



Holocene Gravitative Mass Movements and Tsunami Hazards in a Highly Active Arc System: The Hellenic Arc.

G. Papatheodorou, A. Stefatos, M. Charalambakis and G. Ferentinos

Laboratory of Marine Geology and Physical Oceanography, Department of Geology,
University of Patras, Greece.

George.Papatheodorou@upatras.gr / ++302610996275 / ++302610996275

The Hellenic Arc system is located within one of the world's most seismically active areas and has experienced extreme tectonism throughout the Quaternary. The object of the paper is to examine the various types of gravitative mass movements that have been detected and their causative factors. Furthermore the potential tsunamis which can be triggered by the mass movements are also discussed.

The areas examined are the North Aegean Trough and the Cretan Sea in the Aegean, the Gulf of Corinth and the Zante-Kefalinia slope in the Ionian Sea.

The various types of gravitative mass movements that have been documented include: (i) sliding of large masses with no or only slight internal deformation, (ii) sliding of masses with disintegration of sediment fabric to debris flows and (iii) slow downslope creep.

The mass movements are associated with fault escarpments, delta fronts and well stratified slopes with slope gradients ranging from 2^0 to 40^0 .

Earthquake seems to be the main mechanism initiating mass movement by either reducing the shear strength of the sediments or, causing liquefaction. Other mechanisms such as increasing topographic gradient through structural control, gas in sediment pores and heavy rain can also independently trigger and/or contribute to the initiation of mass movements.

The mass movements mentioned above can be considered responsible for the genera-

tion of tsunamis, as slide-induced tsunamis occurred in the Aegean Sea and the Gulf of Corinth during the 20th century. The first was in 1956 and the second in 1963 and both caused structural damage and loss of human life. Having in mind the latter, an analysis of two submarine landslides, which appear to have occurred about 1400 and 2800 years ago, respectively in the eastern part of the Gulf of Corinth, shows that the landslides were capable of generating tsunamis. The predicted tsunami wave heights over the landslides range from 1 to 4m with wavelengths of 3.6 to 6.2km.

These tsunami wave parameters can impose a threat to the low lying coastal communities, especially on the frontline.