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Potential tsunamigenic hazard associated to submarine mass movement along the Ionian continental margin (Mediterranean Sea).

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Submarine mass movements are natural geomorphic processes that transport marine sediment down continental slopes into deep-marine environments. Type of mass wasting include creep, slides, slump, debris flows, each with its own features and taking place over timescale from seconds to years. Submarine landslides can be triggered by a number of different causes, either internal (such as changes in physical chemical sediment properties) or external (e.g. earthquakes, volcanic activity, salt movements, sea level changes etc.). Landslides may mobilize sediments in such a way as to form an impulsive vertical displacement of a body of water, originating a wave or series of waves with long wavelengths and long periods called tsunamis ('harbor waves').
Over 600 km of continental margin has been investigated by OGS in the Ionian sea using geophysical data - morpho-bathymetry (Reson 8111, 8150) and sub-bottom profiles (7-10 KHz) - collected aboard the research vessel OGS Explora in the framework of the MAGIC Project (Marine Geohazard along the Italian Coasts), funded by the Italian Civil Protection. The objective of this project is the definition of elements that may constitute geological risk for coastal areas.
Geophysical data allowed the recognition of four main types of mass wasting phenomena along the slopes of the ICM:
1) mass transport complexes (MTCs) within intra-slope basins. Seabed imagery show the slopes of all the seabed ridges to be marked by headwall scarps recording widespread failure, multiple debris flows in several basins indicate one or more past episodes of failure that may be linked to activity on the faults bounding the structural highs.
2) submarine landslide – a multiple failure event have been identified (Assi landslide) at about 6 km away from the coastline nearby Riace Marina. Headwall scars up to 50 m high across water depths of 700 to 1400 m, while sub-bottom profiles indicate stacked slide deposits at and near seabed.
4) canyon headwalls – in the upper parts of all canyons, numerous headwall scarps are consistent with retrogressive activity of the canyons.
3) possible gravity sliding –elongate seabed features oriented subparallel to contours are observed, associated with diapiric structures suggest that the elongate seabed features may record a form of downslope sediment sliding above salt.
The aim of this work is to reconstruct the dynamics of different type of submarine mass movements on the tectonically active Ionian Calabrian margin (ICM), calculate the volume of sediment mobilized and assess the potential tsunamigenic hazard associated to different type of mass movements. Assessments of tsunami arrival time in adjacent coastal areas, period and wavelength of the tsunami and implication for coastal geohazards have been formulated for the Calabrian margin (small scale) and extrapolated to adjacent margins of the Mediterranean basin (large scale).