

## Subsurface Structure Analysis of Papandayan Volcano, Indonesia, using Two Dimensional Magnetotelluric Method

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### SUMMARY

Magnetotelluric is a passive geophysical exploration technique that utilizes natural electromagnetic waves sources from the environment to ascertain variations in the subsurface magnetic field and electric field. The two-dimensional magnetotelluric method is utilized to acquire data on the distribution of resistivity and phase in order to analyze subsurface structures of Papandayan Volcano located in West Java, Indonesia. Papandayan Volcano is a stratovolcano known for its historical eruptions and potential volcanic hazards. The eruption of Papandayan Volcano in 2002 resulted in significant changes to the geological structure of its surrounding area. This event led to the formation of lava domes, ash domes, and lava terraces, which affected the topography and geological composition of the region. Magnetotelluric measurements were conducted utilizing a grid system comprising 17 stations spaced approximately 250 meters apart, covering the summit area, along with a longitudinal profile traversing the summit region to capture the regional structure of the volcano. The frequency range from 320Hz to 1Hz was acquired by recording five components of the electric and magnetic fields using the Phoenix MTU-5 system. The results obtained from 2D inversion of the MT data indicate the presence of a resistive zone in the deep structure, forming a circular pattern at the center of the model, which aligns with the location of the new craters. The comparison of low total magnetic field readings also suggests a correlation with the circular-shaped resistive zone, likely associated with high temperatures concentrated in the central area of the region.

**Keywords:** Magnetotelluric, Papandayan volcano, Phase, Resistivity, Subsurface structure

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