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Presentation · December 2016
DOI: 10.13140/RG.2.2.31995.11043

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Insights on the Geodynamics of Western Greece Deduced from 3-D Stress Tensor Inversion and Traveltime Tomography

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Abstract

This region of western Greece has been frequently activated during the last decade, providing a large amount of enhanced quality new seismic information that was recorded by the Hellenic Unified Seismological Network (HUSN). In this work, the results of earthquake relocation, stress inversion and seismic traveltomeography are presented, towards investigating the geodynamics of the study area. Inversion of ~2300 focal mechanisms indicates obliquity by 30° between shearing and the maximum horizontal stress along the major strike-slip faults, consistent with clockwise crustal rotation. Within the lower crust, the stress field appears to be constrained by larger scale deformation. Seismic velocity anomalies have been resolved by regional body-wave traveltomeography, applying an iterative tomographic inversion scheme using phase data from more than 5000 seismic events. Preliminary 3D tomographic models indicate the presence of gross structures related with the western Hellenic Trench, the Cephalonia Transform Fault (CTF), the Aitolakarnania shear zone, the Corinth Gulf and the Messinia graben. Dipping towards the east and segmentation of CTF between Cephalonia and Lefkas is evidenced by the resolved anomalies while a predominant NE-SW oriented low velocity zone observed in central Peloponnesus, related with...
dextral strike-slip faulting, marks a 90° rotation of the extensional stress direction that is found to occur at both sides.
