ABSTRAK

IDENTIFIKASI STRUKTUR BAWAH PERMUKAAN DENGAN METODE GAYABERAT BERDASARKAN ANALISIS *DERIVATIVE*, MODEL 2D DAN 3D PADA DAERAH PANAS BUMI GUNUNG UNGARAN, JAWA TENGAH

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Gunung Ungaran termasuk dalam Kabupaten Semarang, Provinsi Jawa Tengah. Gunung Ungaran merupakan gunung yang mempunyai sebuah potensi panas bumi karena ditemukan sumber mata air panas, tanah panas, fumarol, batuan teralterasi dan endapan travertin. Terdapat banyak metode geofisika yang dapat digunakan dalam tahapan identifikasi struktur, salah satunya adalah metode gayaberat. Dalam penelitian ini, metode gayaberat digunakan untuk mengidentifikasi zona patahan di kawasan panas bumi Gunung Ungaran sebagai pengontrol sistem panas bumi. Tujuan dari penelitian ini adalah untuk menentukan zona kedalaman anomali regional dan anomali residual menggunakan analisis spektrum, melakukan analisis struktur patahan berdasarkan pola anomali residual, analisis *First Horizontal Derivative* (FHD) dan *Second Vertical Derivative* (SVD), kemudian menginterpretasikan struktur bawah permukaan. berdasarkan model 2D dan model 3D anomali gayaberat. Didapatkan kedalam zona anomali regional 3.6 km dan kedalaman zona anomali residual 0.6 km. Beberapa daerah munculnya manifestasi ditemukan karena adanya struktur patahan yang ditemukan di daerah penelitian. Terdapat anomali rendah di puncak Gunung Ungaran yang diperkirakan merupakan zona lemah akibat keruntuhan dan diidentifikasi sebagai zona dimana terdapat reservoir di Gunung Ungaran.

Kata kunci: *First Horizontal Derivative,* Metode Gayaberat, Reservoir Panasbumi, *Second Vertical Derivative*, Struktur Patahan

ABSTRACT

IDENTIFICATION OF SUBSURFACE STRUCTURES USING THE GRAVITY METHOD BASED ON DERIVATIVE ANALYSIS, 2D AND 3D MODELS IN THE UNGARAN MOUNTAIN GEOTHERMAL AREA, CENTRAL JAVA

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Mount Ungaran is included in Semarang Regency, Central Java Province. Mount Ungaran is a mountain that has a geothermal potential because hot springs, hot soil, fumaroles, altered rocks and travertine deposits are found. There are many geophysical methods that can be used in the structural identification stage, one of which is the gravity method. In this study, the gravity method was used to identify fault zones in the geothermal area of Mount Ungaran as a geothermal system controller. The purpose of this study is to determine the depth zone of regional anomalies and residual anomalies using spectrum analysis, perform fault structure analysis based on residual anomaly patterns, analyze First Horizontal Derivative (FHD) and Second Vertical Derivative (SVD), then interpret the subsurface structure. based on 2D model and 3D model of gravity anomaly. It is found in the regional anomaly zone of 3.6 km and the depth of the residual anomaly zone of 0.6 km. Several areas of manifestation were found due to the fault structure found in the study area. There is a low anomaly at the top of Mount Ungaran which is estimated to be a weak zone due to the collapse and is identified as a zone where there is a reservoir on Mount Ungaran.

Keywords: Fault Structure, First Horizontal Derivative, Geothermal Reservoir, Gravity Method, Second Vertical Derivative