Tsunami vulnerability analysis in the coastal town of Catania, Sicily: methodology and results

Gianluca Pagnoni, Stefano Tinti, Sara Gallazzi, Roberto Tonini, and Filippo Zaniboni

University of Bologna, Dept. of Physics, Sector of Geophysics, Bologna, Italy (gianluca.pagnoni3@unibo.it, +39 051 2095058)

Catania lies on the eastern coast of Sicily and is one of the most important towns in Sicily as regards history, tourism and industry. Recent analyses conducted in the frame of the project TRANSFER have shown that it is exposed not only to tsunamis generated locally, but also to distant tsunamis generated in the western Hellenic arc. In the frame of the European project SCHEMA different scenarios covering local sources such as the 11 January 1693 event and the 1908 case as well as remote sources such as the 365 AD tsunami have been explored through numerical modelling in order to assess the vulnerability of the area to tsunami attacks.

One of the primary outcomes of the scenario analysis is the quantification of the inundation zones (location, extension along the coast and landward). Taking the modelling results on flooding as input data, the analysis has focussed on the geomorphological characteristics of the coasts and on the buildings and infrastructure typology to make evaluation of the vulnerability level of the Catania area. The coast to the south of the harbour of Catania is low and characterized by a mild slope: topography reaches the altitude of 10 m between 300-750 m distance from the shoreline. Building density is low, and generally tourist structures prevail on residential houses. The zone north of the harbour is high-coast, with 10 m isoline usually close to the coastline, and little possibility for flood to penetrate deep inland. Here there are three small marinas with the corresponding services and infrastructure around, and the city quarters consists of residential buildings.

Vulnerability assessment has been carried out by following the methodology developed by the SCHEMA consortium, distinguishing between primary (type and material) and secondary criteria (e.g. ground, age, foundation, orientation, etc.) for buildings, and by adopting a building damage matrix, basically depending on building type and water inundation depth. Data needed for such analysis have been retrieved from satellite images such as Google and validated through ad hoc local surveys with the collaboration of the local civil protection agency.