

The Geothermal Heat Source of Ilan Area, Northeast Taiwan

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ABSTRACT

The Ilan Plain, Taiwan is located at the southwest-most part of Okinawu trough which is a back arc basin spreading due to the Philippine Sea plate subducted into the Asian continent margin. There are many hot springs occurred in and around the Plain indicate that it has high geothermal gradient underneath this area. Recent measurements on the heat flows using direct borehole and geothermometry methods also show the same results. The Ilan area, therefore, has the most potential geothermal energy in Taiwan, and has been assigned as the major national energy program by NSC on exploring and developing geothermal power in the future. Why does the Ilan have so high geothermal gradient? Based on the profiles of magnetotellurics (MT) to the depth 10 km, it shows the thermal reservoir underneath the Plain can be reached over 10 km deep. Meanwhile, the seismic tomographic images also infer that the thermal fluids can be traced up to very deep which may come from the subducted Philippine Sea plate. This result is the same as Lin et al., (2004) proposed. Geochemical data including helium, carbon and sulfur isotopic ratio of gases and precipitated minerals phases of hot springs also support the mantle origin of thermal fluids in the Ilan area. Yu and Tsai (1979) and Tong et al., (2008) have proposed that a dike intruded underneath the Plain in terms of geomagnetic anomalies. This study, thus, combines the data got from our researches and previous results to propose that the high heat flow in the Ilan area is due to the magma generated from the subducted Philippine Sea plate, and intruded underneath the Plain.

References:

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