Geology structural identification through 3D Resistivity Inversion of Magnetotelluric (MT) data in the Tatun Volcano Group, Northern Taiwan

Presenter: Nguyen, Thi Lan Chi

Advisor: Huang, Wen-Jeng

Co-Advisor: Chen, Chien-Chih

Date: 2023/11/24

Abstract

The electrical conductivity of the subsurface is known to be a crucial parameter for the characterization of geothermal settings. Geothermal systems, composed of a network of faults and/or fractures filled with conducting geothermal fluids and altered rocks, are ideal targets for Magnetotelluric (MT) methods, which have become the industry standard for exploring geothermal systems. This presentation discusses the application of the state-of-theart geology structural and geothermal exploration using MT methods in the Tatun Volcano Group (TVG) in Northern Taiwan. The geophysical data set consists of 49 MT measurement stations (including 2 data sources: the ITRI data set and the Computational Geophysical Research Group data set) to obtain a 3D resistivity model. Resistivity cross-section and resistivity maps at different elevations were compiled. The purpose of the 3D resistivity model was to image anomalies that could help to understand the conceptual model for the future expansion of the actual production field. The 3D resistivity model identifies three potential geothermal areas based on low-resistivity clay cap underlain by a high-resistivity core. The heat source with high resistivity is located 5km beneath the southwest of the TVG area. Compared to previous research, our study improved the 3D resistivity model in estimating the Kan-chiao and Shan-chiao fault zones. These findings serve as valuable guides for future geothermal exploration and development efforts in this region.

Keywords: Geothermal geological exploration, Magnetotelluric (MT), Resistivity model, Tatun Volcano Group (TVG)