

Electrical structure of Taiwan and its tectonic implications

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Taiwan is located on the convergent boundary between the Eurasian plate on the west and the Philippine Sea plate on the east. Knowledge of this complex and tectonically active region has increased substantially during the past decade with the tool of seismicity and the tomographic imaging. However, little was known about the deep electrical structures beneath Taiwan until magnetotellurics (MT) were conducted.

The recent MT results show the existence of a distinct low resistivity zone (less than 160 ohm-m) in the uppercrust with depths ranging about 10-40 km and northward dipping near latitude of 24°N beneath Taiwan. This finding is the feature that evidence the Philippine Sea plate subduction northward beneath Taiwan. Based on the temperature estimate, the main cause of this low resistivity zone is the most probably the fluids released from dehydration reactions. Therefore, the present MT observation seems to support the so-called thin-skinned mountain-building model that, within the depth of about 20 km, the thin-skinned deformation style prevail in the Western Foothills as the results of the recent Taiwan Orogeny, while beyond that depth there exists as independent structural zone probably with a densely interconnected fluid phase.