GPR Studies of Wushantou Trenches in Understanding of Near Surface Response of the Liujia Fault Zone in SW Taiwan.

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ABSTRACT

We conducted the Ground Penetrating Radar (GPR) surveys on two Trenches located along the Liujia fault zone in the southwestern Taiwan. We used 500 MHz and 250 MHz antennas, respectively, to collect the measurements from two trenches. The antennas are arranged with inline orientation with common-offset GPR configuration along the survey lines. In total we conducted 8 survey lines in trench #1 and 6 lines in trench #2 with their lengths ranging from 14.5-61 m. The estimated penetration depth of 500 MHz scans is about 2.5m, and those of 250 MHz are about 4.5m. The results of the parallel GPR reflection images are consistent with the trench outcrops. The young Tainan formation composed of mainly fine sand and mud sediments were uplifted and tilted on the hanging wall of the Liujia Fault. From the radargram, we confirmed that the Tainan formation on the hanging wall is dipping toward the west with an angle from 15-35 degree. In addition, we also discovered some small river channels with a transverse diameter of about 1.5-3m that incised into the horizontal-layered fluvial formation consisted of sand and gravels on the foot wall. Parabolic responses were found due to the reflection of the large pebbles deposited on the footwall, in general, Ground Penetrating Radar is a powerful method for studying the near surface structures and their geometries of along the fault deformation zones.

Keywords: Ground Penetrating Radar, Wushantou Trenches, Signal Response.