



T waves as precursor of tsunami waves in the Western Mediterranean Sea

C. Eva (1), M. Frisenda (1) and S. Solarino (1,2)

(1) Dipteris, Dipartimento per lo Studio del Territorio e delle sue Risorse, University of Genova, Italy (eva@dipteris.unige.it)

(2) INGV, Istituto Nazionale di Geofisica e Vulcanologia, c/o Dipteris, Dipartimento per lo Studio del Territorio e delle sue Risorse, Italy (solarino@ingv.it)

T phases recorded at a number of North Western Italy sites, generated after the $M_b 6.5$ earthquake and its aftershocks that shook Algeria on May 21, 2003 are used as possible precursors of a tsunami wave. The seismograms, recorded by a bunch of seismic stations located on the coast facing the Ligurian Sea, northern Italy, some 800 km N-NE from the source, represent a good database for unveiling both the process of conversion from seismic to acoustic energy and the general characteristics of such phases, by studying their arrival times at the various stations.

The seismic event has generated tsunami waves recorded by the tidal gage located in the harbour of Genova. The coupling of the seismographic and mareographic recordings provided an unique data set for investigating the relationship and the importance of the T waves as precursors of tsunami in the north-western Mediterranean Sea.

The investigations on the complex recorded seismogram reveal the existence of a T phase about 9 minutes after the event, the timing of which is compatible with the distance from the coast where the conversion from acoustic to seismic energy took place. The frequency content of these phases, as derived from a careful spectral analysis, reveals marked amplitude peaks for frequencies greater than 1 Hz. The attenuation of the T phase does not depend from the actual distance of the receiver from the source but rather from the back-conversion point: the amplitude varies thus with the in-land path and decreases proportionally to x^{-1} .

While the ocean waves travel with a velocity of about 160-170 m/s, the evaluated velocity for the T train wave is about 1.55 km/s, increasing with the distance from the

coast. However, being the time arrival differences between T and tsunami of the order of one and a half hours for the Ligurian coast, this would represent enough time for an early warning provided that a routine for detecting the T arrival and sending alert messages is properly designed.