ABSTRACT

This study aims to identify the subsurface structure of the Kalianget Sempor hot spring area in Kebumen Regency and determine the flow path of groundwater and hot fluids based on the distribution of resistivity values. The method used is the Wenner 2D resistivity geophysical method with secondary data from the National Research and Innovation Agency (BRIN). Current and potential difference data were processed using Microsoft Excel to calculate geometric factors and resistivity, then processed using RES2DINV software to produce two-dimensional resistivity cross-sections. The modeling results show that the subsurface lithology of tracks A and B consists of clay, tuff, sandstone, volcanic breccia, and solid volcanic rock (andesite) representing the Waturanda Formation and Penosogan Formation. Resistivity values range from 18 to >13,000 Ω· m with four main zones, namely a low-conductivity zone interpreted as a water-saturated clay layer or the result of hydrothermal alteration, a medium zone associated with weathered volcanic breccia and clayey sand, and a high to very high resistivity zone indicating fresh andesite or strongly cemented breccia. Two main aquifer zones were identified at depths of 10 - 25 meters and 10 - 20 meters, functioning as hot fluid circulation pathways. The vertical resistivity pattern indicates the presence of active fractures or faults that serve as pathways for hydrothermal fluids. Based on these results, the geothermal system in Sempor is categorized as a non-volcanic geothermal system of the fault type consistent with the Quaternary period, with the possibility of heat influence from ancient intrusions.

Keywords*: resistivity, Wenner 2D, geoelectric, hydrothermal, Sempor*