Geophysical Research Abstracts,
Vol. 11, EGU2009-7588, 2009
EGU General Assembly 2009

Scenarios of tsunami impact in the town of Catania, Italy: a combination of numerical modelling results and vulnerability considerations

S. Tinti, R. Tonini, G. Pagnoni, S. Gallazzi, A. Manucci, A. Armigliato, and F. Zaniboni

University of Bologna, Department of Physics, Sector of Geophysics, Bologna, Italy (stefano.tinti@unibo.it, +39 051 2095025)

Catania is one of the most important towns in Sicily, and more generally in southern Italy, due to its long historical and cultural tradition and to active industrial, commercial and touristic activities. Catania is located along the coast of eastern Sicily, which is well known to be one of the coastal areas most exposed to earthquake and tsunami hazard and risk in Italy and in the whole Mediterranean. The most famous event hitting the town was the earthquake of 11 January, 1693 (M=7.4) which almost completely ruined the city and that was followed by a violent tsunami, impacting the entire eastern Sicily coast and producing very relevant effects in Catania. The high level of tsunami hazard is accompanied also by a high level of vulnerability to tsunamis. This is the reason why Catania is one of the five test sites that were chosen in the framework of the EU-funded SCHEMA project for the tsunami vulnerability assessment along the Mediterranean coasts. Building reliable scenarios of tsunami impact requires on one side to develop numerical simulations of worst-case events on the basis of the known tsunami history and of the tectonics and geological evolution of the area, on the other side to characterise the vulnerability of the town, possibly distinguishing which areas area most exposed to a tsunami threat. As to the first point, it appears reasonable to adopt the 11 January 1693 event as the reference for the development of the numerical scenarios. The important fact is that a debate on the source of the 1693 tsunami is still ongoing as it is not clear whether the tsunami was generated by the earthquake only or by a submarine landslide or by a combination of these causes. So different hypotheses must be taken into account as regards the generation of the tsunami, and numerical scenarios of tsunami propagation and impact must be run for each hypothesis. All simulations are carried out by means of the numerical finite-difference code UBO-TSUFD, developed an maintained at the Department of Physics of the University of Bologna, Italy. Regarding the vulnerability assessment, at a first glance Catania presents three coastal areas with different characteristics. South of Catania, an extended flat area is delimited seaward by a very long sandy beach striking N-S (the so-called Playa di Catania); the area counts a large number of summer houses and resorts; moreover, the airport of Catania Fontanarossa is built at just about 1.5-2 km from the sea. North of Catania the coastline is instead very rocky, steep and high, with very few settlements facing along this coast. These two very different zones are divided by the port of Catania, which is very close to the city centre but is separated from it by the ancient walls of the city. Combining the results coming from the numerical simulations with the preliminary considerations on the tsunami vulnerability, we determine for each considered tsunamigenic source which part of the town presents the highest exposure to possible future tsunami impacts.