

ABSTRACT

This study aims to identify subsurface characteristics interpreted as potential zones of geothermal fluid migration at Umbul Banyu Roso, Tempuran District, Magelang Regency, using the Horizontal to Vertical Spectral Ratio (HVSR) method based on microtremor data. The analyzed parameters include shear wave velocity (V_s), V_p/V_s ratio, and Poisson's ratio (ν) as elastic responses of the medium that are sensitive to rock stiffness, fracture intensity, and fluid saturation conditions. The V_s values range from 348.7–1766.12 m/s at depths of 69.55–359.19 m, increasing to 753.77–3167.45 m/s within the manifestation zone, indicating relatively rigid and compact materials at greater depths. Variations in the V_p/V_s ratio (1.55–4.87) and ν (0.19–0.47) indicate elastic heterogeneity of the subsurface, which is interpreted to be associated with the presence of shallow fracture zones that potentially act as preferential pathways for hydrothermal fluid discharge. The spatial distribution patterns of elastic parameters suggest a geothermal system development trend from northwest to southeast, with meteoric fluid recharge zones within permeable volcanic lithologies and discharge zones marked by the Umbul Banyu Roso manifestations.

Keywords: *Geothermal, Tempuran, HVSR, Microtremor, V_s , V_p/V_s , Poisson's Ratio.*