

ABSTRACT

This study was conducted in the Ngliman Mountain Range area, Nganjuk Regency and its surroundings, East Java, using satellite gravity data from the Global Gravity Model Plus (GGMplus). The study aims to identify patterns of residual gravity anomalies and delineate the position and orientation of subsurface geological structures using First Horizontal Derivative (FHD) and Second Vertical Derivative (SVD) analyses, as well as to reconstruct a subsurface structural model in the form of a two-dimensional cross-section based on rock density distribution and basement depth using the ZondGM2D software. Data processing involved gravity correction to obtain the Total Bouguer Anomaly (TBA), Radially Average Power Spectrum (RAPS) analysis, separation of regional and residual anomalies using Trend Surface Analysis, FHD and SVD analysis, and two-dimensional inversion modeling. The results of the study indicate that the subsurface geological structure has a dominant Northwest-Southeast (NW-SE) orientation, as evidenced by the linear patterns of the anomalies and density contrasts. Two-dimensional inversion modeling along four transects yielded rock density distributions ranging from 1,010 to 3,110 kg/m³, interpreted as sedimentary material, weathered volcanic rock, more compact volcanic rock, and volcanic basement rock. The presence of fault structures and variations in rock density indicate that the subsurface geological conditions of the study area are influenced by tectonic activity that controls the distribution of lithologies in the Ngliman.

Keywords: *Ngliman Mountain Area, GGMplus, FHD, SVD, 2D inversion.*