



Geo-hazard by sediment mass movements in submarine canyons

Afif Ghaith (1,2,4), Milad Fakhri (2), Roberta Ivaldi (3), and Paolo Ciavola (4)

(1) Lebanese Navy, Lebanon (afifg@hotmail.com), (2) Lebanese National Center for Marine Sciences (CNRS-L), (3) Italian Hydrographic Institute, (4) University of Ferrara (UNIFE)

Submarine mass movements and their consequences are of major concern for coastal communities and infrastructures but also for the exploitation and the development of seafloor resources. Elevated awareness of the need for better understanding of the underwater mass movement is coupled with great advances in underwater mapping technologies over the past two decades. The seafloor in the Nahr Ibrahim and Saida regions (Lebanon) is characterized by deep canyons, reaching one thousand meters depths in proximity of the coast. Signs of submarine mass movement instability related to these canyons create a connection between shallow and deep water. The presence of these canyons in a tectonically active area generates a particular drained mechanism to the sediment in form of mass movement and slumping. Identification of potential areas where slope movements could be triggered requires data with high spatial resolution. Since this area is poorly explored, in the framework of an international project between Lebanese Navy, Lebanese National Center for Marine Sciences, University of Ferrara and Italian Hydrographic Institute, we analyse the morpho-bathymetric and sedimentological characters of the coastal and shelf sectors. Multibeam echosounder and sub-bottom profiler acoustic systems calibrated with ground truths (sediment grab and core samples) allow us to characterize the nature of seafloor and sub-seafloor with particular detail to the geotechnical properties of sediments and high resolution seismic stratigraphy of the shallow layers. The detection of particular undersea features provides detail maps which are in support to littoral morpho-dynamics, coastal transport and sediment budget. Multilayer hydro-oceanographic map, referring to the seafloor dynamics in connection with deep water environment and drainage system, in accordance to the International Hydrographic Standards and nautical supports, are produced. This high resolution multibeam bathymetry dataset, integrated by the sedimentological characters, will provide useful constraints to the potential natural hazards that may be caused by active tectonics in the offshore and a high coastal risk in a most populated region of Lebanon.