

APPLICATION OF THE MT AND CSAMT METHOD TO GEOTHERMAL EXPLORATION AT WUHAN FIELD

Guiju Wu, Xiangyun Hu, Kangsop KIM

Institute of Geophysics and Geometrics, China University of Geosciences, Wuhan 430074, China, e-mail: wugjsky@gmail.com xyhu@cug.edu.cn

High-temperature geothermal deposits are concentrated in areas of modern volcanic activity. Existence of sources of thermal water is connected with presence of the high-temperature deep center and tectonic faults in which exists circulation of thermal water. In china geothermal deposits have been found on Wuhan area. MT(magnetotellurics) method and CSAMT(controlled source audio-frequency magnetotelluric) method were used in the field measurement and data processing.

The MT sounding method can detect geothermal deposits usually as zones of low resistivity at several thousand meters below surface. Works by MT method using the frequency range 320Hz to 2000s were carried out in the area of Wuhan. At the realization of the MT measurements the distance between profiles made 2000m, between sounding points 500m. 2D inversion programs were used for data interpretation. As result structural features of the territory were investigated, fault zones mapped, geoelectric cross sections plotted and anomalies perspective for detection of geothermal sources detailed. Then we used CSAMT to verify the above results. CSAMT was conducted along two profiles crossing the Wuhan area. The distance between points is 40m, and the frequency range is from 8192Hz to 0.1s. CSAMT data is great complex of high quality data, which at the same time represents an extensive folding and faulting of an already complicated geological environment. In the whole geoelectric cross section is characterized by three layer structure with more conductive second layer. And three local anomaly zones the most perspective for detection of geothermal sources were found. They have depths from 1000-1500m up to 2000-2500m and are characterized by values of resistivity from 30-120 ohm-m. Conductive anomalies were mapped and contoured by the MT and CSAMT methods and recommended for drilling.

geothermal exploration, MT, CSAMT

Xiangyun Hu, INSTITUTE OF GEOPHYSICS AND GEUNIV OF GEOSCIENCES
WUHAN 430074 CHINA, tel:86-27-67883592, fax:
86-27-6788251, e-mail: xyhu@cug.edu.cn