

## INTISARI

### ANALISIS DIMENSIONALITAS DAN *GEOELECTRICAL STRIKE* BERDASARKAN DATA MAGNETOTELLURIK DALAM PEMODELAN 2D SISTEM PANAS BUMI LAPANGAN “NAS”, PASAMAN, SUMATRA BARAT

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Model data MT dapat mengalami kerancuan jika dimensionalitas data berbeda dengan dimensi model, sehingga perlu analisis data MT untuk mengatasinya. Kondisi tersebut dapat diakibatkan kompleksitas struktur geologi bawah permukaan yang biasanya ditemui pada sistem panas bumi. Energi panas bumi sebagai energi terbarukan perlu dimanfaatkan, salah satunya pada sistem panas bumi pada lapangan “NAS” yang diduga memiliki potensi energi panas bumi. Untuk memanfaatkan energi ini, maka dilakukan kegiatan eksplorasi, yakni dengan metode magnetotellurik yang mengidentifikasi nilai resistivitas batuan dibawah permukaan berdasarkan respon medan elektromagnetik, sehingga sistem panas bumi dapat diidentifikasi dan diinterpretasi berdasarkan model resistivitasnya. Untuk mengurangi ambiguitas dari model yang akan diinterpretasi, diperlukan analisis dimensionalitas dan *geoelectrical strike*. Penelitian ini menggunakan analisis dimensionalitas *skewness* dan *polar diagram* untuk mengetahui karakteristik data MT dan analisis *geoelectrical strike* untuk menentukan *strike* dibawah permukaan sebagai acuan rotasi sehingga menghasilkan model yang minim ambiguitas. Hasil analisis menunjukkan dimensionalitas *skewness* dan *polar diagram* memiliki dominasi karakter data 1D-2D, dilihat dari nilai *skew*  $<0.3$  dan bentuk *polar diagram* yang dominan elips/oval. Analisis *geoelectrical strike* menunjukkan nilai rotasi masing-masing titik sebesar  $342.5^\circ$ ,  $332.5^\circ$ ,  $332.5^\circ$ ,  $325^\circ$ ,  $337.5^\circ$ , dan  $335^\circ$  dengan arah Barat Laut – Tenggara, mengindikasikan arah konduktivitas di lapangan “NAS”. Penampang 2D yang diinterpretasi adalah penampang rotasi hasil analisis *geoelectrical strike* karena RMS *error* paling rendah diantara penampang lainnya, diinterpretasikan batuan penudung dengan resistivitas  $4 - 9 \Omega.m$ , zona reservoir dengan resistivitas  $53 - 532 \Omega.m$ , batuan metamorf dengan resistivitas  $>532 \Omega.m$ , dan struktur sesar terlihat dari kontras resistivitas lateral.

**Kata Kunci:** dimensionalitas, *geoelectrical strike*, magnetotellurik, panas bumi, resistivitas

## ABSTRACT

### **DIMENSIONALITY AND GEOELECTRICAL STRIKE ANALYSIS BASED ON MAGNETOTELLURIC DATA IN 2D MODELING OF GEOTHERMAL SYSTEM THE "NAS" FIELD, PASAMAN, WEST SUMATRA**

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*MT data models can experience confusion if the dimensionality of the data is different from the dimensions of the model, so MT data analysis is needed to overcome this. This condition can be caused by the complexity of subsurface geological structures that are usually found in geothermal systems. Geothermal energy as renewable energy need to be utilized, one of which is in the "NAS" geothermal field which is suspected of having geothermal potential. To utilize this energy, exploration activities are carried out, magnetotelluric method that identifies the resistivity value of subsurface rocks based on the response of the electromagnetic field, so that the geothermal system can be identified and interpreted based on the resistivity model. To reduce the ambiguity of the model to be interpreted, dimensionality analysis and geoelectrical strike are needed. This research uses dimensionality skewness and polar diagram analysis to determine the characteristics of MT data and geoelectrical strike analysis to determine the strike below the surface as a reference for rotation so as to produce a model that has minimal ambiguity. The analysis results show that dimensionality skewness and polar diagrams have a dominance of 1D-2D data characters, seen from the skew value  $<0.3$  and the dominant elliptical / oval polar diagram shape. Geoelectrical strike analysis shows the rotation value of each point is  $342.5^\circ$ ,  $332.5^\circ$ ,  $332.5^\circ$ ,  $325^\circ$ ,  $337.5^\circ$ , and  $335^\circ$  with the direction of Northwest - Southeast, indicating the direction of conductivity in the "NAS" field. The 2D cross section interpreted is the rotational cross section of the geoelectrical strike analysis results because the RMS error is the lowest among other cross sections. interpreted host rock with a resistivity range from 4 to 9  $\Omega.m$ , reservoir zone with a resistivity range from 53 to 532  $\Omega.m$ , metamorphic rock with resistivity of more than 532  $\Omega.m$ , and fault structure seen from lateral resistivity contrast.*

**Keywords:** *dimensionality, geoelectrical strike, geothermal, magnetotelluric, resistivity*