



Geomorphologic Structures on the South Cretan Margin, Greece

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The swath bathymetric survey of the South Cretan Margin has been conducted during the HERMES-1 (May-June 2005) and HERMES-2 (September-October 2005) cruises onboard R/V "AEGAEON" using the 20 kHz, SEABEAM 2120 system. High-resolution multibeam bathymetry outlines in unprecedented detail the shape and the morphological features of the region.

One of the most dominant geomorphological structures of the southwest Cretan slope is the submarine Samaria Canyon (Western Cretan Trough) which is characterized by high relief steep walls and V-shaped cross sections. Despite the fact that the trough trends predominantly northeastward, with a central axis oriented from east to west, the head displays a north-trending hook termination on the continental shelf. The minimum depth of its axis is 1400 m and the thalweg ranges from 1500 to 3500m. In addition, abrupt alternation in the axial trend of the canyon is observed, accompanied by sharp changes in axial gradient and in the geometry of the canyon profile ending in a flat area of 3600 m depth.

From Paleochora up to Sindonia, numerous small canyons trending N-S crosscut the steep Cretan southern margin, that reaches the 2000 m isobath. These are transversal to the main direction E-W of the slope. Furthermore, the detailed bathymetric map reveals the morphology of several troughs bounded by steep flanks. Their flat bottom may reach up to 3000m water depth. The most characteristic one, Ptolemy trough (eastern South Cretan Trough), is located in the central southern margin, south of Messara basin. It has a main central axis orientated ENE-WSW, a maximum depth of 2600m and is bounded by E-W fault zones.

On the other hand, Gavdos Rise occupies a major part of the South Cretan Margin. It is bordered by longitudinal troughs with steep slopes. Two intraslope basins are also distinguishable at the southwestern part of the Rise, with depths 1100 and 2000 m respectively. The gentler slopes of the Rise are relatively channel-free with low morphological values.

The very detailed illustration of the bathymetry and morphology of the South Cretan Margin in addition with the study of the canyon system reflects the offshore active tectonics and faulting of the seafloor and the overall deformation since Middle Miocene, in association with the general extension of the South Aegean region.