

## INTISARI

### **Pemodelan Inversi 1D dan 2D Data Magnetotellurik: Sistem Patahan Paralana, Northern Flinders Ranges, Australia Selatan**

Oleh

FELLYCIA AUDRY RAHARJO SANTOSO  
19/442427/PA/19176

Sistem patahan Paralana merupakan patahan yang membatasi *Gawler Craton* dan *Curnamona province*. Geologi daerah ini tersusun atas struktur geosinklin dan sistem patahan, i.e. *reverse strike-slip* yang dikontrol oleh *compressional stress* berarah barat – timur. Batuan litologi terdiri atas batuan dasar kristalin granit yang di atasnya terendapkan metasedimen mengandung unsur radiogenik. Manifestasi, berupa mata air panas, ditemukan di sekitar patahan Paralana yang mengindikasikan terdapat jalur fluida dan reservoir di bawah permukaan.

Penelitian ini bertujuan untuk memetakan jalur fluida dan reservoir di sekitar patahan Paralana. Metode yang digunakan dalam penelitian ini adalah magnetotellurik (MT), untuk mengetahui resistivitas bawah permukaan yang berasosiasi dengan sistem panas bumi ini. Data MT, berupa *EDI-file*, dianalisis menggunakan metode impedansi, tensor fase, dan *tipper*. Data yang telah dilakukan *masking* kemudian dimodelkan menggunakan inversi 1D dan 2D MT.

Hasil inversi 1D dan 2D menunjukkan adanya perbedaan dikarenakan data MT berjenis 2D. Hasil inversi 2D menunjukkan zona konduktif ( $< 100 \text{ Ohm.m}$ ) yang berasosiasi dengan aliran fluida termal dari sumber dalam. Fluida diperkirakan mengalir di sepanjang sistem rekahan dan termanifestasi pada *Paralana Hot Springs*. Batuan dasar kristalin memberikan respon nilai resistivitas yang relatif lebih tinggi ( $> 1000 \text{ Ohm.m}$ ). Melalui hasil inversi 2D, maka dapat disimpulkan bahwa metode ini dapat digunakan untuk memetakan zona konduktif dalam.

**Kata kunci** : magnetotellurik; inversi 2D; fluida termal; patahan Paralana

## ABSTRACT

### ***1D and 2D Inversion Modelling of Magnetotelluric Data: Paralana Fault System, Northern Flinders Ranges, South Australia***

by

FELLYCIA AUDRY RAHARJO SANTOSO  
19/442427/PA/19176

The Paralana Fault System is a major fault that separates Gawler Craton and Curnamona Province. The geology of the study area consists of geosyncline structures and fault systems, i.e. reverse strike-slip fault that is controlled by compressional stress directed west to east. The lithological rocks consist of crystalline granitic basement overlain by metasediments containing radiogenic elements. Manifestations in the form of hot springs are found around the Paralana Fault, indicating the presence of fluid pathways and reservoir beneath the surface.

This study aims to map the fluid pathways and reservoirs. The method that being used in this research is Magnetotelluric (MT) surveying, which detects subsurface resistivity associated with geothermal system. The MT data, in the form of EDI files, were analyzed by using impedance, phase tensor, and tipper. The data then werer masked and modeled by using 1D and 2D inversion.

The results of the 1D and 2D inversion show differences due to the 2D nature of the MT data. The 2D inversion model indicates a conductive zone associated with thermal fluid flow from a deep source. The fluid is estimated to stream along the fracture system, and it is being manifested in the Paralana Hot Springs. The crystalline granitic basement rocks provide a relatively higher resistive response. Through the results of the 2D inversion, it can be concluded that this method can be used to map conductive zones in the subsurface.

**Keywords :** magnetotelluric; 2D inversion; hydrothermal; Paralana fault