Geophysical Research Abstracts
Vol. 13, EGU2011-1942-1, 2011
EGU General Assembly 2011


# How to calibrate a Tsunami Early Detection Algorithm for a site with no instrumental tsunami records: the example of Catania, Italy

Lidia Bressan, Stefano Tinti, Filippo Zaniboni, and Gianluca Pagnoni
University of Bologna, Department of Physics, Sector of Geophysics, Bologna, Italy (lidia.bressan@unibo.it)

TEDA is a real-time algorithm that has been developed to detect long high waves like tsunamis. It works at station level and it is formed by two independent and simultaneous modules: a tsunami detection algorithm, aiming at identifying incoming tsunami waves, and a "secure detection" algorithm, which indicates when long period waves overcome a given threshold. The tsunami detection algorithm is based, shortly, on the comparison between the instantaneous sea level slope |IS| and the background sea level slope |BS| (both corrected for the tide). When the function |IS| exceeds a given threshold and at the same time exceeds $\lambda$|BS| where $\lambda$ is a predetermined parameter, a tsunami state is triggered.
Before to make TEDA operational, TEDA has to be adapted to local conditions, namely a number of parameters that enter in the definitions of the functions |IS| and |BS| has to be determined. In fact, tide gauge signals are usually characterized by a typical and constant spectral content due to the strong influence of the local bathymetry and morphology, which, shortly, brings to the persistence of the resonant frequencies and to the attenuation of the other frequency content.
To establish the best set of parameters, TEDA has to be tested offline on data both of background and of tsunami events. However, tsunami records are rare especially in those basins like the Mediterranean sea where, though large historical tsunamis have occurred, tsunami activity is infrequent. When tsunami records are not available, then synthetic records have to be produced by means of numerical models. This is certainly the case of all the harbours in Italy. Here we present an application to the site of Catania, which is a town known to have been affected by disastrous tsunamis in the past. More specifically TEDA calibration has been carried out for the tide gauge that was installed in the harbour of Catania in the frame of the project TSUNET in late 2009. The synthetic tsunami signals have been computed by using scenarios of the possible local and remote tsunamigenic sources, including earthquakes and landslides.
The methodology we adopt here to calibrate a real-time tsunami detection algorithm can be applied to all the sites where no or insufficient tsunami records are available.