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The South Ionian Sea earthquake (Mw6.8) of 25 October 2018 and its associated tsunami

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On 25 October 2018 a Mw6.8 earthquake occurred in the South Ionian Sea. Fault plane solutions produced by various centers revealed a rupture mechanism combining thrust fault movement with significant strike-slip component. Only moderate damage was reported mainly from Zakynthos Isl. due to that the earthquake epicenter was placed offshore about 55 km away from the closest settlements. Many aftershocks followed at least until writing these lines (10 Jan. 2019) with the largest event of Mw5.8 being recorded on 30 October 2018. The occurrence of such a strong earthquake came without a surprise since the area is of very high seismicity due to the convergence of the African (Nubian) and Eurasian lithospheric plates along the Western Hellenic Arc and the subduction of the former beneath the latter. The 2018 main shock generated a tsunami wave which although of small amplitude ($\sim$10 cm) was the first that has been recorded by a network of 5 digital tide-gauge sensors installed in western Greece and eastern Italy. Macroscopic anomalous sea level change was also reported from NW Zakynthos Isl. We utilized seismic records of the Hellenic Unified Seismological Network to relocate the main shock and its aftershock sequence and study the space-time-size distributions of the aftershocks. The spatial aftershock cloud strikes NNW-SSE and determines a seismic fault dipping about eastwards. From the inversion of teleseismic P-wave records we produced a finite fault model of the main shock which showed unilateral rupture but mainly propagating southwards. The maximum seismic slip was of ca. 1.8 m at the source but only ca. 0.1 m at the surface. The model has been introduced as an input to numerically simulate the tsunami generated by the main shock and compare the synthetic mareograms obtained with the ones recorded by tide-gauge instruments. From the tide records we also calculated tsunami magnitude Mt 7.0 which is close to the seismically calculated Mw. This result was verified independently from the dimensions of the tsunami source determined from the relocated aftershock area. Since it is the first time that Mt is calculated for a tsunami occurring in the European-Mediterranean region we discuss the prospects for establishing a tsunami magnitude scale in that region and the possible operational applications for early warning.