

CONTINUOUS MONITORING MICROSEISMIC ACTIVITY IN THE EASTERN MARMARA: THE ARMUTLU NETWORK

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ABSTRACT: *The Armutlu peninsula is located in the eastern Marmara region south of Istanbul. The area has a high seismic hazard potential after the 17 August 1999 Kocaeli Earthquake according to Coulomb failure studies and stress transferring hypothesis. A local seismological network has been installed by Kocaeli University (Turkey) and GeoForschungZentrum Potsdam (Germany) in the second half of 2005 to monitor the micro-earthquake activity to better understand the active tectonics of the Armutlu peninsula. It includes 22 seismic stations (8 of them are broadband). Several pressure and temperature sensors were installed at the geothermal fields of Armutlu, Gemlik, and Yalova to investigate the role of fluids in tectonically active regions.*

The preliminary results indicate that the micro-seismic activity of the Armutlu peninsula is higher than expected. There are three clear earthquake clusters: (i) Earthquakes of the first cluster are arranged on an E-W striking line north of the Armutlu peninsula. This line is the westward continuation of the 1999 earthquake rupture. The focal mechanisms of earthquakes show right lateral strike slip faulting which is consistent with the general characteristic of the Northern Anatolian Fault Zone. (ii) The most active cluster is located in between Tesvikiye, Esenköy and Hayriye villages (SW of Cinarcik, W of Yalova Termal) with a weak NE-SW trend. The focal mechanisms of the earthquakes within this cluster show normal faulting with a left lateral strike-slip component as well as left lateral strike-slip faulting with a normal component. (iii) The third cluster is located between Gemlik and the western end of the Iznik Lake. At a station located just on top of the geothermal reservoir north of the Armutlu town a large number of micro-earthquakes occurred that the other stations did not record. The smaller earthquakes are still occurring and needs special attention. We are planning to install another seismic stations nearby this activity area for better understanding the source characteristics and mechanism.

The preliminary results are consistent with surface observations such as topography and tectonic lineaments from remote sensing images. Using the micro-earthquake activity, the active tectonics and 3-dimensional crustal structure of the Armutlu peninsula can be investigated in greater detail.