Geophysical Research Abstracts
Vol. 17, EGU2015-6012, 2015
EGU General Assembly 2015

Tsunami Hazard Analysis for the Eastern Mediterranean and its Connected Seas

Ocal Necmioglu and Nurcan Meral Ozel

Boğaziçi University, Kandilli Observatory and Earthquake Research Institute, Geophysics Department, Istanbul, Turkey (ocal.necmioglu@boun.edu.tr)

Accurate earthquake source parameters are essential for any tsunami hazard assessment and mitigation, including early warning systems. Complex tectonic setting makes the a priori accurate assumptions of earthquake source parameters difficult and characterization of the faulting type is a challenge. Information on tsunamigenic sources is of crucial importance in the Eastern Mediterranean and its Connected Seas, especially considering the short arrival times and lack of offshore sea-level measurements. In addition, the scientific community have had to abandon the paradigm of a "maximum earthquake" predictable from simple tectonic parameters (Ruff and Kanamori, 1980) in the wake of the 2004 Sumatra event (Okal, 2010) and one of the lessons learnt from the 2011 Tohoku event was that tsunami hazard maps may need to be prepared for infrequent gigantic earthquakes as well as more frequent smaller-sized earthquakes (Satake, 2011). We have initiated an extensive modeling study to perform a deterministic Tsunami Hazard Analysis for the Eastern Mediterranean and its Connected Seas. Characteristic earthquake source parameters (strike, dip, rake, depth, Mwmax) at each 0.5° x 0.5° size bin for 0-40 km depth (total of 310 bins) and for 40-100 km depth (total of 92 bins) in the Eastern Mediterranean, Aegean and Black Sea region (30°N-48°N and 22°E-44°E) have been assigned from the harmonization of the available databases and previous studies. These parameters have been used as input parameters for the deterministic tsunami hazard modeling. Nested Tsunami simulations of 6h duration with a coarse (2 arc-min) grid resolution have been simulated at EC-JRC premises for Black Sea and Eastern and Central Mediterranean (30°N-41.5°N and 8°E-37°E) for each source defined using shallow water finite-difference SWAN code (Mader, 2004) for the magnitude range of 6.5 – Mwmax defined for that bin with a Mw increment of 0.1. Results show that not only the earthquakes resembling the well-known historical earthquakes such as AD 365 or AD 1303 in the Hellenic Arc, but also earthquakes with lower magnitudes do constitute to the tsunami hazard in the study area, as indicated also by historical information. A simplified tsunami hazard map is also presented. This work is partially funded by project ASTARTE - Assessment, Strategy And Risk Reduction for Tsunamis in Europe - FP7-ENV2013 6.4-3, Grant 603839.