

# MORPHOLOGICAL DESCRIPTION OF THE SOUTH EASTERN CYPRUS OUTER SHELF AND SLOPE REGIONS (EASTERN MEDITERRANEAN)

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## Abstract

We present here the first results of the analysis and interpretation of the swath bathymetry and side scan sonar data collected along the southeastern outer shelf and upper slope regions of the Cyprus insular margin (offshore Cape Greco). The resultant bathymetric model and the derivatives (e.g.: slope, aspect, benthic position index) are presented and analyzed in order to describe the morphology of the seabed and the main geomorphological features through quantitative indicators including morphometric indexes and statistical descriptors. The presence of deep sea coral communities (*Dendrophyllia ramea*) in a particular location of the surveyed area is also discussed and tentatively related to the landscape morphology where the colonies are settled.

**Keywords:** *Canyons, Deep sea corals, Geomorphology, Swath mapping, Cyprus Arc*

## Introduction

Although the complex geological setting of the Cyprus Island has been the subject of numerous studies inshore, most of them focused on Troodos massif and its singular ophiolite complex, the corresponding insular margin has been barely surveyed. Most of the Cyprus insular shelf and upper slope regions still remain to be mapped through modern acoustic methodologies like multibeam echosounder and side scan sonar.

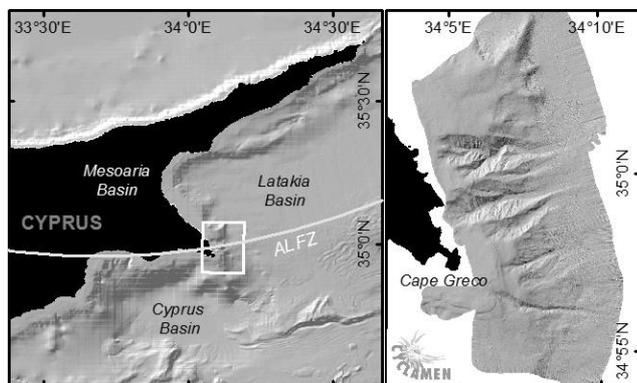


Fig. 1. **Surveyed area and location Map.** Amanos-Larnaka Fault Zone (ALFZ). Bathymetric data in the location map are from EDMONET [5].

We present here the first results of a multibeam survey conducted along the outer shelf and slope sectors of the southeastern insular margin offshore Cape Greco. The study area is located among three basins; the Latakia Basin to the East, the Mesaoria Basin to the West (currently emerged) and the Cyprus Basin to the South. This margin is crossed in an East-West direction by the Amanos-Larnaka Fault zone [1] extending from the Amanos mountains in Turkey to the Troodos ophiolitic complex in Cyprus and presenting a remarkable graben structure offshore Cape Greco. The resulting Digital Elevation Model (DEM) shows the Cyprus southeastern insular margin from 60 to 800 m depth (Fig 1).

The continental shelf is narrow (up to 3 km) and the shelf break is around 100 m deep. The average slope of the surveyed shelf is 1° and it varies from 0.5° to 2° along the surveyed area. The shelf break along the northern part of the surveyed region is diffuse whereas it becomes sharper towards the south, where at least two terraces at the depths of 110 m and 160 m are evident. Four main submarine canyons, interpreted as controlled by a retrograding evolution, are present along the mapped slope, displaying an 8° steep average gradient. Retrograding canyons generally start to develop along the lower slope regions and migrate

towards shallow depths through punctual turbiditic flows and stacked mass wasting events [2]. In the surveyed area some of the canyons reach the shelf edge, demonstrating a relatively mature stage whereas some other are poorly developed [3]. A general evolutionary trend shows the northernmost canyons as more developed features. The two canyons located at the upper latitude are wider, more incised, and present three tributaries and a rather sinuous axis. Few small landslide scars were also observed in this area. The southern canyons present a single strait axis (Fig 1). The surveyed insular glacial slope is about 2° and no remarkable features are present on it.

As the Amanos-Larnaka Fault zone crosses the study area in the same direction of the canyon axis, it is reasonable to infer a tectonic control of the canyon orientation [4]. High densities of deep sea corals *D. ramea* are present in a particular area of the slope with a priori no significance differences to other areas in terms of water composition, light availability or exposure to hydrodynamics. Slope, orientation and depth threshold, among other morphometric parameters have been analyzed in order to find any singularity.

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