



Earthquake Swarm in Armutlu Peninsula, Eastern Marmara Region, Turkey

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The most active fault system of Turkey is North Anatolian Fault Zone and caused two large earthquakes in 1999. These two earthquakes affected the eastern Marmara region destructively. Unbroken part of the North Anatolian Fault Zone crosses north of Armutlu Peninsula on east-west direction. This branch has been also located quite close to Istanbul known as a megacity with its high population, economic and social aspects. A new cluster of microseismic activity occurred in the direct vicinity southeastern of the Yalova Termal area. Activity started on August 2, 2014 with a series of micro events, and then on August 3, 2014 a local magnitude is 4.1 event occurred, more than 1000 in the followed until August 31, 2014. Thus we call this tentatively a swarm-like activity. Therefore, investigation of the micro-earthquake activity of the Armutlu Peninsula has become important to understand the relationship between the occurrence of micro-earthquakes and the tectonic structure of the region.

For these reasons, Armutlu Network (ARNET), installed end of 2005 and equipped with currently 27 active seismic stations operating by Kocaeli University Earth and Space Sciences Research Center (ESSRC) and Helmholtz-Zentrum Potsdam Deutsches GeoForschungsZentrum (GFZ), is a very dense network tool able to record even micro-earthquakes in this region. In the 30 days period of August 02 to 31, 2014 Kandilli Observatory and Earthquake Research Institute (KOERI) announced 120 local earthquakes ranging magnitudes between 0.7 and 4.1, but ARNET provided more than 1000 earthquakes for analyzes at the same time period.

In this study, earthquakes of the swarm area and vicinity regions determined by ARNET were investigated. The focal mechanism of the August 03, 2014 22:22:42 (GMT) earthquake with local magnitude (MI) 4.0 is obtained by the moment tensor solution. According to the solution, it discriminates a normal faulting with dextral component. The obtained focal mechanism solution is conformable with the features of local faults in the region. The spatial vicinity of the earthquake swarm and the Yalova geothermal area may suggest a physical link between the ongoing exploitation of the reservoir and the earthquake activity.

Keywords: Earthquake swarm, Armutlu Peninsula, ARNET, geothermal activity