

Analysis of structural imaging based on resistivity distribution in Kelud Volcano using the 2-D Magnetotelluric approach

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SUMMARY

Indonesia is geographically inside the Ring of Fire. Due to a volcanic ring that encircles the Pacific, Indonesia is consequently susceptible to disasters like earthquakes, volcanoes, and others natural disasters. Because the area is situated in the Pacific's tectonic and volcanic zone. The islands of Sumatra, Java, and Sulawesi in Indonesia are home to active volcanoes with the greatest levels of volcanic activity in the circumbelt. Kelud Volcano, situated in Kediri, East Java, Indonesia, is an active stratovolcano. A lava dome formed in the crater lake as a result of the 2007 eruption of the Kelud volcano. We call this phenomenon effusive. This study predicts the subsurface resistivity distribution in the Kelud volcano area using the magnetotelluric technique. In order to visualize the regional structure of the volcano, magnetotelluric measurements were developed using a grid system consisting of 10 sites with interval stations spaced roughly 250 meters apart, spanning the summit area. Additionally, a long profile was used to cross the summit area. Using the Phoenix MTU-5 system, five components of the electric and magnetic fields were recorded, delivering a frequency range of 320 Hz to 1 Hz. The subsurface resistivity close to Kelud volcano ranges from 1 to 100 ohm, according to the MT data obtained from 2D inversion. At a depth of 1000 meters below the surface, in the western area of the summit, the major structure of the hydrothermal system's clay cap was discovered, with resistivity values ranging from 1 to 10 meters. In the central region of the summit area, a high resistivity which forms a conduit is visible, with a resistivity of more than 100 ohm.m. These structures are volcanic, according to the subsurface structural values that have been identified.

Keywords: Kelud Volcano, Magnetotelluric, Resistivity, structural imaging, inversion modelling
