O15-2 HOT SODA WATER DISCOVERY WITH MULTIPLE GEOPHYSICAL METHODS

A. ERCAN[1-2], C. SUNGUR[1], A. SAHIN[1] and M. MUTAFCILAR[1]
[1] YERALTI ARAMACILIK Lmt. Spor Cad. Acisu Sok. No:9/2 Besiktas- Istanbul, Turkey
[2] Prof. Dr. ITU School of Mines Dept. of Geophysics, Maslak-Istanbul, Turkey

First geophysical investigation for soda water, Caybasi village, Bursa, Turkey was made in 1985. During this geophysical investigation, Electrical Sounding and profilings, Natural Polarization and Electrical Mise a la methods were used along nine NW-SE profiles on the foot of Uludag Mountain. On the south side of Uludag Mountain where Nilufer Creek flow, cold soda water existences were observed the creek. Electrical measurements were applied to locate soda water and to destinnate subsurface structures.

Next geophysical investigation on the same area was made in 1997 (A. Ercan, 1997). This work intended to explore hot soda water and to select a drilling location. Electromagnetic VLF, Electromagnetic Slingram (f=110, 220, 440, 880, 1760, 3520, 7040, 14080, 28160, 56320 Hz.) and Natural Polarization Last investigation on the study area was made in 1999 to explore subsurface structure with multiple geophysical methods; such as radiometry microgravity and vertical gradient, magnetics and gradiometry, geophysical well logging (temperature, SP, R). These geophysical studies were run on the same two NW-SE profiles of 1997`s study. Radiometric measurements were carried out in two modes with 100 seconds duration time. First mode, Total Count Search (TC-S) which lower threshold is approximately 80KeV includes all energy level to 3,MeV. Second mode Potassium (K^{40}) which is a differential window looking at energy level from 1.38 MeV to 1.54 MeV, with the centre of the window at 1.76 MeV. Aiming to find regional anomaly, we made correction measurement on the Barrage Lake. Gravity measurement were run in two level z_1 and $z_2(z_1+13cm)$ with 1 microGal sensitivity, which helped us to obtain vertical gradient of gravity (μGal/m). Corrections applied to those data`s are shown below Daily Variation, Latitude, Free Air and Terrain Corrections. Magnetic measurements were attempted in one NW-SE profile. Additionally to Total Earth Magnetic Field, we measured gradient by the same technic of gravity measurements. Daily variations was calculated and reduced from the magnetic data.

Along east side of the study area soil thickness increases; soda and fresh water are mixed. This properties observed along profile A (A200-A240) with decreasing radiometric and magnetic data which indicate passage from mineral to fresh water; same effect observed on the west side of the profiles (A60) on Electrical Resistivty (Direct Current) data.

All those geophysical signatures cause suspicion about the existance of N-S orientated faults. Then a drilling location, at K_2 position was selected to be at target depth of 320 meters. However, beginning from 37 meters and continueing since 250 meters, we faced a hot soda water with temperature of 57°C and with field of 4lt/sec. Now site will be used for healing both as well as for soda water production.