

ABSTRACT

Brebes Regency is characterized by geological complexity, comprising various rock formations and the presence of potentially active faults. This research aims to identify the subsurface conditions of Brebes Regency using the gravity method based on satellite data from the GGMPlus model. This method is applied to determine the distribution of rock density and to detect geological structures such as lithologies and faults. Gravity anomaly data were processed into Complete Bouguer Anomaly (CBA) and analyzed using First Horizontal Derivative (FHD), Second Vertical Derivative (SVD), and 2D modeling to provide a more detailed understanding of the subsurface structures. The analysis shows that rock density values range from 2.2 to 3.05 g/cm³, with an average of 2.34 g/cm³. Low anomalies are generally associated with sandstone and clay lithologies, while high anomalies correlate with andesitic and basaltic lithologies. SVD and FHD analyses identified several zones interpreted as lithological boundaries or fault structures. The 2D models along five profiles reveal the presence of several normal and reverse faults distributed across various formations, particularly in the Kumbang, Halang, and Pemali Formations. The identified faults are predominantly oriented in the northwest–southeast and southwest–northeast directions. The results of this research are expected to contribute to a better understanding of the subsurface geology of Brebes Regency and serve as a foundation for disaster mitigation and geological resource exploration.

Keywords: *gravity method, GGMPlus, FHD, SVD, fault, Brebes Regency.*