ABSTRACT

This research aims to identify subsurface geological structures in the Patuk Banteng Peak area based on rock density values using GGMplus satellite gravity data. The data used include Free Air Anomaly (FAA), elevation, latitude, and longitude. Data processing was carried out through the determination of average rock density using the Parasnis method, calculation of Complete Bouguer Anomaly (CBA) through Bouguer and terrain corrections, Radially Averaged Power Spectrum (RAPS) spectral analysis to determine anomaly source depths and cut-off filter values, separation of regional and residual anomalies using a Butterworth filter, First Horizontal Derivative (FHD) and Second Vertical Derivative (SVD) analyses to identify geological structures, and 2D inversion modeling to obtain subsurface density distribution. The results show an average rock density of 2.6882 g/cm³, with Complete Bouguer Anomaly (CBA) values ranging from 60.8 to 87.0 mGal. Spectral analysis indicates a regional anomaly depth of 5.90 km and a residual anomaly depth of 1.66 km. FHD and SVD analyses reveal several lineaments interpreted as fault structures. The 2D inversion modeling results along the A-A', B-B', C-C', D-D', and E-E' profiles show rock density variations ranging from 1.49 to 2.96 g/cm³, which are interpreted as volcanic rocks with different degrees of compaction. The identified subsurface geological structures in the study area consist of faults, lithological boundaries, and subsurface basins.

Keywords: *GGMplus, gravity, subsurface structure, rock density, 2D inversion.*