

# **Seasonal variation of surface creeping and pore water pressure distributed in Chihshang fault zone near Chinyuan**

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## **Abstract**

The Chihshang thrust fault is one of the most active segments of the Longitudinal Valley fault (LVF) situated along the plate suture zone between the Philippine Sea plate and the Eurasian plate in eastern Taiwan. During the past two decades, different monitoring efforts have been undertaken across the Chihshang fault at different spatial/temporal scales. Among others, creep meters installed in Chinyuan area showed a seasonal variation, with the fault moving rapidly during the rainy season from April to October (particularly in the beginning months of the wet season), and remaining quiescent during the rest of the year. This seasonal, precipitation-induced variation of creep behavior is a fundamental phenomenon that this study intends to give insights on. In this study, three boreholes penetrating through fault zone of the Chihshang fault were drilled near Chinyuan. Based on core analyses, the structure of the Chihshang fault zone at the shallow level, including geometry of the fault, stratigraphy across the fault, shear structure of the fault zone was characterized. In addition, the pore pressure in the fault zone was monitored by eight Casagrande type piezometers installed in the three boreholes. Continuous decline of pore water pressure during dry season, as expected, in all of the installed piezometers was observed. Interestingly, the monitored pore water pressure in Chihshang fault zone reveal that impermeable bands do exist between hangingwall and footwall of Chihshang fault. Accordingly, the hydro-geological conceptual model was proposed to accounts for the seasonal variation of creep phenomenon of Chihshang fault. We pay particular attention to analysis the relation between rainfall, pore pressure distributed in the fault zone and fault creep. Seasonal variation of surface creep indicates a close relation between the fault surface creep and hydro-geological characteristics.