

## INTISARI

### **IDENTIFIKASI STRUKTUR BAWAH PERMUKAAN DESA KASIHAN, KECAMATAN TEGALOMBO, KABUPATEN PACITAN BERDASARKAN DATA ANOMALI GRAVITASI**

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Secara geologi, Kabupaten Pacitan memiliki litologi dan struktur geologi yang kompleks serta berada di utara zona subduksi. Kondisi tersebut menjadikan Kabupaten Pacitan rawan terhadap bencana gempa bumi, salah satunya Desa Kasihan, Kecamatan Tegalombo yang tidak jauh dari Sesar Grindulu dan juga diapit oleh dua sesar yaitu Sesar Karangrejo dan Sesar Kayuwayang. Interaksi kedua sesar yang mengapit daerah ini dapat memunculkan sesar sekunder di sepanjang jalur kedua sesar tersebut. Keberadaan sesar sekunder dapat diidentifikasi menggunakan metode gravitasi. Data gravitasi sebanyak 249 titik tersebar di dalam area seluas 3,0 x 2,4 km<sup>2</sup>. Data gravitasi tersebut dikoreksi hingga mendapatkan anomali Bouguer lengkap (ABL) pada topografi. Melalui proyeksi ke bidang datar menggunakan metode Dampney diperoleh ABL pada bidang datar dengan ketinggian 1000 meter dan kedalaman bidang ekuivalen 1100 meter, didapatkan sebaran nilai anomali sebesar 75,547 hingga 88,197 mGal. Anomali gravitasi tersebut kemudian dilakukan pemisahan anomali menggunakan metode kontinuasi ke atas pada ketinggian 200 meter. Analisis keberadaan sesar dilakukan dengan *first horizontal derivative* (FHD) dan *second vertical derivative* (SVD). Berdasarkan pola anomali rendah pada bagian barat daya serta hasil FHD dan SVD, ditemukan indikasi keberadaan sesar naik dengan orientasi barat laut – tenggara, sedangkan anomali tinggi pada bagian barat laut, utara, dan tenggara disebabkan oleh adanya intrusi. Hasil pemodelan 2,5D menunjukkan daerah penelitian tersusun atas empat litologi, yaitu breksi piroklastik Formasi Arjosari ( $\rho = 2,57 \text{ gram/cm}^3$ ), dasit Formasi Arjosari ( $\rho = 2,70 \text{ gram/cm}^3$ ), intrusi andesit ( $\rho = 2,82 \text{ gram/cm}^3$ ), dan dasit teralterasi Formasi Arjosari ( $\rho = 2,60 \text{ gram/cm}^3$ ), serta dimodelkan struktur sesar naik dengan *strike/dip* N303°E/66°.

**Kata kunci:** Kabupaten Pacitan, sesar sekunder, metode gravitasi, kontinuasi ke atas, FHD, SVD.

## ABSTRACT

### **SUBSURFACE STRUCTURE IDENTIFICATION OF KASIHAN VILLAGE, TEGALOMBO DISTRICT, PACITAN REGENCY USING GRAVITY ANOMALY DATA**

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*Geologically, Pacitan Regency has a complex lithology and geological structure and is located in the north of the subduction zone. This condition makes Pacitan Regency prone to earthquake disasters, one of which is Kasihan Village, Tegalombo District which is not far from the Grindulu Fault and is also flanked by two faults, namely the Karangrejo Fault and the Kayuwayang Fault. The interaction of the two faults flanking this area can lead to secondary faults along the path of the two faults. The presence of secondary faults can be identified using the gravity method. Gravity data of 249 points spread over an area of  $3.0 \times 2.4 \text{ km}^2$ . The gravity data is corrected to obtain a complete Bouguer anomaly (ABL) on the topography. Through projection onto a flat plane using the Dampney method, ABL is obtained on a flat plane with a height of 1000 meters and an equivalent depth of field of 1100 meters, the distribution of anomaly values is 75.547 to 88.197 mGal. The gravity anomaly is then separated using the upward continuation method at an altitude of 200 meters. Analysis of the presence of faults was carried out using the first horizontal derivative (FHD) and second vertical derivative (SVD). Based on the low gravity anomaly pattern in the southwest and the results of FHD and SVD analysis, it was found indications of the presence of a thrust fault with a northwest-southeast orientation, while the high anomaly in the northwest, north, and southeast is thought to be caused by an intrusion. The 2.5D modeling results show that the research area is composed of four lithologies, namely the pyroclastic breccia of the Arjosari Formation ( $\rho = 2,57 \text{ gram/cm}^3$ ), the dacite of the Arjosari Formation ( $\rho = 2,70 \text{ gram/cm}^3$ ), andesite intrusion ( $\rho = 2,82 \text{ gram/cm}^3$ ), and the altered dacite of the Arjosari Formation ( $\rho = 2,60 \text{ gram/cm}^3$ ), as well as a thrust fault structure modeled with strike/dip  $N303^\circ E/66^\circ$ .*

**Keywords:** *Pacitan Regency, secondary faults, gravity method, upward continuation, FHD, SVD.*