ABSTRAK

Lapangan Panas Bumi Dieng merupakan salah satu sistem panas bumi vulkanik bertemperatur tinggi di Indonesia. Wilayah ini memiliki potensi energi yang besar, namun dikendalikan oleh kondisi geologi dan magmatik yang kompleks. Penelitian ini bertujuan untuk mengidentifikasi dan memetakan zona prospektif panas bumi di Kompleks Gunungapi Dieng. Pendekatan yang digunakan adalah integrasi metode gravitasi dan *Land Surface Temperature (LST)*. Data yang digunakan seluruhnya merupakan data sekunder. Data gravitasi diperoleh dari model global *GGMPlus* berupa *Free Air Anomaly* dan elevasi. Data penginderaan jauh berupa citra *Landsat 8 OLI/TIRS* digunakan untuk menurunkan parameter *LST* dan *NDVI*. Data DEMNAS dimanfaatkan untuk analisis topografi dan koreksi gravitasi. Metode penelitian meliputi perhitungan *Complete Bouguer Anomaly (CBA)*, pemisahan anomali regional dan residual, serta analisis turunan medan gravitasi berupa *Horizontal Gradient (HG)*, *Vertical Derivative (VD)*, dan *Tilt Derivative (TDR)*. Analisis *LST* dilakukan untuk mendeteksi anomali suhu permukaan yang berkaitan dengan aktivitas hidrotermal. Hasil penelitian menunjukkan bahwa zona anomali gravitasi residual rendah berkembang dominan di sektor Sikidang–Pakuwaja dan Sileri, yang berasosiasi dengan batuan teralterasi hidrotermal dan reservoir panas bumi. Anomali gravitasi tinggi di sekitar Gunung Prau, Bismo, dan Pakuwaja diinterpretasikan sebagai intrusi magma dangkal yang berperan sebagai sumber panas. Struktur sesar berarah dominan NW–SE dan NE–SW teridentifikasi sebagai jalur utama migrasi fluida. Anomali LST tinggi berasosiasi dengan manifestasi panas bumi aktif, meskipun sebagian dipengaruhi faktor non-geotermal. Hasil penelitian ini diharapkan mendukung eksplorasi panas bumi yang lebih efektif serta upaya mitigasi risiko kebencanaan di wilayah vulkanik aktif.

Kata Kunci: Kompleks Vulkanik Dieng, *Gravity*, *Land Surface Temperature*, *Bouguer Anomaly*, *Tilt Derivative*

ABSTRACT

The Dieng Geothermal Field is one of the high-temperature volcanic-hosted geothermal systems in Indonesia. The area has significant energy potential; however, it is controlled by complex geological and magmatic conditions. This study aims to identify and map prospective geothermal zones within the Dieng Volcanic Complex. An integrated approach combining gravity methods and Land Surface Temperature (LST) analysis was applied. All data used in this study are secondary data. Gravity data were obtained from GGMPlus data model in the form of Free Air Anomaly and elevation data. Remote sensing data consist of Landsat 8 OLI/TIRS imagery, which was used to derive LST and Normalized Difference Vegetation Index (NDVI). DEMNAS data were utilized for topographic analysis and gravity terrain correction. The research methodology includes the calculation of Complete Bouguer Anomaly (CBA), separation of regional and residual anomalies, and analysis of gravity field derivatives, wich is Horizontal Gradient (HG), Vertical Derivative (VD), and Tilt Derivative (TDR). LST analysis was conducted to detect surface temperature anomalies related to hydrothermal activity. The results indicate that low residual gravity anomaly zones are dominantly developed in the Sikidang–Pakuwaja and Sileri sectors. These zones are associated with hydrothermally altered rocks and geothermal reservoirs. High gravity anomalies around Mount Prau, Mount Bismo, and Pakuwaja are interpreted as shallow magmatic intrusions acting as heat sources. Fault structures with dominant NW–SE and NE–SW orientations were identified as the main pathways for fluid migration. High LST anomalies are spatially associated with active geothermal manifestations, although some are influenced by non-geothermal factors. The results of this study are expected to support more effective geothermal exploration and contribute to geological hazard mitigation efforts in active volcanic regions.

Keywords*: Dieng Volcanic Complex, Gravity, Land Surface Temperature, Bouguer Anomaly, Tilt Derivative*.