

The Pelusium Line and Structures of Western Lebanon

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SUMMARY: The discovery of the Pelusium line has explained a number of structures on the continental shelf and the west slope of Mount Lebanon. These structures consist of a number of E-W or SW-NE directed faults, whose throw increases in a westerly direction and which tend to die out eastward; A submarine borderland between Sidon and Tyre and a submarine horst to the south of Ras Beirut. These structures are bounded by the faults which appear to have localized the many submarine canyons crossing the upper continental shelf off Lebanon.

The discovery of the Pelusium line by the scientists of the Geological Survey of Israel has helped to clarify a number of inconsistencies in previous theories of the origin of the structural elements on the upper continental shelf off Lebanon and on the western slope of the Mount Lebanon mountain range.

These structural elements are the following: A series of faults having an approximate E-W direction which decrease in throw from the coast toward the cenomanian high plateau of the Mount Lebanon mountain range. This decrease in throw toward the east and therefore toward the 'Yammouneh' fault, the northern extension of the Jordan-Dead-Sea rift, appears inconsistent if these faults are postulated to have a genetic origin associated with the rift.

Several of the submarine canyons crossing the continental shelf of Lebanon appear to have been located along zones of weakness associated with these faults. Examples of this are found in Junieh Bay, where a hinge fault near the site of the Casino du Liban continues to the west as a submarine cliff and the northern branch of the Junieh Bay canyon, as well as in the canyons off Nahr Ibrahim, Nahr el Fidar, and the canyons near Ras Beirut and Ras Chekka.

NE trending structural elements are present both onshore and offshore between the postulated northward extension of the Pelusium line at the base of the continental slope off Lebanon and the Yammouneh-Dead-Sea Jordan fault.

Onshore these consist of several anticlines. From the Tyr-Nabatie anticline in the south to the Quarta Horst in the north. There is a continental borderland between Sidon and Tyr cut by E-W faults and dissected by submarine canyons.

These NE directed elements are of the same directions and origin as the NE trending onshore and offshore anticlines between the Pelusium line and the Dead Sea rift. It is believed that they are due to the same cause and together with the faults, suggest the extension of the Pelusium Line to the north off the shore of Lebanon.

An EW oriented submarine horst situated to the south of the Ras Beirut promontory is bounded by deeply incised submarine canyons. The canyon forming the northern boundary of the horst appears to be in line with a fault controlling the upper course of the Nahr Beirut, which is concealed beneath coastal plain sediments. A possible indication of the presence of this fault at the coastline and in line with the head of the submarine canyon is given by a pronounced magnetic anomaly.

