



Development of a Decision Matrix for Early Tsunami Warning in the Mediterranean and Connected Seas

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After the generation of the large Indian Ocean 2004 tsunami a systematic effort started for the establishment of regional, national and local early tsunami warning systems in Europe under the co-ordination of IOC-UNESCO. One of the most important requirements for the development of operational tsunami warning systems is the existence of a reliable procedure for decision making about the tsunamigenic or non-tsunamigenic nature of a particular earthquake in real-time conditions. In this contribution we introduce a first approach of a tsunami warning decision matrix for the most tsunamigenic region of Europe that is for the Mediterranean Sea. Connected seas, such as the Marmara Sea, the Black Sea and the Atlantic Ocean offshore Portugal are also included. The decision matrix developed is empirical and is based on two main data compilations. The first is the catalogue of earthquakes of the instrumental era of seismology, that is from 1900 to 2006. Earthquakes occurring either offshore or on land at distance no more than 30 km from the closest shoreline are considered. We perform completeness analysis and determine earthquake magnitude cut-off for several time intervals from magnitude-frequency and magnitude-time diagrams. The second data compilation is the tsunami catalogue for the time period from 1900 to 2006. We perform completeness analysis and determine tsunami intensity cut-off for several time intervals from intensity-frequency and intensity-time diagrams. The 12-grade Papadopoulos-Imamura tsunami intensity scale is used. We correlate complete data sets of earthquakes and tsunamis and produce empirical probabilities for the tsunamigenic nature of a particular earthquake according to the earthquake magnitude class, focal depth, epicentral location and focal mechanism. Such probabilities make a good basis for the construction of a tsunami warning decision matrix in the Mediterranean Sea region.