Outline of Fluid Injection Test using two drill-holes penetrating Chelungpu-fault

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Abstract

The two research boreholes penetrating across Chelungpu Fault in Da-Keng, are utilized for Fluid Injection Test (FIT), in order to understand hydrological properties and recovering process of the strength of the active fault zone. A branched borehole C (Hole C, drilled from Hole B in 2005) and Hole A, approximately 40 m apart to each other, were perforated at the depth of the fault zone. The depth of perforation is 1111 m in Hole A and 1138 m in Hole C. Stainless and Tygon® tubes with 6 mm diameter were installed with 7 levels seismometers in Hole A on June 2006. The crack/slip propagations with fluid migration and hydrological properties concerned with fluid migration were main targets to be solved by this project. The long-line tubes were set directly on the fault zone in order to collect flowed-through fluid directly from the fault at 1111 m. The flow rate of water through the stainless tube is 50 - 100 mL/min, which was enough for monitoring the water. Under the flow condition, approximate 3 - 5 hours are taken to come the water up from the fault to the ground surface. Fluid Injection Test (FIT) was performed three times from November 2006 to March 2007. Former two injections were conducted to check connectivity of two boreholes and measure the chemistry of the water throughout the fault zone. Final injection was performed in middle March 2007, in order to measure pressure transfer of the fluid along the fault zone. Water was injected from Hole C at constant pressure (4 MPa on November 2006 and January 2007, 3 and 5 MPa on March 2007). The arrival of injected water was monitored by seismometers, manometers, a Quadrupole Mass Spectrometry and chemical sensors at Hole A. Collected water through the tubes contained gas, which was separated from water in a column and then monitored by a Quadrupole Mass Spectrometry. Gas-free water was collected into a cylinder with chemical sensors to monitor pH, conductivity, turbidity, Oxidation Reduction Potential (ORP), Dissolved Oxygen (DO), salinity and temperature. Outline of these results will be presented in this presentation.