S11G-0435 - Seismicity and geodynamics of western Peloponnese and central Ionian Islands: insights from a local seismic deployment. (Invited)

Monday, 9 December 2019

08:00 - 12:20

Moscone South - Poster Hall

Abstract

We investigate the seismotectonics of Western Greece using data recorded by a local network of 15 short-period seismic stations. They were installed in July 2016 in order to densify the permanent Hellenic Unified Seismological Network (HUSN), which is sparse in this region.

The study area covers the islands of Zakynthos and Cephalonia in addition to Western Peloponnese and Akarnania.

The temporary network remained in operation until May 2017 and recorded roughly 4000 events that were analyzed using automatic P- and S-wave phase picking algorithms. The procedure yielded 1200 local earthquakes located using the Hypoinverse code and five 1D velocity models optimized by the Velest error minimization technique. The events were further relocated using the HypoDD package.

We computed 100 focal mechanisms for magnitudes down to M_L 2.3 using first motion polarities. The rose diagrams and stress axes imply transpressional tectonics.

By combination of the focal mechanisms, historical earthquakes and the recorded patterns of (micro)seismic activity, seismogenic structures were detected and emphasized. The data allowed us to construct a conceptual and updated tectonic model of the Ionian Akarnania crustal Block (IAB) articulated around 4 major strike-slip structures :

-The Cephalonia Transform Fault has been recognized as a large deformation zone that intersects with left-lateral NW-striking strike-slip faults and is the western margin of the IAB.

-The Kyllini Cephalonia Fault highlighted by this study intersects with the Movri-Amiliada Fault Zone. These structures are proposed to be the south-western and south-eastern boundaries of the IAB.

-The NW-striking sinistral Katouna-Stamna Fault zone and the Ambracian Gulf depict the north-eastern and north margin of the block.

During the deployment we also recorded intense seismic activity southwest of the island of Zakynthos. These events most likely occurred on an activated structure of the upper plate that we link with the large 2018 M_w 6.7 megathrust earthquake that occurred 20 km towards the south.

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