

# Pengolahan Data Gravitasi Menggunakan Inversi 3-D Dengan Analisis Terpadu Dan Studi Korelasi Hasil Dengan Metode Land Surface Temperature (LST) Pada Daerah Prospek Panas Bumi Hu'u Daha, Nusa Tenggara Barat = Processing Of Gravity Data Using 3-D Inversion With Integrated Analysis And Correlation Study With Land Surface Temperature (LST) Method In The Geothermal Prospective Area Of Hu'u Daha, West Nusa Tenggara

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## Abstrak

Wilayah eksplorasi panas bumi Hu'u Daha merupakan salah satu wilayah yang dianggap potensial untuk dijadikan sumber energi alternatif berupa energi panas bumi. Dalam penelitian ini dilakukan korelasi hasil pengolahan data gravitasi dengan data Land Surface Temperature (LST) untuk memperkirakan adanya sumber panas bumi, di mana titik-titik dengan nilai gravitasi tinggi kemungkinan besar merupakan lokasi adanya sumber panas bumi dan memperkirakan suhu reservoir panas bumi di bawah permukaan tanah. Dalam pengolahan data tersebut, dilakukan tahapan filtering First Horizontal Derivative (FHD) dan Second Vertical Derivative (SVD) yang menunjukkan adanya 6 struktur geologi pada daerah Hu'u Daha dengan arah patahan barat laut - tenggara, barat - timur, hingga timur laut - barat daya yang mengontrol sistem panas bumi daerah penelitian yang ditandai oleh garis berwarna hitam. Kemudian dilakukan analisis patahan dan analisis 3D inversi yang dimana dugaan keterdapatan lapisan reservoir berupa batuan lava dan breksi berkomposisi andesit dan basalt serta sisipan batuan tufa dengan rerata kedalaman 633 – 1500 m dengan nilai densitas 3.4 - 3.33 gr/cm<sup>3</sup> yang dilingkupi oleh lapisan cap rock berupa batuan lava hasil erupsi dengan kedalaman rata-rata 0 – 633 m dengan nilai densitas 3.51 - 3.44 gr/cm<sup>3</sup>, serta terdapat patahan-patahan yang mengontrol sistem panas bumi berdasarkan korelasi FHD dan SVD.

.....The exploration area of Hu'u Daha geothermal field is considered to be a potential source of alternative energy in the form of geothermal energy. In this study, the correlation between gravity data and Land Surface Temperature (LST) was conducted to estimate the presence of geothermal sources. Points with high gravity values are likely locations of geothermal sources, and the temperature of the geothermal reservoir beneath the ground surface was estimated. The data processing involved the use of First Horizontal Derivative (FHD) and Second Vertical Derivative (SVD) filtering, which revealed the presence of six geological structures in the Hu'u Daha area, characterized by fault lines in the northwest-southeast, west-east, and northeast-southwest directions, controlling the geothermal system. Subsequently, fault analysis and 3D inversion analysis were performed, indicating the suspected presence of a reservoir layer consisting of andesite and basalt rock, as well as tufa rock, at an average depth of 633-1500 m with a density value of 3.4-3.33 g/cm<sup>3</sup>. This layer is covered by a cap rock layer of erupted lava rock at an average depth of 0-633 m with a density value of 3.51-3.44 g/cm<sup>3</sup>. The analysis also identified faults controlling the geothermal system based on the correlation of FHD and SVD.