Recognition of large scale deep-seated landslides in vegetated areas of Taiwan

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In August 2009, Typhoon Morakot triggered thousands of landslides and debris flows, and according to government reports, 619 people were dead and 76 missing and the economic loss was estimated at hundreds million of USD. In particular, the large deep-seated landslides are critical and deserve attention, since they can be affected by a reactivation during intense events, that usually can evolve in destructive failures. These are also difficult to recognize in the field, especially under dense forest areas. A detailed and constantly updated inventory map of such phenomena, and the recognition of their topographic signatures really represents a key tool for landslide risk mitigation, and mapping. The aim of this work is to test the performance of a new developed method for the automatic extraction of geomorphic features related to landslide crowns developed by Tarolli et al. (2010), in support to field surveys in order to develop a detailed and accurate inventory map of such phenomena. The methodology is based on the detection of thresholds derived by the statistical analysis of variability of landform curvature from high resolution LiDAR derived topography. The analysis suggested that the method allowed a good performance in localization and extraction, respect to field analysis, of features related to deep-seated landslides. Thanks to LiDAR capabilty to detect the bare ground elevation data also in forested areas, it was possible to recognize in detail landslide features also in remote regions difficult to access.
Reference
Tarolli, P., Sofia, G., Dalla Fontana, G. (2010). Geomorphic features extraction from high-resolution topography: landslide crowns and bank erosion, Natural Hazards, doi:10.1007/s11069-010-9695-2