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Preliminary Analysis on Multi-Devices Monitoring of Potential Deep-Seated Landslide in Xinzhuang, Southern Taiwan

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In-situ monitoring of slope is crucial for recognizing and recording the occurrence of landslide. Figuring out the correlation between monitoring data and hillslope displacement would help early warning for landslide-induced disasters. Xinzhuang potential deep-seated landslide area has been identified by Taiwan executive authority where is located in Kaohsiung City, southern Taiwan, it covers a 10.3 hectares' area and 20 buildings with an average slope of 22.8 degrees. The lithology of the upper slope is sand-shale interbedded with highly sand contented, which differs from lower slope in shale with mud contented.

For conducting early warning and comprehending displacement of landslide in this study, the monitoring of ground displacement was carried out using the tiltmeter and the GNSS RTK (Real Time Kinematic), and the hydrology data (rainfall and ground water level) were recorded every 10 minutes by automatic gauges. Furthermore, we executed manual borehole inclinometer measurement to obtain the possible sliding position of subsurface.

This study has been conducted for two years, the results shows that (1) The local shallow creep (4-5 meters underground) in the central deep-seated landslide area was recorded by the tiltmeter, GNSS and borehole inclinometer measurement. (2) The groundwater level is the significant factor for displacements of creep in this site. (3) The velocity of the displacement would be accelerated when the groundwater level was higher than 2.1 meters. (4) The 6-hours displacement has a highly correlation with accumulative rainfall and ground water level. Moreover, the results have been applied to the landslide early-warning system of Taiwan authority.