ABSTRACT

This study aims to identify the subsurface geological structure and analyze the distribution of land surface temperature in the Maronge geothermal area, Sumbawa, West Nusa Tenggara. The methods used include the integration of gravity data from Global Gravity Model Plus (GGMPlus) and Land Surface Temperature (LST) from Landsat-8 satellite imagery for the 2023 and 2024 periods. Gravity data processing involved terrain correction, Bouguer correction with an estimated average density of 2.8384 g/cm³, regional-residual anomaly separation using upward continuation, and 2D inversion modeling using ZondGM2D software. LST analysis was conducted through the Single-Channel algorithm with emissivity correction based on the Normalized Difference Vegetation Index (NDVI) to map surface thermal anomalies. The results indicate that the subsurface structure of the Maronge area is dominated by high-density igneous rocks such as diorite and basalt (2.88 – 2.96 g/cm³) acting as heat sources. A low-density anomaly zone (2.74 – 2.82 g/cm³) was found cutting vertically beneath the Maronge hot springs manifestation, indicating the presence of fault structures or fracture zones as pathways for geothermal fluid circulation to the surface. Land surface temperature distribution showed significant thermal anomalies around the manifestation point, with the highest temperature reaching 37.79°C in 2024. These high temperatures spatially correlate with low NDVI values between 0.26 and 0.5, indicating that open land areas have higher surface temperatures than densely vegetated areas. Overall, the integration of both methods successfully identified the geothermal prospect zone controlled by geological structures in the study area.

Keywords *: Maronge, Gravity, Land Surface Temperature, Density, Geological Structure.*