

ABSTRAK

Penelitian ini bertujuan mengidentifikasi struktur geologi bawah permukaan dan menduga potensi sumber daya alam di bagian timur Kabupaten Grobogan berdasarkan data anomali gravitasi. Analisis dilakukan melalui pemrosesan anomali Bouguer lengkap, reduksi ke bidang datar, pemisahan anomali residual dengan metode *upward continuation*, serta analisis turunan FHD dan SVD untuk mendeteksi struktur sesar. Hasil pemodelan 2D pada empat lintasan utama menunjukkan pola stratigrafi yang berlapis teratur serta mengidentifikasi 28 sesar, terdiri atas 14 sesar normal dan 14 sesar naik. Beberapa sesar berada di sekitar zona aktivitas gunung api lumpur seperti Bledug Kuwu, Bledug Kramesan, dan Bledug Cangkring, serta diduga menjadi jalur migrasi fluida ke permukaan. Analisis lebih lanjut menunjukkan enam zona potensial kemunculan gunung api lumpur baru, ditandai oleh anomali densitas lokal yang terletak di antara struktur sesar. Distribusi densitas berkisar antara 1,980 – 2,024 g/cm³ dan diasosiasikan dengan Aluvium, Formasi Tambakromo, Formasi Lidah, Formasi Selorejo, dan Formasi Mundu. Formasi Selorejo dan Formasi Mundu berpotensi sebagai batuan reservoir dan penutup, sedangkan Formasi Lidah sebagai batuan induk. Konfigurasi ini menunjukkan potensi sistem hidrokarbon dan akumulasi mineral di zona rekahan bawah permukaan, serta berkontribusi terhadap strategi mitigasi geologi dan perencanaan tata ruang wilayah.

Kata kunci: metode gravitasi, pemodelan inversi, gunung api lumpur, analisis derivative, hidrokarbon.

ABSTRACT

This study aims to identify subsurface geological structures and suspect the potential of natural resources in the eastern part of Grobogan Regency based on gravitational anomaly data. The analysis was carried out through complete Bouguer anomaly processing, reduction to a flat plane, separation of residual anomalies by upward continuation method, and FHD and SVD derivative analysis to detect fault structures. The results of 2D modeling on the four main trajectories showed a stratigraphic pattern that was regularly layered and identified 28 faults, consisting of 14 normal faults and 14 ascending faults. Several faults are located around the activity zone of mud volcanoes such as Bledug Kuwu, Bledug Kramesan, and Bledug Cangkring, and are suspected to be a fluid migration route to the surface. Further analysis showed six potential zones of the emergence of new mud volcanoes, characterized by local density anomalies located between fault structures. The density distribution ranges from 1,980 – 2,024 g/cm³ and is associated with the Alluvium, Formasi Tambakromo, Formasi Lidah, Formasi Selorejo, and Formasi Mundu. Formasi Selorejo and Formasi Mundu have the potential to be reservoir and overcover rocks, while the Formasi Lidah as the parent rock. This configuration demonstrates the potential for hydrocarbon systems and mineral accumulation in the subsurface rift zone, as well as contributing to geological mitigation strategies and regional spatial planning.

Keywords: gravity methods, inversion modeling, mud volcanoes, derivative analysis, hydrocarbons.