

## SARI

Potensi panas bumi merupakan salah satu potensi sumber energi yang sedang dikembangkan lebih lanjut sebagai efek dari keperluan pemenuhan energi dunia yang semakin tinggi dalam menunjang berbagai aspek dalam kehidupan. Prospek panas bumi Namora I Langit, yang berlokasi di Kecamatan Pahae Julu, Kabupaten Tapanuli Utara, Provinsi Sumatera Utara ini dipilih sebagai lokasi penelitian dikarenakan merupakan salah satu lokasi keterdapatan potensi panas bumi di Indonesia, baik berupa manifestasi permukaan maupun titik yang sudah dalam tahap produksi. Dalam penelitian potensi yang dilakukan, digunakan beberapa metode dan pertimbangan. Dimulai dengan pembuatan model geologi secara tiga dimensi (3D) berdasarkan data stratigrafi dan struktur geologi. Kemudian, dilakukan analisis struktur berupa densitas patahan dan *slip tendency* dari patahan. Selanjutnya juga digunakan data suhu permukaan bumi (*land surface temperature*) sebagai informasi tambahan.

Pada area penelitian lapangan panas bumi Namora-I-Langit, berdasarkan peringkat yang didapatkan melalui proses pembobotan/pemberian skor pada parameter-parameter tersebut, didapati bahwa area di sisi utara daerah penelitian memiliki potensi yang paling baik apabila akan dilakukan penelitian lanjutan untuk eksplorasi. Dengan nilai *slip tendency* rata-rata 0,5 (dalam skala 0 hingga 1) yang memungkinkan potensi reaktivasi patahan dalam rangka peningkatan permeabilitas batuan, nilai densitas struktur patahan yang cukup tinggi, dan keterdapatan anomali *land surface temperature* hingga  $>70^{\circ}\text{C}$ .

Kata kunci: Pemodelan geologi tiga dimensi, *slip tendency*, panas bumi, *land surface temperature*

## **ABSTRACT**

Geothermal is one of the potential sources of energy that is being further developed as an effect of the increasing need for world energy fulfillment in supporting various aspects of life. The geothermal prospect of Namora I Langit, which is located in Pahae Julu District, North Tapanuli Regency, North Sumatra Province, was chosen as the research location because it is one of the locations where geothermal potential is found in Indonesia, both in the form of surface manifestations and in the production stage. In this research, several methods and considerations were used. Starting with the creation of a three-dimensional (3D) geological model based on stratigraphic data and surface geological structures. Then, structural analysis was carried out in the form of fault density and slip tendency of the fault. Furthermore, land surface temperature is also used as additional information.

In the research area of the Namora-I-Langit geothermal field based on the ranking obtained through the process of weighting/scoring these parameters, it was found that the area on the north side of the research area has the best potential if further research is carried out for exploration. With an average slip tendency value of 0.5 (on a scale of 0 to 1) which allows the potential for fracture reactivation in order to increase rock permeability, the fracture structure density value is quite high, and the presence of land surface temperature anomalies up to  $>70^{\circ}\text{C}$ .

**Keywords:** Three-dimensional geomodelling, slip tendency, geothermal, land surface temperature