

**“HORIZONTAL GRADIENT, TILT ANGLE, 2D, AND 3D GRAVITY
MODEL ANALYSIS IN IDENTIFYING FAULT ZONE OF GUNUNG
UNGARAN GEOTHERMAL AREA, CENTRAL JAVA”**

by

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ABSTRACT

Mount Ungaran is a geothermal area where there is a geothermal system in the area that is characterized by certain characteristics such as the presence of hot springs, fumaroles, hot soils, deposits of travertine and altered rocks. The location of geothermal manifestations is mainly located on the northwest, southwest and southeast slopes of Mount Ungaran. This research was conducted using gravity method to identify fault zones which is controller of geothermal system, in this case in Mount Ungaran area, using Horizontal Gradient and Tilt Angle. The regional zone at study area is at a depth of 3.5 km and the residual zone at a depth of 0.6 km. The manifestations of Nglimut, Diwak, Banaran, Gedongsongo, and Kendalisodo are associated with the existence of faults. Fault structures are scattered in the study area at North West-South East and North-South direction. There are 5 types of rock lithology, namely Gajahmungkur Formation (2.39 gr / cc), Kaligesik Formation (2.64 gr / cc), Jongkong Formation (2.51 gr / cc), Penyatan Formation (2.4 gr / cc), and Basement (3.1 gr / cc). The existence of Basement layer based on the research final result model is estimated placed in Kaligetas Formation. High bouguer anomaly value is influenced by Kaligesik Formation which exposed to the surface and low bouguer anomaly is caused by the presence of magma chamber that has high porosity. Ungaran Mountain geothermal reservoir is in Gedongsongo, exactly, at a depth until 2700 m below sea level.

Keywords: gravity, faults, Mount Ungaran.

“ANALISIS *HORIZONTAL GRADIENT*, *TILT ANGLE*, MODEL 2D, DAN MODEL 3D GAYABERAT DALAM IDENTIFIKASI ZONA SESAR DAERAH PANAS BUMI GUNUNG UNGARAN, JAWA TENGAH”

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ABSTRAK

Gunung Ungaran merupakan salah satu area sistem panas bumi yang ditandai dengan mata air panas, fumarol, tanah panas, endapan travertin dan batuan teralterasi. Lokasi manifestasi panas bumi terutama terletak di lereng Barat Laut, Barat Daya dan Tenggara Gunung Ungaran. Penelitian ini dilakukan menggunakan metode gayaberat untuk mengidentifikasi zona sesar sebagai pengontrol sistem panas bumi daerah Gunung Ungaran menggunakan *Horizontal Gradient* dan *Tilt Angle*. Zona regional pada daerah penelitian memiliki kedalaman 3.5 km dan zona residual memiliki kedalaman 0.6 km. Manifestasi Nglimut, Diwak, Banaran, Gedongsongo, dan Kendalisodo berasosiasi dengan keberadaan sesar. Struktur sesar tersebar di daerah penelitian dengan arah Barat Laut-Tenggara dan Utara-Selatan. Terdapat 5 jenis litologi batuan yaitu Formasi Gajahmungkur (2.39 gr/cc), Formasi Kaligesik (2.64 gr/cc), Formasi Jongkong (2.51 gr/cc), Formasi Penyatan (2.4 gr/cc), dan *Basement* (3.1 gr/cc), *Basement* pada model hasil penelitian diperkirakan berada pada Formasi Kaligetas. Nilai anomali bouguer tinggi dipengaruhi oleh Formasi Kaligesik yang tersingkap ke permukaan, kemudian anomali bouguer rendah disebabkan karena adanya kantong magma yang memiliki porositas tinggi. Reservoir panas bumi Gunung Ungaran berada di Gedongsongo dengan kedalaman mencapai 2700 m di bawah permukaan laut.

Kata kunci: gayaberat, sesar, Gunung Ungaran