

Crustal Resistivity Anomalies Beneath Central Taiwan Imaged by a Broadband Magnetotelluric Transect

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(Manuscript received 15 June 2006, in final form 30 October 2006)

ABSTRACT

The Taiwan orogeny is young and presently very active. To improve understanding of the tectonics of Taiwan, especially the present of fluid of interconnected fluids such as water and partial melts in the Earth's crust, a transect across the central island of Taiwan by using broadband magnetotelluric (MT) soundings was made from 1995 - 2006. More than 80 MT stations were surveyed around this transect and a profile almost perpendicular to the regional strike of Taiwan was obtained. A 2-D constrained inversion was implemented and included static shift, topography and the ocean effect. This resistivity model is characterized by three main conductive anomalies located beneath the Coastal Plains, Central Range and Longitudinal Valley. Correlation of the conductors to the seismicity, the heat flow and surface geology of Taiwan suggest that the Coastal Plain conductor represents fluids, the Central Range conductor reflects both fluids and the effect of enhanced temperature, and the Longitudinal Valley conductor depicts the suture zone of the plates' boundary, respectively. These low resistivity zones could represent zones of reduced viscosity that may control the deformation of this active orogen. The GPS observations of a general motion in Taiwan area support this tectonic implication.

(Key words: Magnetotelluric method, Crustal electrical conductor, Crustal fluid, Taiwan orogeny, Constrained inversion)

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