stratigraphic sections preserved in low basins. We found a continuous abrasive platform of Middle Miocene to Pliocene age, which extends approximately at similar altitudes from the Judea hills to Mt. Carmel, indicating similar exposure history of these regions since the Middle Miocene. On the other hand, the initial exposure of the Judea hills, predated Mt. Carmel, by 20-25 my and may have started in the Late Eocene. During the Oligocene, when northern Israel was still submerged, the Judea mountain stage formed as a part of a northward descending extensive peneplain, which truncated Sinai, Jordan, southern and central Israel.

A wide, N-S oriented, abrasive continental shelf was first formed along the foothills of the Judea hills during the Middle Miocene and extended northwards during the Late Miocene and Pliocene times. The abrasive process ended when Pliocene seaward progradation of the shelf pushes the coast westward to its present position.

This process of mild uplift that gradually exposed the north Arabian platform during the Neo-Tethys closure is very different from the orogenic processes that coevally occurred along the Arabia-Eurasia plate boundary. Unlike the major crustal deformation at the plate boundary, the landscape development of the Levant region was governed by the interplay of intra-continental deep mantle processes and continental margin surface processes. At each stage of land uplift the shoreline was shifted westward and a new coastal plain and continental shelf was formed by land denudation and marine abrasion. The current topography of a flat mountain stage accompanied by flat foothills surfaces is the result of this process.