Identifikasi Patahan di Bawah Permukaan Yang Dapat Menyebabkan Gempa Berdasarkan Metode First Horizontal Derivative dan Second Vertical Derivative Di Kabupaten Penajam Paser Utara, Kalimantan Timur = Identification of Under-Surface Structur Which Can Cause Earthquakes Based on First Horizontal Derivative and Second Vertical Derivative Methods in Penajam Paser Utara District, East Kalimantan

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Abstrak

Pemindahan Ibu Kota Negara di Pulau Kalimantan, tepatnya di wilayah administratif Kabupaten Penajam Paser Utara, Kalimantan Timur sudah ditetapkan oleh Presiden Joko Widodo. Alasan pemindahan Ibu Kota negara disebabkan karena kecilnya risiko bencana alam, salah satunya bencana gempa bumi. Namun, berdasarkan catatan sejarah, Kalimantan Timur pernah terjadi gempa bumi dan terdapat Sesar Sangkulirang dan Sesar Paternoster yang masih aktif. Meskipun magnitudo yang dihasilkan tidak terlalu besar, gempa bumi mempunyai kedalaman dangkal sehingga bersifat merusak. Oleh karena itu, diperlukan penelitian untuk mengidentifikasi keberadaan dan jenis struktur yang terdapat di Pulau Kalimantan Timur, serta untuk mitigasi bencana gempa bumi. Penelitian ini bertujuan untuk mengetahui dan mengidentifikasi struktur bawah permukaan yang terdapat di Kalimantan Timur dengan menggunakan metode gravitasi. Pengolahan data dianalisis menggunakan metode First Horizontal Derivative (FHD) dan Second Vertical Derivative (SVD). Hasil analisis menunjukan bahwa sebaran anomali sebesar 6.4 mGal hingga 22.6 mGal. Hasil yang didapat bahwa daerah Penajam Paer Utara, Kalimantan Timur terdapat struktur yaitu, antiklin, sinklin, dan dugaan patahan naik maupun patahan normal. Menurut peta seismisitas dan peta bahaya gempa bumi BMKG bahwa wilayah penelitian memiliki potensi bahaya gempa bumi rendah, sehingga jika terjadi gempa bumi lokasi penelitian akan merasakan getaran gempa bumi. Maka dari itu, lokasi calon Ibu Kota negara dapat dikatakan berpotensi gempa bumi, namun magnitudo geteran yang dirasakan ringan dan tidak merusak.

.....The relocation of the capital city of the State on the island of Kalimantan, to be precise in the administrative area of North Penajam Paser Regency, East Kalimantan has been determined by President Joko Widodo. The reason for moving to the country's capital city is due to the small risk of natural disasters, one of which is an earthquake. However, based on historical records, an earthquake has occurred in East Kalimantan and the Sangkulirang and Paternoster Faults are still active. Even though the resulting magnitude is not too large, the earthquake has a shallow depth so that it is destructive. Therefore, research is needed to identify the existence and types of structures found on the island of East Kalimantan, as well as to mitigate earthquakes. This study aims to see and identify subsurface structures in East Kalimantan using the gravity method. Data processing was analyzed using the First Horizontal Derivative (FHD) and Second Vertical Derivative (SVD) methods. The results of the analysis show that the distribution of the Bouguer anomaly is 6.4 to 22.6 mGal. The results obtained are that the North Penajam Paser area, East Kalimantan has structures, namely, anticline, syncline, and suspected ascending and normal faults. According to the seismicity map and the BMKG earthquake hazard map, the research area has a low potential for earthquake hazard, so that if an earthquake occurs, the research location will feel earthquake vibrations. Therefore, the

location of the potential capital city of the country can be said to have the potential for an earthquake, but the magnitude of the tremor felt light and not damaging.