



Interpretation of Magnetic Anomalies in Salihli (Turkey) Geothermal Area Using 3-D Inversion and Edge Detection Techniques

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There are numerous geophysical methods used to investigate geothermal areas. The major purpose of this magnetic survey is to locate the boundaries of active hydrothermal system in the South of Gediz Graben in Salihli (Manisa/Turkey). The presence of the hydrothermal system had already been inferred from surface evidence of hydrothermal activity and drillings. Firstly, 3-D prismatic models were theoretically investigated and edge detection methods were utilized with an iterative inversion method to define the boundaries and the parameters of the structure. In the first step of the application, it was necessary to convert the total field anomaly into a pseudo-gravity anomaly map. Then the geometric boundaries of the structures were determined by applying a MATLAB based software with 3 different edge detection algorithms. The exact location of the structures were obtained by using these boundary coordinates as initial geometric parameters in the inversion process. In addition to these methods, reduction to pole and horizontal gradient methods were applied to the data to achieve more information about the location and shape of the possible reservoir. As a result, the edge detection methods were found to be successful, both in the field and as theoretical data sets for delineating the boundaries of the possible geothermal reservoir structure. The depth of the geothermal reservoir was determined as 2,4 km from 3-D inversion and 2,1 km from power spectrum methods.