

# A preliminary report on the large aseismic creep detected by precise leveling survey at the central part of the Longitudinal valley fault, Southeast Taiwan (2008-2012)

Masayuki Murase\*<sup>1</sup>, Nobuhisa Motta<sup>2</sup>, Cheng-Hong Lin<sup>3</sup>, Wen-Shan Chen<sup>4</sup>, and Naoji Koizumi<sup>5</sup>,

1. Department of Geosystem, College of Humanities and Sciences, Nihon University

2. Earthquake and Volcano Research Center, Graduate School of Environmental Studies, Nagoya University

3. Institute of Earth Sciences, Academia Sinica, Taiwan

4. Department of Geosciences, National Taiwan University, Taiwan

5. AIST, Geological Survey of Japan, Active Fault and Earthquake Research Center

The Longitudinal Valley fault,(LVF) a major reverse fault dipping eastward in eastern Taiwan, is commonly considered as the collision boundary between the Eurasian plate and Philippine Sea plate. Some aseismic creep motions had been detected across the central and southern part of the Longitudinal Valley fault based on the GPS measurements and creep- meters. In order to discuss the spatio-temporal distribution of the aseismic creep motion in the central part of this fault, we established six precise leveling routes (the Rueisuei, Chike-shan, Yuli, Dongli, Dongzhu, Fuli routes) (Murase et al, 2009; Murase et al, 2012).

At first, the precise leveling surveys in Yuli area were conducted in every August from 2008 to 2012. The overview of the deformation detected in the Yuli route is as follows. An uplift rate of about 30 mm/year has been detected within 2 km in width across the fault. To the east of the fault, the uplift rate gradually reduces eastward with the distance, and down to 15 mm/year at the east coast. Since there was no significant earthquake occurred in the fault during the 4-year observation period, the detected deformation has been resulted from the aseismic creep motion. The creeping motion might occur at the same location of the fault with a constant rate in that the deformation denoted the same tendency and rate during all measurement periods.

Next, we conducted three routes in the Dongli, Fuli, and Chike-shan areas to detect the spatial distribution of the aseismic creep motion in August 2010 and 2012. The results show vertical deformation rates of 25 mm/year and 10 mm/year were detected in the Fuli route and the Chike-shan route, respectively. Furthermore, we conducted two routes in the Rueisuei and Dongshu area in August 2011 and 2012. Uplift rates of about 10 mm/year and 18 mm/year have been detected in the Rueisuei and Dongshu route, respectively.

These results suggest the creep rates of northern half of the central LVF are smaller than southern half.

## Acknowledgment

We would like to thank the staff of Institute of Earth Sciences, Academia Sinica and National Taiwan University for their support of our survey.

## References

- Murase M., N. Matsuta, J.-J. Lin, H.-C. Pu, W.-S. Chen and C.-H. Lin, Precise Leveling Survey at the Yuli fault, Southeast Taiwan, Proceedings of the institute of natural sciences, nihon university, 44, 159-166, 2009 (in Japanese with English abstract).
- Murase M., N. Matsuta, K. Ozawa, C.-H. Lin, W.-S. Chen, J.-J. Lin, Large Aseismic Creep Detected by Precise Leveling Survey at the Central Part of the Longitudinal Valley Fault, Southeast Taiwan (2008-2011), Proceedings of the institute of natural sciences, nihon university, 47, 241-254, 2012 (in Japanese with English abstract).