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# Resistivity Structures of the Chelungpu Fault in the Taichung Area, Taiwan

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## ABSTRACT

**We conducted magnetotelluric prospecting in the Taichung area to investigate subsurface resistivity structures of the Chelungpu fault and the resistivity of rock formations. The results indicate that the Chelungpu fault is a complex fault system consisting of two major fault zones, several fracture zones, and back thrust. The two major fault zones, the basal and the Chi-Chi fault zone are about 800 m apart on the ground and converge to a narrow band at a depth of 3000 m. The fault zones are not smooth, composed of ramps and platforms with an average eastward dipping angle of 35° - 37° within the depth of 3000 m. In the shallower region, the basal fault zone has developed along the boundary of the Toukoshan Formation (resistivity: 200 - 400 $\Omega-m$) at the footwall and the Neogene formations on the hanging wall, where the Cholan Formation, the Chinshiu Shale, and the Kueichulai Formation have respective resistivity mainly in the ranges: 40 - 100, 8 - 60, and 50 - 150 $\Omega-m$. While the Chi-Chi fault zone has developed along the weak layers of the Cholan Formation where resistivity is lower than the unsheared block.**

**At the TCDP site, the use of MT soundings, prior to TCDP drilling, predicted the position of the Chi-Chi fault zone to be at a depth between 1100 m and 1250 m. Drilling subsequently confirmed this result, indicating MT sounding to be a reliable approach in revealing subsurface structures.**

**(Key words: Resistivity structures, Magnetotellurics, Chelungpu fault)**

## 1. INTRODUCTION

The reactivation of the Chelungpu fault in Central Taiwan in 1999 resulted in the disastrous Chi-Chi earthquake. A 2-km deep drilling project (Taiwan Chelungpu Drilling Project,

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