Geophysical Research Abstracts
Vol. 14, EGU2012-11809, 2012
EGU General Assembly 2012

Modern seismological reassessment and tsunami simulation of historical Hellenic Arc earthquakes

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Neither large magnitude nor tsunamigenic earthquakes occur frequently in the eastern Mediterranean, hampering comprehensive study of these events and consequential hazards whenever digital data are required. Using analog seismograms, travel-time catalogs, and hydrodynamic simulations, we reassess here four large (M$\sim$7) historical earthquakes occurring in various regions of the Hellenic Arc: on 6 October 1947, in the Peloponnesus; 9 February 1948, near Karpathos; and a couplet east of Rhodos on 24 and 25 April 1957. Damaging near-field tsunamis are associated with the 1947 and 1948 earthquakes. Results include seismic moments (in units of 1027 dyn.cm) of 1.26 (1947), 0.97 (1948), 0.56 (1957a), and 1.09 (1957b); recovered focal mechanisms and hypocentral locations are consistent with the regional stress field resulting from the ongoing collision between the Nubia plate and Aegea microplate. Seismological reassessments indicate that the sources of the 1947 and 1948 tsunamis involved submarine slumping; hydrodynamic simulations assuming a submarine landslide source for the 1948 tsunami recreate run-up and inundation values consistent with eyewitness accounts presented here.