ABSTRAK

ANALISIS POLA STRUKTUR GEOLOGI DAN KONFIGURASI BAWAH PERMUKAAN CEKUNGAN JAWA TENGAH BAGIAN SELATAN BERDASARKAN METODE GRAVITASI

Oleh:

Dina Nurvaningsih

115.190.022

Indonesia terletak di daerah konvergensi antara Lempeng Pasifik yang bergerak ke barat, Lempeng Hindia-Australia yang bergerak ke utara dan Lempeng Eurasia yang bergerak ke selatan mengakibatkan peningkatan zona seismisitas, bergesernya jalur tumbukan dan mengaktifkan gunungapi yang mempengaruhi pembentukan struktur regional, serta pembentukan cekungan sedimen. Indonesia memiliki 128 cekungan sedimen dimana 54 cekungan sudah dilakukan eksplorasi dan sisanya belum di eksplorasi salah satunya yaitu cekungan yang ada di Jawa Tengah bagian selatan. Penelitian ini difokuskan untuk mengetahui pola struktur dan konfigurasi bawah permukaan di cekungan Jawa Tengah bagian selatan menggunakan metode Gravitasi. Penelitian dilakukan di daerah Jawa Tengah bagian selatan meliputi daerah Kebumen, Karangsambung, Kulonprogo, Yogyakarta, dan Bayat dengan luasan 45 x 160 km^2 menggunakan data hasil digitasi peta Anomali Bouguer Lengkap. Proses digitasi dilakukan dengan cara menggambar kembali peta Anomali Bouguer Lengkap sehingga didapatkan data berupa koordinat X dan Y, serta nilai Anomali Bouguer Lengkap. Data Anomali Bouguer Lengkap dilakukan pemisahan anomali menggunakan *Bandpass filter* karena dapat meloloskan rentang frekuensi tertentu sesuai dengan kebutuhan. Kemudian untuk memperkuat batas anomali, dilakukan analisis *derivative* yaitu *Total Horizontal Derivative*, *Tilt Derivative*, dan *Second Vertical Derivative*. Selanjutnya dilakukan pemodelan 2,5 dimensi dengan data kedalaman berdasarkan perhitungan analisis spektrum. Berdasarkan hasil penelitian, didapatkan nilai Anomali Bouguer Lengkap pada daerah penelitian dengan rentang 389,0 mGal sampai 1232,3 mGal sedangkan nilai anomali regional sebesar -233,8 mGal sampai 217,1 mGal. Pada anomali regional diindikasikan terdapat adanya 9 sesar dengan arah relatif baratdaya-tenggara dan baratlaut-tenggara di daerah penelitian, hal tersebut juga didukung dengan respon yang muncul pada analisis *derivative*. Dari hasil pemodelan 2,5D didapatkan informasi bahwa terdapat tiga cekungan pada daerah penelitian yaitu cekungan di Wonosari-Bayat, cekungan di Yogyakarta, dan cekungan di Kebumen yang di alasi oleh batuan Pra-Tersier dan diisi oleh sedimen Tersier dengan masing-masing kedalaman 4,6 km, 5,5 km, dan 6 km.

Kata kunci   : Cekungan, Gravitasi, Jawa Tengah Selatan, Struktur

ABSTRACT

ANALYSIS OF GEOLOGICAL STRUCTURAL PATTERNS AND SUBSURFACE CONFIGURATIONS OF THE SOUTHERN PART OF THE CENTRAL JAVA BASIN BASED ON THE GRAVITY METHOD

Dina Nurvaningsih

115.190.022

Indonesia is located in the convergence area between the westward-moving Pacific Plate, northward-moving Indian-Australian Plate and southward-moving Eurasian Plate resulting high seismicity zone, shifting collision paths and active volcanic, which also affects the formation of regional structures, as well as the formation of sedimentary basins. Indonesia has 128 sedimentary basins, where 54 basins have been explored and vice versa for the others, actually one of the pure basin is located at Central Java. Then this research is focused on knowing the pattern of subsurface structure and configuration in the southern Central Java basin using the Gravity method. The research is conducted in the southern part of Central Java including Kebumen, Karangsambung, Kulonprogo, Yogyakarta, and Bayat with an area of 45 x 160 km^2 using data from the Complete Bouguer Anomaly map digitization. The digitization process is carried out by redrawing the Complete Bouguer Anomaly map to obtain data in the form of X and Y coordinates, and ABL values. Complete Anomaly Bouguer data is separated using a Bandpass filter because it can pass frequency ranges according to the needs. Then to strengthen the boundary of the anomaly, derivative analysis is carried out, namely Total Horizontal Derivative, Tilt Derivative, and Second Vertical Derivative. Furthermore, 2.5-dimensional modeling is carried out with depth data based on spectrum analysis calculations. Based on the results of the study, the Complete Bouguer Anomaly value in the research area is obtained in the range from 389.0 mGal to 1232.3 mGal while the regional anomaly value is between -233.8 and 217.1 mGal. The regional anomaly indicates the presence of 9 faults with a relative direction of southwest-southeast and northwest-southeast in the study area, this is also supported by the response that appears in the derivative analysis. From the results of 2.5D modeling, it is found that there are three basins in the research area, namely the Wonosari-Bayat basin, the Yogyakarta basin, and the Kebumen basin, which are underlain by Pre-Tertiary rocks and filled by Tertiary sediments with depths of 4.6 km, 5.5 km, and 6 km respectively.

Keywords   : Basin, Fault, Gravity, South Central Java, Structure