

Analysis of Magnetic Anomaly Data for Identification Structure in Subsurface of Geothermal Manifestation at Candi Umbul Area, Magelang, Central Java Province, Indonesia

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Abstract : Acquisition of geophysical survey with magnetic method has been done in manifestation of geothermal at Candi Umbul, Grabag, Magelang, Central Java Province on 10-12 May 2013. This objective research is interpretation to interpret structural geology that control geothermal system in Candi Umbul area. The research has been finished with area size 1,5 km x 2 km and measurement space of 150 m. And each point of line space survey is 150 m using PPM Geometrics model G-856. Data processing was started with IGRF and diurnal variation correction to get total magnetic field anomaly. Then, advance processing was done until reduction to pole, upward continuation, and residual anomaly. That results become next interpretation in qualitative step. It is known that the biggest object position causes low anomaly located in central of area survey that comes from hot spring manifestation and demagnetization zone that indicates the existence of heat source activity. Then, modeling the anomaly map was used for quantitative interpretation step. The result of modeling is rock layers and geological structure model that can inform about the geothermal system. And further information from quantitative interpretations can be interpreted about lithology susceptibility. And lithology susceptibilities are andesite as heat source has susceptibility value of ($k= 0.00014$ emu), basaltic as alteration rock ($k= 0.0016$ emu), volcanic breccia as reservoir rock ($k= 0.0026$ emu), andesite porphyritic as cap rock ($k= 0.004$ emu), lava andesite ($k= 0.003$ emu), and alluvium ($k= 0.0007$ emu). The hot spring manifestation is controlled by the normal fault which becomes a weak zone, easily passed by hot water which comes from the geothermal reservoir.

Keywords : geological structure, geothermal system, magnetic, susceptibility

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