

Geomorphological and geological environment of the landslides on steep slopes induced by the 2008 Iwate-Miyagi Inland Earthquake

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We studied effect of geological structure on the landslide mechanism caused by the 2008 Iwate-Miyagi inland earthquake in the Nuruyu district in the upper reach of Ichihazama River.

The small collapses occurred on the old landslides on the east facing (dip slope side) slopes. In contrast, many landslides occurred on the jointed welded tuff layer underlain by the stratified tuffaceous sand and mudstone on the steep west-facing (back slope side) slope. On the backslope-side slopes, there were many small topple-type landslides in the jointed tuff layer, but some landslides were significantly large and accompanied by deep slip plane. Flexural slips in the underlying sedimentary rocks and newly occurred cracks on the mountain ridges suggest that the earthquake caused deep deformation in the back side slopes of the mountain.

In the southern part of Iwate Prefecture, many small landslides occurred on the Tertiary consolidated sedimentary rocks. The landslides were occasionally aligned parallel to the active faults detected from the airborne LiDAR observations, suggesting that the tectonic movement of the underlying sedimentary rock significantly affected on the slope unstabilization.

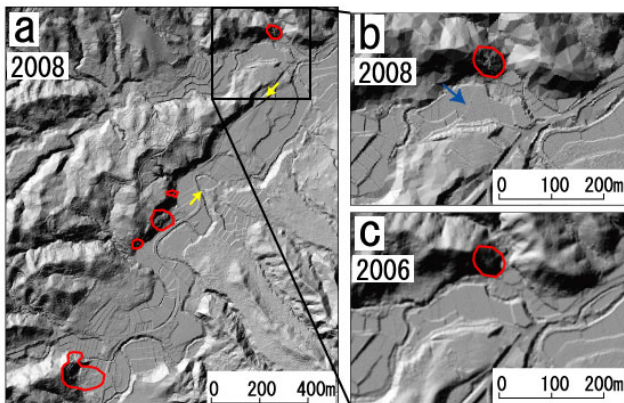


Fig. LiDAR shade image of the hanokidachi area before (b) and after the earthquake (a, c) in Hanokidachi district, Iwate Prefecture, showing a row of newly occurred landslides (red polygons) parallel to the fault line (between the yellow arrows in fig. a). The northernmost landslide locates on the newly appeared lineament (the blue arrow in fig. b) that were not recognizable in the 2006 LiDAR shade image (fig. c).