

## Seismicity and 3D tectonic stress field distribution in the western Hellenic Arc

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A catalogue of relocated earthquake hypocenters and focal mechanisms was constructed and evaluated in order to examine the tectonics of the western Hellenic Arc. The major part of the analysed dataset includes seismic activity that was recorded during the last decade. This is due to the occurrence of several moderate to strong earthquakes in the area and to the integration of the Hellenic Unified Seismological Network (HUSN), which provided adequate coverage with high quality waveform records that were analyzed by the Seismological Laboratory of the University of Athens. Additionally, phase data available by local networks were employed. The concept of double differences was applied to achieve improved relative hypocentral locations. Relocated seismicity appears concentrated at depths above 25 km, exhibiting spatial continuity along the convergence boundary and being clustered elsewhere. Earthquakes are confined within the accreted sediments escarpment of the down-going African plate against the un-deformed Pindos hinterland.

Stress tensor inversion of  $\sim 2000$  relocated focal mechanisms reveals predominantly strike-slip faulting in NNE-SSW to NE-SW direction and normal faulting in E-W or N-S directions. The heterogeneity of the stress field appears to be unusually high, particularly in the region of the northernmost tip of the Hellenic subduction and in the vicinity of the Cephalonia-Lefkada transform fault zone, an area of high seismic risk that was activated recently, with the generation of two strong earthquakes of  $M_w=6.1$  and  $5.9$  at the western part of the Cephalonia Island in January-February 2014 and an  $M_w=6.4$  event that occurred onshore SW Lefkada Island in November 2015. The stress field distribution implies that Pindos constitutes a seismic boundary along which large heterogeneities occur. Onshore western Greece, N-S crustal extension dominates, while in central and south Peloponnesus the stress field appears rotated by  $90^\circ$ . Shearing-stress obliquity by  $30^\circ$  is indicated along the major strike-slip faults. At larger depths, within the lower crust, the stress field becomes more homogeneous, consistent with well-known large scale kinematics of the Aegean region.