



## **The Mw6.7 October 12, 2013 western Hellenic Arc earthquake and seismotectonic implications for the descending slab**

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The 2013 earthquake is the largest that occurred in the last four decades along the western part of the Hellenic subduction zone, causing light damage in western Crete. Since rupture dimensions and properties of subduction events are in general more difficult to estimate due to their position in relation with seismological networks geometry, its occurrence provides an opportunity to investigate its rupture characteristics as in detail as possible, and consequently to shed more light in the geometry of the descending slab. The western almost rectilinear part of the convergent front accommodated the great 365 AD  $M_w$ 8.3 earthquake, the largest event ever reported in the Mediterranean region, generating a tsunami that affected almost its entire eastern part. The oceanic plate of eastern Mediterranean, the front part of the northward moving African lithospheric plate, is subducting northeasterly beneath the Aegean microplate, the southern portion of Eurasian lithospheric plate in this area, at a rate of 4.5 cm/yr, frequently accommodating large destructive earthquakes with magnitudes  $M \geq 6.5$  along the main thrust zone. Historical and instrumental information reveals that strong ( $M \geq 6.0$ ) earthquakes, both shallow and intermediate ones are frequent in the area, although there is not any reference to any other such strong event. Plate motion is far above the manifestation of seismicity, probably due to the fact that the seismic coupling coefficient at this plate boundary has been estimated at approximately 10% or less. The main shock is associated with a fault patch onto the coupled part of the overriding and descending plates, with the compression axis being oriented in the direction of plate convergence. The first 10–days relocated seismicity shows activation of the upper part of the descending slab, with most activity being concentrated between 10 and 30 km, with the main shock being located at the bottom of the activated segment. Cross sectional views of the relocated seismicity evidenced the extent of the main rupture, along with the off fault aftershock activity. This later is proved to be immediately triggered by the downdip stress transfer because of the coseismic slip of the main shock.

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