ABSTRACT

The Semurup area, located in Kerinci Regency, Jambi Province, is a high-temperature geothermal prospect in Sumatra that is inferred to be controlled by active fault segments associated with the Great Sumatran Fault. This study aims to analyze and identify subsurface structures related to the Semurup geothermal system using the gravity method. The gravity data employed are secondary satellite gravity data from the Global Gravity Model Plus (GGMPlus). The data were processed through gravity corrections, including the Bouguer correction and terrain correction. The average rock density was estimated using the Parasnis method, yielding a value of 2.3758 g/cm³. The Complete Bouguer Anomaly (CBA) was then separated into regional and residual components using the upward continuation method at an elevation of 8000 m. Based on the residual anomaly, 2D subsurface inversion modeling was carried out along three profiles selected according to the distribution of hot spring manifestations. The 2D modeling was performed using ZondGM2D software. The results indicate low-density anomalies with Δρ of approximately -0.087 to -0.03 g/cm³, interpreted as permeable rocks, alluvium, and altered rocks, while high-density anomalies with Δρ of approximately -0.01 to 0.094 g/cm³ are associated with volcanic products of the Barisan Range. The transition zone between high and low anomalies from this modeling result is suspected to be a fault segment acting as a vertical upwelling pathway for hydrothermal fluids to rise to the surface and the basin/lithology boundary. The results of this study indicate that fault structures play an important role in controlling the Semurup geothermal system, specifically is categorized as a tectonic geothermal system.

***Keywords**: gravity, semurup, ggmplus, geothermal, residual, inversion modeling, density, fault.*