

ABSTRAK

STUDI IDENTIFIKASI STRUKTUR GEOLOGI BAWAH PERMUKAAN UNTUK MENGETAHUI SISTEM SESAR BERDASARKAN ANALISIS *FIRST HORIZONTAL DERIVATIVE (FHD), SECOND VERTICAL DERIVATIVE (SVD), 2,5D FORWARD MODELING* DI DAERAH MANOKWARI PAPUA BARAT

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Secara garis besar Manokwari memiliki struktur geologi yaitu berupa daerah lipatan yang terdapat di kawasan dataran tinggi pegunungan. Di antara lipatan tersebut terdapat sesar naik dan sesar turun. Di kawasan pantai atau laut banyak dijumpai batuan terumbu karang dan koral. Penelitian gravitasi telah dilakukan di daerah Manokwari Papua Barat dengan tujuan untuk mengetahui struktur geologi bawah permukaan berdasarkan analisis FHD (*First Horizontal Derivative*), SVD (*Second Vertical Derivative*) dan pemodelan 2,5D *Forward Modeling* pada peta anomali residual daerah penelitian. Hasil penelitian menunjukkan bahwa daerah penelitian memiliki nilai Anomali Bouguer antara 4 mGal sampai 96 mGal dengan anomali rendah pada bagian kiri daerah penelitian yang memanjang dengan arah relatif barat laut-tenggara, anomali bernilai sedang beradapada bagian tengah daerah penelitian yang tersebar di daerah barat-timur, sementara untuk anomali tinggi tersebar pada bagian utara daerah penelitian. Hasil pemodelan bawah permukaan 2,5D serta analisis SVD dan FHD menunjukkan adanya sesar naik (*Thrust Fault*) pada penampang C-C', pada penampang B-B' terdapat adanya intrusi batuan Diorit Lembai dengan nilai densitas sebesar 2,75 gr/cc, sedangkan untuk penampang A-A' yang memotong sesar Sorong tidak ditemukan adanya sesar maupun intrusi batuan berdasarkan data observasi gravitasi daerah penelitian tersebut.

Kata Kunci: *Gravitasi, Anomali Bouguer, Pemodelan 2,5D, SVD, FHD, Manokowari Area*

ABSTRACT

STUDY IDENTIFICATION OF THE SUBSURFACE GEOLOGICAL STRUCTURE TO KNOW THE FAULT SYSTEM BASED ON FIRST HORIZONTAL DERIVATIVE ANALYSIS (FHD), SECOND VERTICAL DERIVATIVE (SVD), 2.5D FORWARD MODELING IN WEST PAPUA MANOKWARI AREA

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In general, Manokwari has a geological structure that is in the form of a folding area found in the highlands of the mountains. Among the creases, there is a fault up and the fault down. In coastal or marine areas found many reefs and corals. The study of gravity was conducted in the Manokwari area of West Papua with the aim to know the subsurface geological structures based on FHD (First Horizontal Derivative), SVD (Second Vertical Derivative) and 2.5D Forward Modeling on the residual anomaly maps of the study area. The results showed that the research area has Bouguer Anomaly value ranged from 4 mGal to 96 mGal with the low anomaly at the left side of the research area lengthwise relatively in north-west to south-east direction, the middle-value anomaly spreads in the west-east area of research area, high anomaly scattered in the northern part of the research area. The results of the 2.5D subsurface modeling and the SVD and FHD analysis indicated the presence of a Thrust Fault on the C-C' cross-section, on the B-B' cross-section there is a Diorite Lembai intrusion with the density value is 2.75 gr/cc, whereas the A-A' cross-section which intersects with Sorong fault were not found any fault or rock intrusion based on observed gravity data of the research area.

Keywords: Gravity, Bouguer Anomaly, Modeling 2.5D, SVD, FHD, Manokwari Area