

ABSTRACT

The Bogor area and its surroundings are characterized by relatively complex geological conditions, which developed as a result of the influence of tectonic activity. This process triggered the formation of various subsurface geological structures, including faults and fracture zones. This research aims to map the subsurface geological structure in the Bogor area and its surroundings using magnetic and gravity methods based on satellite data from EMAG2v3 and GGMPPlus. The data processing stages include correction processes and the separation of regional and residual anomalies. Qualitative analysis of subsurface structures was performed using the First Horizontal Derivative (FHD) and Second Vertical Derivative (SVD) methods to emphasize the boundaries of rock physical property contrasts. Meanwhile, quantitative analysis was conducted thru 2D inversion modelling of regional magnetic and gravity data to obtain the distribution of magnetic susceptibility and subsurface rock density values. The research results indicate the presence of susceptibility and density value contrasts that correlate with high FHD values and the intersection of SVD zero values. Line 1 indicates the presence of a fault geological structure at coordinate 655000, line 2 indicates the presence of a fault geological structure at coordinate 9252500, 9262450, and 9275650, line 3 indicates the presence of a fault geological structure at coordinate 655150 and 676750, line 4 indicates the presence of a fault geological structure at coordinate 9252600 and 9271000, and an anticline at coordinate 9280600. This pattern is interpreted as an indication of the presence of subsurface geological structures in the form of faults and fracture zones related to the regional geological conditions of the study area. Overall, the results of this study are expected to provide initial information regarding the characteristics of the subsurface structure of the Bogor area and its surroundings as a basis for further research.

Keywords: *magnetic method, gravity method, qualitative analysis, quantitative analysis, 2D inversion modeling, subsurface geological structure.*