Tracing Buried Fracture Zones Using by Geological and Geophysical Methods in Microzoning: Kayaköy (Denizli-Turkey) Case

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ABSTRACT

Introduction. It is crucial to determine the fault locations in the microzoning studies in the seismically active regions. In such places, the fault characteristics, location and extensionare basis of the studies. It is easy to map this features if they are traced on the surface. However, it is difficult to tract them because of natural and artificial filling, settlement density, degradation and vegetation. In these cases, both geological and geophysical methods are employed and fracture zones can be mapped.

There are many fracture zones in the Kayakoy region (Figure1) in the north of Denizli and nearby, where is planned to be developed. These fracture zones were traced by geological studies and their locations were measured and mapped. However, their direction and extensions could not be decided due to natural cover and artificial filling. Then, a resistivity study was carried out at the possible locations. In this study, both methods were evaluated together in Kayaköy and the fracture zone was mapped.

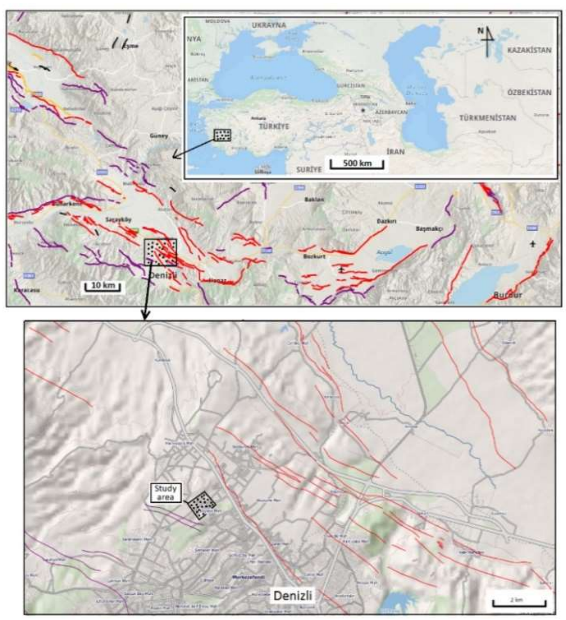

Figure 1. Location map and active faults (modified from Emre at al., 2011)

Geological and geophysical studies. Denizli basin is a graben basin surrounded by Pamukkale, Babadağ and Honaz fault zones. Synthetic and antithetical faults are found parallel to the main faults inside the graben. Karakova horst is located in the middle of the graben. Many paleoseismological studies have been conducted on the faults in the Denizli basin and their potential to generate earthquakes has been interpreted (Hançer and Akyol, 2019). There are active faults around Kayaköy in Denizli. There are eight visible faults in the area (Figure 2). The geophysical studies namely multi-electrode of resistivity has been employed to trace the buried fault lines (Figure 3). The invisible opening structures detected by geophysical cross sections 6 and 8.

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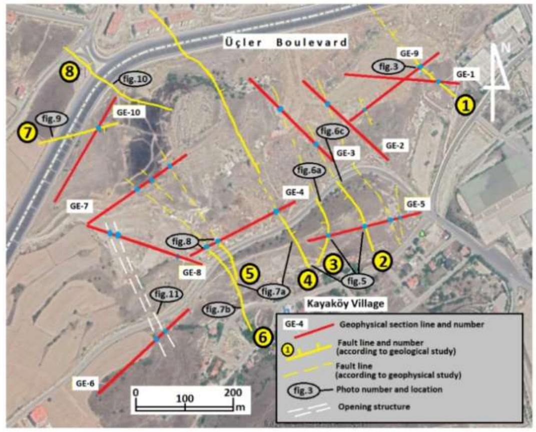

Figure 2. Fracture map of the region (yellow lines: faults, red lines: geophysical cross sections, white lines: opening structures)

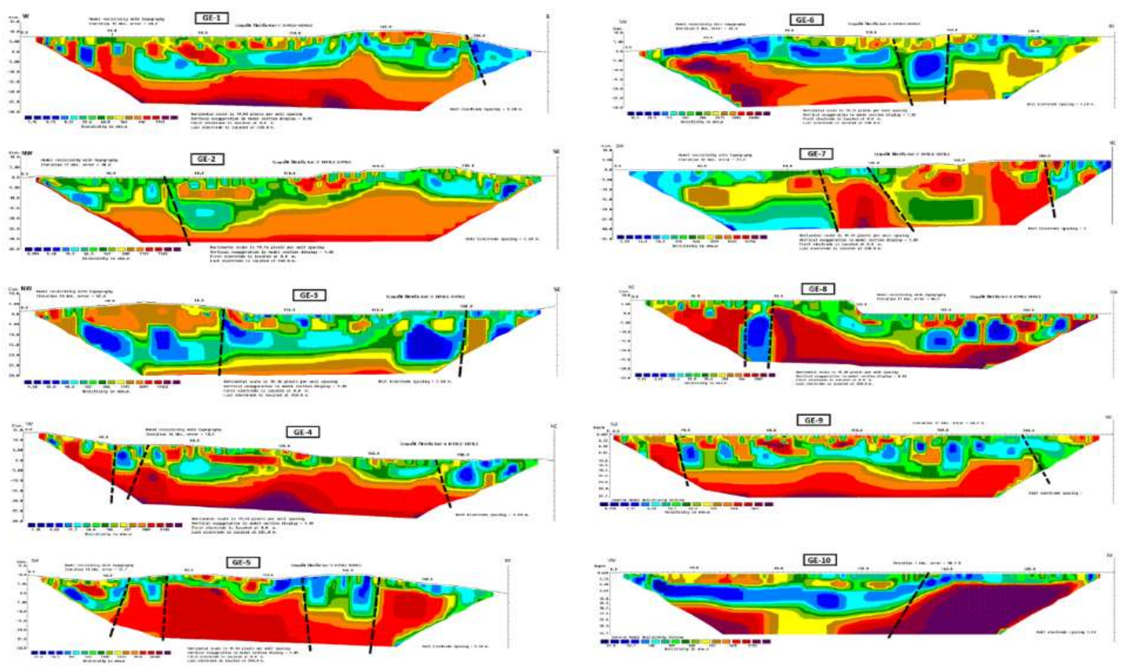

Figure 3. Geophysical cross sections (multielektrode of resistivity)

Conclusions. Eight faults have been identified in the study area and ten geophysical multiple electrode method sections have been taken and interpreted to determine their routes. The invisible opening structures detected by geophysical cross sections 6 and 8. All of these structures form a basis for land use and settlement suitability.

References

Emre, Ö., Duman, T. Y., Özalp, S., Elmacı 2011, 1:250.000 Ölçekli Türkiye Diri Fay Haritası Serisi, Denizli (NJ 35-12) Paftası, Seri No:12, MadenTetkikveArama Genel Müdürlüğü, Ankara-Türkiye.

Hançer M. & Akyol E., 2019, Examination of Faults by Geophysical and Tectonic Methods and Paleoseismological Interpretation: Karahasanli-Kayakoy (Denizli-Turkey) Case. International Journal of Advances in Science, Engineering and Technology (IJASEAT), 7, 4/3, 4-7.

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