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# Deep seated landslides along the Meilungshan fault in Laonung River Waterdhed, southern Taiwan

Dia-Jie Ho (1), Ching-Weei Lin (2), and Chih-Ming Tseng (3)

(1) Disaster Prevention Research Center [U+FF0C] National Cheng Kung University [U+FF0C] Tainan [U+FF0C] Taiwan (kikiroro@dprc.ncku.edu.tw), (2) Department of Earth Sciences [U+FF0C] National Cheng Kung University [U+FF0C] Tainan [U+FF0C] Taiwan (chingwee@mail.ncku.edu.tw), (3) Department of Land Management and Development [U+FF0C] Chang Jung Christian University [U+FF0C] Tainan [U+FF0C] Taiwan (cmtseng@mail.cjcu.edu.tw)

Landslides in Taiwan represent one of most relevant natural hazards for the society. In particular, the large scaled deep-seated landslides deserve attention, because they can be reactivated during intense events and can evolve into destructive failures. For example, one deep seated landslide, the Hsiaolin landslide, with an area of about 250 ha, buried the entire village of Hsiaolin in Kaohsiung County causing 397 causalities, the disappearance of 53 others, and buried over 100 houses during the Typhoon Morakot in 2009.

The Laonung River watershed which covered 1367 $km^2$ is selected as our study area. The study area is mainly compose of Miocene slate and sedimentary rocks that are separated by a major fault, the Meilungshan fault. The Meilungshan fault is part of the boundary fault separating the Central Range and Western Foothill in southern Taiwan. The fault is a west verging, high angle NNE trending thrust. Some outcrops show the fault zone is over one hundred and fifty meters thick, and it is mainly composed of gouge and fault breccias of slate.

Within the study area, 361 sites with an area greater than 10 ha and with sliding topographic features of deep seated landslide such as crown main escarpment, down slope scarp, up slope scarps, and lateral cracks are recognized from LiDAR derived 1 m resolution DEM. Among these, 16 sites are selected for field investigation and all of them are confirmed as deep seated landslides. This implies the reliability of interpretation results from LiDAR derived DEM even in heavy forest region such as Taiwan. In order to know the influence of the Meilungshan fault in the development of deep seated landslides, landslide density are calculated. The landslide density is 7.7% when whole watershed is considered. However, the landslide density significantly increases to 19.3% when only an area 223$km^2$ that contains the Meilungshan fault with a 2km buffer zone is in the calculation. This result indicates that deformation zone associated with major fault is crucial in the development of deep seated landslides in the study area.