

## Shallow slow-slip event detected by leveling survey at the central part of the Longitudinal Valley fault, eastern Taiwan

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Precise leveling survey was conducted across the central part of the Longitudinal valley fault, eastern Taiwan to discuss the detail deformation of the transition zone between the fault creeping area and asperity area. In order to focus on the relationship between the fault creeping area and rich melange distribution in the transition zone, we have established three leveling routes at the Yuli, Chike-san and Reishuei areas. The Yuli route is just located in the northern end of the rich melange distribution, but both Chike-san and Reishuei routes were established in the area where no rich melange exists. In the Yuli route, an uplift rate of about 30 mm/year has been detected from 2010 to 2012, suggesting the aseismic fault creep might be continuing with long-term. In the Chike-san route, the vertical deformation rate of about 8 mm/year was detected in the period from 2010 to 2011. However, there was the huge deformation with uplift rate of about 40 mm/year detected in the period from 2011 to 2012. In the Reishuei route, we detected the deformation of about 8 mm/year in the period from 2011 to 2012.

As explanations for the huge change of the deformation rate in the Chike-san route, we believe that the detected deformation has been resulted from a slow-slip event. Also since the significant deformations were not detected in leveling and GPS around Chike-san route, the slow slip event was localized to a small region just around the Chike-san route. Such a slow slip event might be triggered by the M 5.3 earthquake on June 14, 2012 because the number of micro-earthquakes in the Chike-san area rapidly increased after the M 5.3 earthquake.

We propose that the northern limit of the stable creeping area may be in the Yuli area and the slow slip event occurs in the transition zone between the fault creeping area and asperity area. The boundary between the creeping area and the slow slip area is basically consistent with the northern limit of the rich melange distribution.

Keywords: Taiwan, Longitudinal Valley fault, slow-slip, Precise leveling, fault creep, rich melange