



## Marmara Island earthquakes with associated sea waves

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Apart from the long-term systematic large earthquakes occurred along the active main Marmara fault, NW Turkey, some others of moderate scale are known to have existed, having occurred on other secondary faults in the vicinity of the Marmara Islands. The Proconnesus (11 August 1265,  $M=6.6$ ) and Erdek (4 January 1935,  $M_s=6.4$ ) earthquakes are the most notable events which are characterized by coastal collapse and associated abnormal sea waves. The mountainous region at the west of Marmara Island toppled into the sea after the violent tremors of the first event. Three sides of the Hayirsiz Island were submerged after the third set of tremors of the second event, the rocks at shore had fallen into the sea and the sea had risen. Its epicentre is surrounded by the almost circular isoseists and located on the narrow shelf to the north of the Marmara Island where faults with large normal components are dominant as inferred from seismic reflection data. The network of deep canyons observed in front of the normal faults basinward might be closely associated with mass movements and underwater slides triggered by the frequent earthquake activities on the active main Marmara fault. Peculiar scars overlapping a rough and hummocky topography at the deep basin support multiple events of underwater failures. Our findings indicate that the sea waves observed during these earthquakes were triggered by the massive boulders that tumbled into the sea, or the collapsing of Hayirsiz Island on three sides. The generated sea waves should be local and hardly noticeable from populated places at the northern or southern coasts of the Marmara Sea.