

## **Magnetotelluric investigation of the section of the Büyük Menderes graben in the west of Aydın (Preliminary Results)**

Ümit Avşar<sup>1</sup>, Nisa Akın<sup>1</sup> and Gökhan Karciöğlü<sup>2</sup>

<sup>1</sup> Istanbul Technical University, Department of Geophysical Engineering, Ayazağa, İstanbul Türkiye.

<sup>2</sup> Istanbul University-Cerrahpasa, Geophysical Engineering Department, Büyükçekmece, İstanbul

---

Anatolia is known as a meeting point of many cultures, and it is also a meeting point of various continental platforms amalgamating following the closure of Neotethys. This jigsaw-shaped continent has been shaped by tectonic forces which are related to the ongoing convergence between Arabia and Eurasia performed by active Aegean and Cyprus arcs in the south. Related to this tectonic setting, three regions with different tectonic features have been formed in Anatolia. The westernmost of these regions is called the Western Anatolian Extensional Province (WAEP) where crust extension takes place. The origin and age of crustal extension in the WAEP have been subjects of controversy for many years. Extension in this region has been explained by various models, but more importantly recent tomographic studies indicate that intersection area of the Aegean and Cyprus arc which located beneath the WAEP is defined as a slab tear that causes asthenospheric upwelling. Therefore, an extensional regime, accompanied with asthenospheric rising has been well established in the area. And currently the region is dominated by horst graben systems and associated boundary faults. The ~ 140 km long and 2.5–14 km wide Büyük Menderes graben is the most prominent one and seismically active. The graben is bounded by a steeply dipping major fault which separates the Neogene sediments of the graben from the metamorphic sequences of the Menderes massif to the north. On the southern margin there are a few high-angle faults antithetic to the main northern margin fault system. Two major rock groups are distinguished in the graben (1) Pre-Neogene basement and (2) Neogene–Quaternary sedimentary cover up to 2.5 km thick.

Magnetotelluric data were acquired at 94 stations for geothermal research purpose. We re-evaluated the data to reveal the geology and tectonic structure of the region. We have investigated the main properties of the data with Phase Tensor analysis and 3D inversion were performed using ModEM software to reveal subsurface conductivity structures. PT ellipses have 1D characteristic in compliance with the undeformed, nearly horizontal bedding of the neotectonic graben fills and the depth of the basin fills can be observed in 3D sections. A conductive structure spread over a wide area is located between 400m and 2.5 km depths and vanishes at greater depths.

**Keywords:** Büyük Menderes Graben, Normal Faulting, Magnetotelluric, 3D-Inversion

---