

The present research program is aimed at improving the knowledge of tsunami wave hydrodynamics generated by tsunamides. The generation process, the wave propagation, the interaction with the boundary and the formation of current, flooding on wave run-up and overtopping will be studied in detail.

Tsunami waves are not periodic wave free surface perturbations of high period, they are able to generate currents often reaching the coast in the direction. Focusing on what happened in Italy in the last 100 years three extensive datasets are worth to be monitored. Those are the waves that 1908 killed 130,000 people at Messina, the 1908-1909 tsunami (2,000 people killed) and the very recent tsunami (December 2002) around the Indonesian island.

The knowledge of tsunami and of their effects need joint efforts in the fields of geophysics, geology, geotechnics and hydrodynamics. As far as the latter research is concerned only few although valuable contributions have been provided in the last years in the hydrodynamics. It is important to increase the knowledge on the hydrodynamics, since 1793, thanks to the founding of the National Bureau of Studies of the Italian Government, researchers of the University of Capri (University of Naples III, from 1 and "La Sapienza"), started studying tsunami waves. Experimental, numerical and analytical studies have been done and the contribution towards hydrodynamics and geotechnics for wave generation forecasting. The present program originates from the experience in this important field with the need of further developing the studies carried out onshore. More specifically the research will aim at developing simple formulas based on experimental results, able to forecast wave generation, wave run-up and wave overtopping. Numerical models shall be developed in order to simulate the hydrodynamics of the near field (using either dimensional SPH model) and the flow in the far field (three depth integrated models shall be developed). The important case of tsunami waves along a straight coast and around a coastal island will be studied through both phenomenological

in order to provide a unified theoretical framework for the wave impact two analytical theories for wave generation, propagation and run-up will be developed. Finally a feasibility study and a preliminary design of a tsunami real time warning system based on the follow meteorological network will be carried out.

It is finally believed the results of the project will be of interest to any authority dedicated to the management of some environments such as the coastal regions, artificial ecosystems and lakes.



Riproduzione numerica di esperimenti in cunicolo.
Numerical reproduction of laboratory experiments
in SPH model.



Simulazione numerica di un'ondata di maremoto generata da una frana, Isola di Stromboli.
Numerical simulation of a landslide generated wave around an island, the case of Stromboli.



Prove sperimentali in vasca (Università di Capri).
Costruzione di un manto rappresentativo una frana in un bacino idrico.
Laboratory experiments of water waves generated by tsunamides.



Onda di maremoto interna ad un'isola.
Tsunami around a coastal island.

