

### **Three-dimensional seismic velocity structure in the Denizli geothermal region, western Turkiye**

**Bulent Kaypak**<sup>1</sup>, Gozde Venedik<sup>2</sup>

<sup>1</sup>*Ankara University, Department of Geophysical Engineering, Ankara, Turkiye*

<sup>2</sup>*Turkish Petroleum Corporation (TPAO), Ankara, Turkiye*

**Keywords:** *earthquake tomographic inversion, seismic velocity structure, local earthquake*

The Denizli basin and its surroundings are one of the regions that have high seismic activity and rich geothermal fields in the west Anatolia. In the first half of a year of 2000, it was observed an increasing seismic activity around the Denizli basin without a large mainshock occurrence. A temporary seismic network consisted of 28 stations were deployed to observe the seismic activity in the region by a Turkish research institute (TÜBİTAK-MAM-EMSI). In this study, three-dimensional Vp and Vp/Vs structure of the Denizli basin have been determined by using the travel times of the collected data. Firstly one-dimensional inversion schema was performed to stabilize initial velocity model and to have a more reliable hypocentral locations. Then an iterative and simultaneous three-dimensional inversion procedure was carried out to obtain 3-D high-resolution seismic velocity models. Furthermore to assess the solution quality of our inversion, we conducted a series of resolution tests.

We concluded high-resolution 3-D VP and VP/VS seismic velocity models for the upper 20 km of the crust beneath the Denizli basin and surroundings and interpret the results in the context of known geologic and tectonic units. The resulting VP models define the geometry of the basin and sediment thickness ( $VP \leq 2$  km/s) as well as regions of anomalous velocity. The VP/VS models help to constrain the location and geometry of the faults, zones of weakness and fluid saturated formations with high pore pressure zones.