SECOND EUROPEAN CONFERENCE ON EARTHQUAKE ENGINEERING
AND SEISMOLOGY, ISTANBUL AUG. 25-29, 2014

THE MAY – JULY 2013, SEISMICITY CLUSTER AT THE WESTERN CORINTH RIFT, CENTRAL GREECE

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On May 21st , 2013, a large series of small earthquakes initiated a cluster formation, few km to the southeast of the city of Aigion, on the southwestern coast of the Gulf of Corinth in Central Greece. Over the next ten days more than 250 shocks with M<3.4 had been reported and on May 31st a M=3.7 earthquake was strongly felt and was accompanied by more than 100 smaller shocks within a 24 hour period. On July 13th-14th another outburst was reported with the occurrence of four M=3.0-3.5 events, followed by more than 250 earthquakes for the next three days. Thereafter, the activity diminished and terminated in the beginning of August.

This unexpected phenomenon alarmed the local citizens because the seismic history of the area involves the occurrence of the great earthquake of 373 B.C, which extinguished the ancient city of Heliki, as described in great detail by Aristotelis in 330 B.C. The recent seismic history of the region has indicated that the Gulf of Corinth produces significantly high strain rates and it is ranked as the 'fastest' continental rifts in the world and the most seismically active part of the Mediterranean.

After the most recent catastrophic earthquake in 1995 with Ms=6.2 to the north of Aigion city, several seismological and geophysical networks have investigated the area and these have provided valuable scientific information concerning the regional seismotectonic regime. Shortly after the initiation of the May 21st, 2013 activity in Aigion, a local network of 10 portable seismographic stations was installed in the area, by the Institute of Geodynamics of the National Observatory of Athens and the Seismological Laboratory of the National Kapodistrian University of Athens. This network has been transmitting real-time data to the Hellenic Unified Seismological Network and recorded about 1000 events significantly improving the detectability of local earthquakes and the associated seismic hazard evaluation.

In this study we investigate the dynamics and spatio-temporal characteristics of the sequence. For this purpose we performed relocation of the whole sequence using catalogue and waveform data and an optimized velocity structure, which improved the initial hypocentral solutions by the order of a magnitude. A large number of focal mechanisms was computed using P-wave first motion polarities of the local recordings, implying for shallow E-W normal faulting, compatible with regional tectonics. Furthermore, we employed a scheme involving the temporal frequency-magnitude and stress field distribution aiming to interpret the causative and triggering mechanism of the activity.

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