

Microseismic Monitoring of the Sultandagi Fault Zone: Western Turkey

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Western Turkey is one of the seismically active region in Turkey. The high seismic activity is a result of the complex tectonic deformation of the Anatolian plate which has been dominated by the N-S extensional tectonic regime in the western edge. In western Turkey, relatively 3 major earthquakes ($M_w \geq 6.0$) were identified on the Sultandagi Fault Zone (Afyon-Aksehir Graben) between years of 2000–2002. In this study, mentioned local earthquake activity, have been investigated to understand their nature and relation of the regional seismic activity and tectonic deformation on the Sultandagi Fault Zone (SFZ) in western Turkey. Due to these activities along the SFZ it is decided to monitor microseismic activity ($M < 2.5$) by establishing low-magnitude threshold seismic network. For this purpose, 3 new broadband (BB) seismic stations were temporarily established to control the northern part of the Sultandagi Fault Zone, and the micro-seismicity of the fault zone was started to be observed in July 2017. Thus, the earthquake activity in the region started to be monitored sensitively. So we started to get 2 times more earthquakes than permanent stations in the region. The one of the biggest primary outcome by this study that there is a significant microseismic activity ($M < 2.5$) at the SFZ which was not seen from prior studies and long-term seismicity catalogues from permanent network ($M > 2.5$). At first, we started to analyze the distribution of micro-earthquakes in the region. During the data analysis, it was predicted that some intensive micro-earthquake activity in the project area could be caused by quarry-blasting and some locations were visited during the field study. Relocation of common earthquakes recorded by KOERI and the study was carried out, and the earthquake epicenters were displaced approximately as ± 0.8 –6 km. There were also some positive changes in the depth distribution of earthquakes. Consequently, thanks to the stations established within the scope of the study, horizontal (distance) and vertical error (depth) margins of the events in the region have been reduced. As a result of the evaluation of the data obtained, it was observed that the Sultandagi Fault Zone has especially intense seismic activity in the middle and northwest part. In addition, a significant seismic activity was observed in NW-SE direction at the north of Isparta city .

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