GEOPHYSICAL EXPLORATION OF GEOTHERMAL RESOURCES

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REGIONAL SCALE

Main tasks: Regional geophysical surveys are aimed at studying geological structures (tectonic basins, tectonic zones, spreading- and rift zones, faults) that could host the geothermal reservoir and contain appropriate ways of the heat transfer to the surface.

Main methods used: seismic surveys, gravity and magnetic surveys, radar tomography, and electromagnetic surveys, which are often applied for increasing the reliability of conclusions drawn based on the interpretation of the seismic data.

Geochemical surveying: geochemical studies are aimed at determining the nature of the geothermal energy source and the chemical composition of the geothermal fluids.

Seismic tomography: the study of the earth’s crust (using quite expensive methods) reveals the geometrical boundaries of the geological units and is especially good in detecting the superficial geology.

Geophysical surveying: the method of seismic exploration is based on the generation of seismic waves in the earth and the interpretation of their travel time and amplitude as a function of the geological properties of the earth.

Tectonic features: the study of the tectonic features of the earth’s crust is an important tool for the exploration of geothermal energy resources.

INTERMEDIATE SCALE

Main tasks: Tectonic studies at the intermediate scale are aimed at spatial delineation of the geothermal reservoir, indirect evaluation of the temperature, porosity, permeability and other parameters of the deep geothermal reservoir.

Main methods used: 30D electromagnetic and borehole geophysical surveys.

EW MAPPING HYDROGEOLOGICAL ZONES

EW DETECTION OF AZIMUTHS OF FRACTURE ZONES

EW MAPPING PERMEABLE ZONES

LOCAi SCALE

Main tasks: Geophysical studies at the local scale are aimed at spatial delineation of the geothermal reservoir, indirect evaluation of the temperature, porosity, permeability and other parameters of the deep geothermal reservoir.

Main methods used: 30D electromagnetic and borehole geophysical surveys.

3D EM-MAPPING GEOTHERMAL RESERVOIRS

3D EM MAPPING CLAY CAP

INTERMEDIATE MODEL OF THE GEOTHERMAL ZONE REVEALED FROM GEOFOUNTAIN DATA

TEMPERATURE ESTIMATION BY MEANS OF INDIRECT EM GEOTHERMOMETER

THERMAL SUBSURFACE TEMPORATURE ESTIMATION BY MEANS OF INDIRECT EM GEOTHERMOMETER CALIBRATED BY DATA MEASURED IN OTHER WELLS

REFERENCES