

Geomorphological analysis of the large scale collapse in southern Leyte using satellite imagery

Mamoru Koarai[1]; Hiroshi, P. Sato[1]; Izumi Kamiya[1]; Kiminori Araiba[2]; Nobutomo Osanai[3]; Hideyuki Itoh[4]

[1] GSI; [2] NRIFD, FDMA; [3] Nilim; [4] NILIM

On 17th February 2006, a large scale collapse occurred at Barangay Guinsaugon, Municipality St. Bernard, Southern Leyte Province, Philippines. The collaboration research team which consists of Geographical Survey Institute (GSI), National Research Institute of Fire and Disaster (NRIFD), and National Institute for Land and Infrastructure Management (NILIM) is investigating geomorphological characteristics of this large scale collapse by the field research in this winter and interpretation using satellite imagery and aerial photos.

The used satellite imagery are as follows:

Quick Bird 1.5 meter resolution pansharpen imagery taken on 16th and 18th April 2006.

ALOS PRISM 2.5 meter resolution stereo imagery taken on 10th October 2006.

Using Quick Bird pansharpen imagery, the damaged area is divided into collapse area, flow area and deposit area. Large numbers of hummocks are recognized in the deposit area. As GCPs (ground control points) on the ALOS PRISM stereo imagery were obtained by our GPS survey, the research team has the plan to generate DEM and ortho imagery from ALOS PRISM stereo imagery to estimate the volume of mass movement and to measure the shape of hummocks. The original structures of volcanic bodies and jigsaw puzzle structures are observed in cross section of hummocks, it is considered that this debris hazard is the debris avalanche due to large scale collapse of volcanic body.

The olden large scale collapses are interpreted using old aerial photos taken by US Military in 1950's. And the existence of olden hummocks is recognized in counter map from DEM generated by ASTER stereo imagery. Then, it is suggested that the large scale collapse sometime occurred in geological period in the studied area. The active faults are interpreted in the foot of collapse wall using aerial photos. It is conjectured that this large scale collapse was occurred by heavy rain fall, however, was deeply influenced by tectonic shear zone.