

## INTISARI

### IDENTIFIKASI BAWAH PERMUKAAN BERDASARKAN HASIL PEMODELAN 2D DAN ANALISIS *SECOND VERTICAL DERIVATIVE* MENGUNAKAN METODE MAGNETIK DI KAWASAN CANDI UMBUL-TELOMOYO-ANDONG, MAGELANG, JAWA TENGAH

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Daerah prospek panas bumi Telomoyo terletak di Provinsi Jawa Tengah, Indonesia. Salah satu manifestasi di sekitar Telomoyo adalah mata air hangat, yang dikenal dengan sebutan Candi Umbul. Fluida hidrotermal dari mata air hangat tersebut kemungkinan dapat bergerak ke permukaan melalui struktur geologi berupa rekahan atau sesar. Survei menggunakan metode magnetik telah dilakukan di Kawasan Candi Umbul-Telomoyo-Andong, Magelang, Jawa Tengah. Pengolahan data dimulai dengan melakukan koreksi IGRF dan koreksi variasi harian untuk memperoleh anomali medan magnet total. Kemudian, anomali medan magnet total ditransformasi reduksi ke kutub. Untuk memperoleh anomali medan magnet regional, dilakukan proses kontinuasi ke atas 600 meter. Pemodelan 2D serta analisis *Second Vertical Derivative* (SVD) dibuat dari anomali hasil reduksi ke kutub. Interpretasi dilakukan terhadap hasil pemodelan 2D serta hasil analisis *Second Vertical Derivative* (SVD).

Hasil analisis *second vertical derivative* dan pemodelan 2D data magnetik sayatan A-B menunjukkan adanya batas anomali pada jarak koordinat lokal 4000 m (0 m jarak koordinat lokal berada di titik A pada sayatan A-B yang berarah dari barat ke timur, titik A memiliki koordinat *easting* 421942 dan *northing* 9184902). Batas anomali tersebut diidentifikasi sebagai struktur geologi berupa sesar turun. Sesar turun tersebut diduga mengontrol munculnya manifestasi mata air hangat di Candi Umbul. Selain itu, terdapat anomali berupa kontak litologi antara batuan andesit dengan endapan Merbabu pada jarak koordinat lokal 1500 m, 3000 m, 5000 m, 6000 m dan 7000 m. Rentang nilai suseptibilitas batuan andesit berkisar antara 0,055 SI hingga 0,0925 SI, sedangkan nilai suseptibilitas endapan Merbabu adalah 0,0001 SI.

**Kata kunci :** *second vertical derivative*, sesar, panas bumi, metode magnetik

## ABSTRACT

***SUBSURFACE IDENTIFICATION BASED ON 2D MODELLING AND  
SECOND VERTICAL DERIVATIVE ANALYSIS USE MAGNETIC METHOD  
IN CANDI UMBUL-TELOMOYO-ANDONG, MAGELANG, CENTRAL  
JAVA***

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Telomoyo geothermal prospect area is located in Central Java Province, Indonesia. One of the manifestations around Telomoyo is a warm spring, called Candi Umbul. The hydrothermal fluids from the warm spring could be from the subsurface flowing up through geological structures, i.e. fracture or fault. A magnetic survey had been conducted in Candi Umbul-Telomoyo-Andong, Magelang, Central Java. The data processings were started by doing the IGRF correction and diurnal correction to get the total magnetic field data. Then, reduction to pole was performed to the total magnetic field data. To get the regional magnetic field anomaly, it was done upward continuation 600 meter. The 2D modelling and Second Vertical Derivative (SVD) analysis were made from the regional magnetic field anomaly. The interpretations were done from the result of 2D modelling and the result of Second Vertical Derivative (SVD) analysis.

The result of the Second Vertical Derivative (SVD) analysis and the 2D modelling of the magnetic data in the A-B slicing line shows that there is an anomaly border at the distance 4000 m of the local coordinate (0 m of the local coordinate is located in the A point of A-B slicing line from west to east, A point has easting coordinate 421942 and northing coordinate 9184902). The border of the anomaly is identified as a geological structure, called normal fault. This normal fault is predicted controlling the emergence of the warm spring in Candi Umbul. Besides that, there are anomalies that show the lithological borders of andesite and Merbabu deposit at the distance 1500 m, 3000 m, 5000 m, 6000 m dan 7000 m of the local coordinate. The range of the susceptibility of andesite is 0,055 SI until 0,0925 SI, while the susceptibility of the Merbabu deposit is 0,0001 SI.

**Keywords :** second vertical derivative, fault, geothermal, magnetic method