

ABSTRACT

Surakarta and its surrounding areas are characterized by complex geological and lithological conditions, making subsurface investigations essential for understanding the geological structures that control the regional setting. This study aims to interpret gravity anomalies qualitatively using the Complete Bouguer Anomaly (CBA) map and quantitatively through 2D inversion modeling. The data used in this research consist of gravity anomaly data, elevation data, and regional geological information of the Surakarta area. The gravity data were processed through Bouguer and terrain corrections to obtain the CBA values, followed by qualitative interpretation of anomaly patterns. Quantitative analysis was then carried out using 2D inversion modeling in ZondGM2D to estimate the subsurface density contrast relative to the average density of 2.67 g/cm³. The CBA map shows anomaly values ranging from -4.30 mGal to +3.41 mGal, with a circular pattern marked by low anomalies in the central part of the study area and higher anomalies toward the margins. The low-anomaly zone is interpreted as alluvial deposits, unconsolidated sediments, and weathered volcanic materials, whereas the high-anomaly zone is associated with denser and more compact rocks, including the kabuh formation, notopuro formation, and undifferentiated volcanic rocks. The 2D inversion results indicate density contrasts ranging from -0.037 to +0.020 g/cm³, with low-density zones dominating the central part and extending to depth. These results suggest the presence of a local sedimentary basin in Surakarta bounded by denser rocks, providing important subsurface information for regional development and infrastructure planning.

Keywords: Complete Bouguer Anomaly, 2D inversion, gravity, Surakarta, ZondGM2D.