



Geothermal Potential of the Sığacık Gulf (Seferihisar) and Preliminary investigations with Seismic and Magnetic Surveys

Özde BAKAK (1), Erdeniz ÖZEL (2), and Mustafa ERGÜN (3)

(1) Dokuz Eylül University, Graduate School and Applied Science, Geothermal Department, İzmir-Turkey (ozde.badur@deu.edu.tr), (2) Dokuz Eylül University, Institute of Marine Science and Technology, İzmir-Turkey, (3) Dokuz Eylül University, Faculty of Engineering, Department of Geophysics, İzmir-Turkey

The Aegean region, including both W. Turkey and Central Greece, is one of the world's most rapidly-deforming regions of continental crust and has a seismic rate is exceptional on a world scale. SW Turkey is one of the most rapidly extending regions in the world where the extension appears to have commenced in middle or late Miocene time. Paleomagnetic work in W Turkey and Aegean islands has revealed the horizontal rotation of some crustal blocks. In W Turkey clockwise rotation on Karaburun peninsula west of İzmir by 44° in the last few Ma is detected, and anticlockwise rotation of 37° for the Seferihisar region. The area of W Turkey and the Aegean islands has very strong geothermal gradient in the world scale. Sığacık Gulf is located on south of Karaburun Peninsula, and it is restricted by two important ridges as Karaburun and Seferihisar Ridges. Recent geological and geophysical studies suggested that this area is both E-W trending normal and NE-SW trending strike-slip faulting caused deformation. The Seferihisar earthquake series were occurred here during 17-20 October 2005.

For investigation of geothermal potential and hot water outlets on the seafloor, shallow seismic and magnetic surveys are preferred, which were carried out onboard Dokuz Eylül-1 vessel belongs to Dokuz Eylül University, in 2011. Approximately 250km seismic reflection data was collected along 27 lines. During seismic method used Sparker system which has 1 channel and 12 hydrophone with 17 m long streamer, as a seismic source used SIG Seismic Marine ELC 80 (4 kV & 3.2 KV DC). Seismic data processing (band pass filter, bottom mute, top mute, true amplitude recovery, time migration) was made using Promax program in the Seismic Laboratory in the Institute of Marine Science and Technology. The basement topography map was prepared using Kingdom Suite program drawing seabed line on these sections. Sea floor topography changes between 30-120 m, and this increases towards Ikaria Basin. Penetration depth is maximum 90 meter from the seafloor. The seismic sections reveal both the lens structures represented as current accumulation areas, and deformation areas located in upper unit.

At the same time, the marine magnetic survey was applied using SDM 4000 magnetometer of Shark Marine Technologies Company. The magnetic measurements were collected along the same seismic lines, and magnetic anomaly map shows the low magnetic anomaly value which is between -50nT and -90 nT, in east of Sığacık Gulf. In the light of shallow seismic and magnetic surveys, it is thought that the east of gulf may have geothermal activity on seafloor.