

Geothermal Resource Evaluation of the Tatun Volcano Group (TVG) Area, Northern Taiwan, inferred from multi-geophysical methods

Presenter: Nguyen, Thi Lan Chi

Advisor: Prof. Huang, Wen-Jeng

Co-Advisor: Prof. Chen, Chien-Chih

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Abstract

The Tatun geothermal system in northern Taiwan is hosted by the Plio-Pleistocene Tatun Volcano Group (TVG), consisting dominantly of andesitic lavas, domes, and pyroclastic flows. The TVG is typically a multi-vent volcano group covering an area of approximately 400 km² on the northern tip of Taiwan. The TVG is composed of more than 20 young volcanoes, enclosed by NE-SW trending faults such as the Kan-Chiao thrust fault in the South East and the currently active Shan-Chiao normal fault in the North West. The TVG is seen as a promising target for geothermal exploration due to its abundance of surface thermal manifestations associated with young volcanic rocks. The presentation on the topic incorporates magnetic survey data in conjunction with borehole data to conduct exploration. The aim of a magnetic survey is to investigate subsurface geology on the basis of the anomalies in the earth's magnetic field, resulting from the magnetic properties of the underlying rocks. From the aero-magnetic maps, several of the anomalies can often be correlated with surface expressions of volcanism and magma chambers. From these maps, most of the volcanic centers and magma chambers tend to lie in areas with magnetic highs (positives). From the borehole data and magnetic results, two cross-sections were corrected from the Industrial Technology Research Institute (ITRI) cross-sections. The preliminary results show that NE-SW trending faults define the major trend of recent volcanic activity and the extent of the geothermal system, and the Kan-Chiao Fault is the boundary of TVG in the South-East. Furthermore, the Magnetotelluric method will be applied to do the geothermal exploration using the electrical conductivity of the subsurface material.

Keywords: Tatun Volcano Group (TVG), geothermal system, volcano, magnetic survey, geothermal exploration