ANALYTICAL SOLUTION OF GENERATION OF TSUNAMI WAVES BY SUBMARINE LANDSLIDE FOR A BASIN OF VARIABLE DEPTH IN IONIAN SEA

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Abstract

This paper present geo-scientific evidence of beachrock-type calcareniticts unamites from three study areas. Calcarenitic and locally conglomeratic carbonate crusts were studied in natural outcrops along the seafront and in vibracores. Hight-resolution topographic survey and 3D-visualisation were carried out by differential GPS and LIDAR measurements. The impact of tsunami was dated by combined approach of radiocarbon, OSL and archaeological age determination and compared to local tsunami and earthquake chronologies. Based on our sedimentary structure of the land in sea-basin we have make an aproch of tsunami waves caused by submarine landslides in variable volume and different depth. Tsunami wave generation by submarine landslidesof a variable volume in a basin of variable depth isstudied within the shallow-water theory. The problem oflandslide induced tsunami wave generation and propagationis studied analytically for two specific convex bottom profiles(h_x4/3 and h _ x4). In these cases the basic equationscan be reduced to the constant-coefficient wave equationwith the forcing determined by the landslide motion. Forcertain conditions on the landslide characteristics (speedand volume per unit cross-section) the wave field can bedescribed explicitly. It is represented by one forced wavepropagating with the speed of the landslide and followingits offshore direction, and two free waves propagating in opposite directions with the wave celerity. For the caseof a near-resonant motion of the landslide along the powerbottom profile h_x the dynamics of the waves propagatingoffshore is studied using the asymptotic approach. If thelandslide is moving in the fully resonant regime the explicitformula for the amplitude of the wave can be derived. It isdemonstrated that generally tsunami wave amplitude variesnon-monotonically with distance.

Keywords: *tsunami waves, Ionian sea, submarine, analytical solution.*