RECENT SIGNIFICANT SEISMIC ACTIVITY IN EASTERN AEGEAN SEA

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Greece is characterized by high seismicity mainly due to the collision between the European and the African lithospheric plates. During the recent years (2016-2018) moderate to strong earthquakes occurred in regions with different seismotectonic regimes. The focal mechanisms of the main events were determined using regional moment tensor inversion.

The geodynamic setting of the northern Aegean is governed by the superimposition of NE-SW strike-slip deformation, associated with the propagation of the North Anatolian fault zone towards the west, and N-S extension, caused by the suction of the Aegean realm towards the south due to deep seated processes of trench retreat and slab rollback. The basins of North Aegean Sea and their spatial relationships to the fault pattern representing the diffused termination of the North Anatolian fault system, which is consistent to the mechanical principles of the strike-slip tectonics (Koukouvelas and Aydin, 2002).

A significant earthquake of Mw=6.3 occurred on the 12th of June 2017 (12:28 GMT) offshore, south of the SE coast of Lesvos Island, at a depth of 13km. Manual analysis of more than 900 events of the sequence between 12 and 30 June 2017 were used to obtain an optimized local velocity model. Double-difference relocation revealed distinct spatial seismic clusters, forming two linear branches, at ~N130Â°E direction (Papadimitriou et., 2018b), compatible with the strike of Quaternary faults along the southern coast of Lesvos Island which are related to Lesvos-Psara pull-apart basins, as previous studies have shown (e.g. Kiratzi, 2014). A gradual migration of epicenters towards NW and SE from the margins of the main rupture is evident by the performed spatiotemporal analysis, while a strong secondary sequence at a different fault patch SE of the mainshock, oriented NW-SE, was triggered by the largest aftershock (Mw=5.2) that occurred on 17 June.

Eastern Kos Basin is bordered by Dikeos Mountain slopes to the north and Tilos Basin to the south. The basin is developed further to the east, north of Datcha peninsula and south of eastern Kos. The orientation of the basin is mainly due to the northern branch of GÅ¶Ìkova Fault Zone, which runs parallel to the coast for more than 20 km (Nomikou and Papanikolaou, 2010). The major part of the seismic activity is concentrated along this fault, which is controlled by an Eâ€“W trending normal fault system. Intense earthquake activity has occurred in Gulf of GÅ¶Ìkova in 2004 and 2005 (GÅ¶Ìrer et al., 2013).

On July 21, 2017(01:32 GMT), an Mw=6.6 earthquake occurred at a depth of ~10km and epicenter located offshore NE Kos. It was generated by an E-W striking and south dipping (~38Â°) fault located east of Kos and constitutes the westward prolongation of the northern branch of GÅ¶Ìkova fault of the Mugla province in Asia Minor. The activated fault is fairly correlated to major part of the aftershock sequence. A local 1-D velocity model was developed upon a selected dataset revealing a complex hypocentral distribution that may indicate the activation of more than one structure in the area. The recent strong earthquake and intermediate-depth seismicity will be examined due to their vicinity of Nisyros-Kos-Yali volcanic centers (Papadimitriou et al., 2018a).

References:


