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Tsunami inundation maps and damage sceneries through the GIS GRASS

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Important instruments for the decision-making process that public administrations may use are maps of the realistic effects that destructive natural events may produce. In the present work we have predisposed a GIS procedure to realize tsunami inundation maps and damage prediction with the software open source GRASS6.0.

Input data is the tsunami inshore wave height. Then, the model uses the Digital Terrain Model and the Land Use Cartography (or aerial photographs to classify if Land Use Cartography is not available) to take into account terrain morphology (slope, aspect, etc.) and its roughness due to vegetation and settlements, in the evaluation of wave run-up and its propagation inside the coast.

Moreover, a first estimated value of damage to people and things may be quantified, having evaluated the crucial structures (like harbours, depuration systems, hospitals, schools, roads, railways, etc.) located in the area and their values for the community, the season and the hour in which the event happens, and the prevalent activity of the inhabitants.

A detailed description of the procedure will be reported at the conference.

The whole procedure was applied to a reach of the Ligurian coast, a particularly densely populated areas, in the north-west side of Italy; such test area is characterized by either gentle slope beaches without protection, hence more exposed to risk, and rock cliffs less liable to damage; in both cases we obtained realistic results.

Note that, due to the fact that in the Mediterranean sea the time between the generation of an earthquake or a landslide and the coming of the tsunami wave on the coast is very limited, these maps might have most of all an informative and preventive function: to improve the sensibility of the population on this particular hazard, to indicate to public administrations which crucial structures should be protected to manage better the emergence, and to have in few minutes from the events a quite detailed idea of the expected damage so to help the rescues.

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