



A statistical approach to tsunami hazard estimation applied to the coasts of Calabria and Sicily, southern Italy

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Among the regions overlooking the Mediterranean Sea, Italy is one of the most exposed to tsunami hazard and risk. The most recent catalogue of Italian tsunamis (Tinti et al., 2004; ITC2004) contains 67 events, starting from the large 79 AD Plinian eruption of Vesuvius up to the Stromboli landslide-generated tsunamis of December 30, 2002. Several of the known events produced disastrous effects along the Italian coastlines, both in terms of damage and of human loss. Most of the tsunamis contained in ITC2004 were generated by seismic sources placed partly or completely offshore (49 out of 67). Hence, while the total number of events in ITC2004 is too scarce to be used in reliable statistical analyses, the observation that 73% of the Italian tsunamis were induced by earthquakes suggests to base the tsunami hazard analyses on the computation of the probability of occurrence of tsunamigenic earthquakes.

The approach represents an evolution of the one developed by Tinti (1991) and can be summarised in the following steps: 1) determination of the earthquake occurrence rate by means of proper statistical analysis of a given earthquake catalogue; 2) use of suitable relationships between earthquake magnitude and the initial disturbance of the sea; 3) estimation of the number of tsunamigenic earthquakes expected to produce on the coasts wave heights larger than a given threshold, by means of known simplified amplification formulas taking into account the tsunami features at the source and the sea bottom topography. The general approach has been applied to the Calabria and Sicily, which are the Italian regions most exposed both to seismic and tsunami hazard. We will present contour-plots showing the number and distribution of earthquakes

able to generate tsunami heights larger than given reference thresholds every 10,000 years. The theoretical results will be compared with the data deducible from ITC2004.