Geophysical Research Abstracts,
Vol. 11, EGU2009-13365, 2009
EGU General Assembly 2009

The BIG'95 event, Balearic Islands, Western Mediterranean Sea: numerical simulation of the possibly generated tsunami

S. Tinti (1), M. Canals (2), G. Pagnoni (1), F. Zaniboni (1), O. Iglesias (2), and G. Lastras (2)

(1) University of Bologna, Department of Physics, Sector of Geophysics, Bologna, Italy (filippo.zaniboni@unibo.it, +39 051 2095058), (2) GRC Geociències Marines, Universitat de Barcelona, Barcelona, Spain

The BIG'95 debris flow that occurred ∼11 kyrs BP affected an area of about 2200 km2 of the Ebro margin, in the Western Mediterranean Sea. The debris flow originated at the upper continental slope and involved a sediment volume of ∼26 km3. After a total runout of 110 km the distalmost deposits resulting from this mass movement partly filled the upper course of the Valencia Channel at 2000 m depth. Multibeam bathymetry and backscatter maps, deep-towed side scan images, high-resolution seismic reflection profiles, submarine video records, sedimentological and mass physical properties measurement on sediment cores, and in situ geotechnical tests constitute a valuable dataset providing the basis to model the landslide evolution. Different observational elements in this data set jointly with numerical modelling simulations suggest that the downslope mass movement was rather fast (i.e. peak velocities of 50 ms-1 and 20 ms-1 have been reported for the loose sediment fraction and individual blocks, respectively). It was subsequently inferred that the BIG'95 could have generated a tsunami potentially impacting the Balearic and the Spanish coasts. In this work we explore the tsunamigenic potential of the BIG'95 by applying numerical codes that have been developed by the University of Bologna Tsunami Research Team. The code UBO-BLOCK is used for the simulation of the slide motion on a Lagrangian grid moving along with the body: the mass is split into a set of interacting blocks, that conserve the volume but can change their shape. The movement of the mass on the sea bottom generates tsunami impulses that are calculated and interpolated on the static tsunami computational grid by the intermediate code UBO-TSUIMP. The tsunami propagation is computed via the code UBO-TSUFE, solving the Navier-Stokes equations in the shallow water approximation on the computational domain, constituted by triangles whose dimension depends on the local sea depth. This work has been performed in the framework of the EU-funded project TRANSFER, dealing with the study of tsunamis in the Mediterranean Sea, from the possible sources to the assessment of the risk along the coasts.