

SEABED FEATURES IN RELATION TO GEOHAZARDS ON THE IONIAN CALABRIAN MARGIN: RESULTS FROM THE MAGIC PROJECT

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Abstract

Theseabed dynamics of the Ionian Calabrian Margin are currently being examined in the context of the project MAGIC (Marine Geohazards along the Italian Coasts). Multibeam and shallow seismic data show that the seafloor within X km of the Calabrian coast is characterized by the presence of canyons, slump, slides, diapirs, mud volcanoes and cold seeps. The presence of these morphologies, indicative of ongoing processes of sediment transfer and fluid flow, makes this area particularly interesting in relation to assessments of seafloor geohazards.

Keywords: Ionian Sea, Continental Margin, Geomorphology

The Ionian Calabrian Margin (ICM, Fig.1) is a tectonically active convergent margin, the structures of which reflect two main processes: frontal compression and fore-arc extension during the SE advance of the Calabrian accretionary prism since the late Miocene[1]; and a rapid uplift (up to 1 mm/yr) of onshore and shallow shelf areas since the mid-Pleistocene [2].

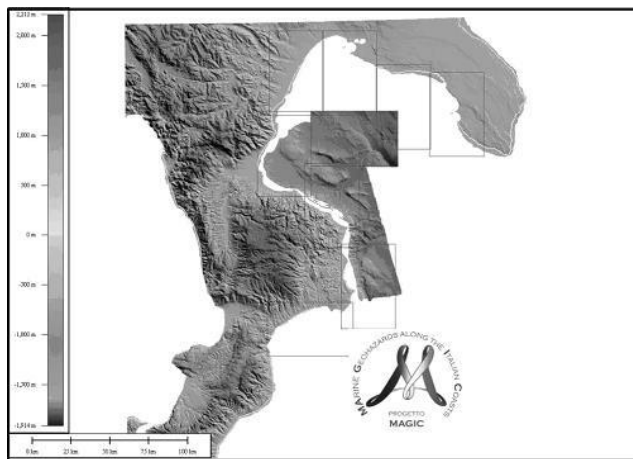


Fig. 1. Bathymetric map of the Ionian Calabrian Margin

The morphological expression of these processes at seabed is a broad, irregular offshore area that comprises the southern Apennine fold-and-thrust-belt, overlain southwards by the Spartivento-Crotone fore-arc basins. The ICM is currently being investigated in the framework of the MAGIC project (Marine Geohazards along the Italian Coasts). The objectives of the project are the definition of elements that may constitute geological risks for coastal areas. This study is based on geophysical data acquired by the r/v OGS Explora in summer 2005 in the framework of the WGDT project, carried out in collaboration with Universities of Calabria and Trieste, and in Spring 2009 in the framework of the MAGIC project. The dataset consists of a swath bathymetry DEM with variable cell size (5-50 m), plus Chirp sub-bottom profiles (2-7KHz) and available multichannel seismic (MCS) reflection data (Ministeriali Zona F) [3], [4]. The interpretative method adopted at OGS for MAGIC consists of mapping seabed morpho-bathymetric elements in relation to the acoustic facies of near-seabed sediments identified on the sub-bottom data. This allows the identification of the principal depositional and erosional features on the margin, as well as indicators of recent seismo-tectonic activity. This approach has been used to construct maps of morphological lineaments and units in order to assess principal sites of geological risk. Morphologically, the seabed of the ICM is characterized by a narrow (in places absent) continental shelf above depths of c. 150 m, above a slope of irregular morphology that extends to depths of 2000 m. In the north, the slope is broad and dominated by the ridges and intervening basins (e.g. Amendolara Ridge and Basin, Corigliano Basin), which are morphological expressions of the southern Apennine fold-and-thrust belt. The fold-and-thrust belt is overlain to the south by the late

Miocene-Pleistocene deposits of the Crotona basin. The northern area includes two main canyon systems (Corigliano and Neto) that feed into the Taranto valley. The main geological risks identified along the ICM during the first two years of the MAGIC project are the retrogressive headwall activity of the Capo Colonna, Esaro, Neto, Punta Alice e Capo Trionto canyons along the southern part of the margin in proximity to the coastline. Other possible risks are due to the presence of canyons, slump, slides, diapirs, mud volcanoes and cold seep and their relative proximity to the coastline.

References

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