Geophysical Research Abstracts
Vol. 20, EGU2018-8191, 2018
EGU General Assembly 2018

Numerical simulation of Aegean Sea summer 2017 tsunami events

Jorge Macías (1), Alessandro Annunziato (2), Gerassimos Papadopolous (3), Sergio Ortega (4), José Manuel González-Vida (5), and Apostolos Agalos (3)

(1) University of Malaga, Facultad de Ciencias, Analisis Matematico, Malaga, Spain (jmacias@uma.es), (2) Joint Research Center, EC, Ispra (Italy), (3) National Observatory of Athens (Greece)., (4) Unidad de Métodos Numéricos, Universidad de Málaga, 29080-Málaga (Spain), (5) Departamento de Matemática Aplicada, Escuela Politécnica Superior, Universidad de Málaga, 29080-Málaga (Spain)

On 12th June and 20th July, two major earthquakes occurred in the Aegean Sea of Magnitude Mw. 6.3 and Mw. 6.6 that generated both tsunamis along the coasts of Greece and Turkey. Although of limited magnitude, the two events raised several questions on the preparedness of Mediterranean countries to face such events that are considered of low probability of occurrence but that may happen.

Several two-level nested-mesh numerical simulations with the Tsunami-HySEA model have been performed for both events by using finite-fault seismic models. In the case of the Bodrum/Kos event, the two-level nested mesh was composed by an ambient coarser grid with a 9.6 m resolution and an enhanced finer grid, comprising the Port of Kos, with a resolution of 2.4 m. A numerical simulation of 42 min in the 9 million cell global mesh described, using two P100 GPUs, took approximately 14 min of real time. Several output variables were analyzed, as maximum wave amplitude, inundation at Kos Port, and time series at several locations. Comparison with observed data is performed when available.

One objective of the present study is to identify the best location in the ports of Bodrum and Kos for the installation of a sea level measurement devices, this in view of a project that it is been prepared for executing a large-scale drill involving the cities of Kos and Bodrum, to be realized in 2019.

As conclusions, it is observed that small events are more difficult to precisely reproduce, besides this, local effects are many times harder to capture, and while high-resolution computations may help to overcome these two issues, they remain useless in the lack of high-resolution topo-bathymetric data. A very important issue is related with the uncertainty in seismic source triggering these events, that translates into a high uncertainty in the numerical results obtained.

Acknowledgements. This research has been partially supported by the Spanish Government Research project SIMURISK (MTM2015-70490-C02-01-R) and Universidad de Málaga, Campus de Excelencia Internacional Andalucía Tech. The GPU computations were performed at the Unit of Numerical Methods (University of Malaga).