RECENT SIGNIFICANT EARTHQUAKES IN WESTERN GREECE

P. Papadimitriou[1], V. Kapetanidis[1], A. Karakonstantis[1], N. Voulgaris[1], K. Chousianitis[2], A. Agalos[2], A. Moshou[2], G. Kaviris[1], I. Kassaras[1], K. Makropoulos[1]

1 - Department of Geophysics-Geothermics, University of Athens, 15784 Athens, Greece
2 - National Observatory of Athens, Institute of Geodynamics, 11810 Athens, Greece

ppapadim@geol.uoa.gr

Western Greece is characterized by the highest seismicity of the Greek territory, since it is dominated by a complex seismotectonic regime which results in intense deformation. The northern part of the Ionian Sea is dominated by a continental collision zone, while the southern is characterized by the subduction of the Eastern Mediterranean oceanic lithosphere beneath the Aegean continental lithosphere. The Cephalonia Transform Fault Zone (CTF), related to right-lateral strike–slip focal mechanisms, constitutes a transition zone between these regions.

In April and May 2006 four events ($5.3 \leq Mw \leq 5.7$) occurred south of Zakynthos island and on its SE part. The source parameters of these events were determined using body-wave modeling and revealed reverse faulting for all cases. An area of approximately $300 km^2$ was activated, as indicated by the hypocentral distribution of the dense aftershock sequence, consisting of more than 3500 events. As it was revealed by the aftershock distribution along seismic cross-sections, two nearly antithetical faults were activated. Stress transfer was calculated by Coulomb Stress Analysis and positive lobes were obtained, related to the observed seismicity increase towards NNW-SSE.

Two years after the Zakynthos seismic sequence, on 8 June 2008, a large (Mw=6.4) event occurred about 22 km E-NE of Andravida town at Western Peloponnese. Source parameters of the mainshock and of the strongest aftershocks were obtained using teleseismic body-wave modeling and regional modeling, respectively. Focal mechanisms of most events indicated strike slip type faulting. A tomography study was performed, consisting of the inversion of both V_P and V_S and of V_P and the V_P/V_S ratio, by inverting first arrival times of the Andravida aftershock sequence. Events were relocated using a double-difference algorithm that takes into account the waveform similarity, estimated by cross-correlation. The rupture plane is the one that strikes in NE-SW direction, as indicated by both the aftershock hypocentral distribution and the calculated slip. A synthetic peak ground velocity (PGV) ShakeMap was calculated using the slip model, determined by the waveform inversion. It was revealed that, apart from the broader epicentral area, there was another region, north of the mainshock epicenter, with significant PGV values verified by the damage distribution. This fact is strongly related to source directivity towards NE.