

Pengolahan data magnetotellurik 2-dimensi pada lapangan panas bumi marana, Sulawesi Tengah

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Abstrak

Daerah Marana terletak di Kabupaten Donggala, Provinsi Sulawesi Tengah. Ditinjau dari data geologi, daerah ini didominasi oleh batuan granit berumur Eocene-Tersier dan berada pada zona tektonik. Daerah Marana diduga memiliki prospek panasbumi yang ditandai dengan kemunculan manifestasi permukaan berupa mata air panas. Untuk memperjelas pendugaan tersebut telah dilakukan survey metode Magnetotellurik (MT). Data MT yang diperoleh dari akuisisi lalu dilakukan pengolahan dengan tahapan sebagai berikut: seleksi data time-series, transformasi Fourier, robust processing, seleksi cross power, koreksi static shift, dan kemudian dilakukan inversi 2-dimensi menggunakan program WinGlink. Hasil pengolahan data MT 2-dimensi diintegrasikan dengan data geologi, geokimia, metode gravitasi, dan sumur landaian suhu untuk memperoleh suatu model konseptual dari sistem panasbumi di daerah Marana yang ditampilkan dengan program GeoSlicer-X. Model konseptual tersebut menunjukkan bahwa terdapat reservoir panasbumi di bawah kompleks mata air panas Masaingi pada kedalaman 750-1500 m. Pendugaan temperatur reservoir dari data geokimia menunjukkan kisaran temperatur 154-237°C sehingga sistem panasbumi Marana termasuk kedalam moderate temperature geothermal system yang diduga memiliki potensi sekitar 33 MWe.

.....Marana area is located at Donggala District, Central Sulawesi Province. Observed from geological data, this area is dominated by granite (Eocene-Tertiary age) and located in a tectonic zone. Marana area is estimated as a geothermal prospect area based on the appearance of hot springs in the area. To verify this, a geophysical survey has been conducted using Magnetotelluric (MT) method. The MT data obtained from acquisition was processed in stages as follow: time-series data selection, Fourier transformation, robust processing, cross power selection, static shift correction, and 2-dimensional inversion using WinGlink software.

The result of 2-dimension MT processing was then integrated with geological, geochemical, gravity method, and shallow depth well data of temperature to obtain a conceptual model of geothermal system in Marana area which is performed by using GeoSlicer-X software. The conceptual model shows that there is a geothermal reservoir below a series of Masaingi hot springs at the depth of 750-1500 m. The reservoir temperature is estimated between 154-237°C from available geochemical data. Hence, geothermal system in Marana field is classified as moderate temperature geothermal system which has an estimated potential reserve of 33 MWe.