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Landslide surface deformation of hilly area in Sendai City, Japan

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The 2011 off the Pacific coast of Tohoku Earthquake triggered landslide surface deformation in hilly area, Sendai City, Japan; such the deformation damaged residential districts. We focused Midorigaoka district (ca.1.2km²), where were damaged by 1978 Miyagiken-oki earthquake and this earthquake, and investigated surface deformation (e.g., open crack and shortening of asphalt pavement). The total number of the field survey sites was 149, and mapped 77 deformation and 72 no-deformation sites. Next, we mapped earth filling and cut earth area distribution using two kinds of 5-m-digital elevation model (DEM, as of 1951 and 2000). Finally, we overlaid total 149 sites on the distribution map. As a result, average thickness of earth filling was 0.8m (SD: 5.4m) and 6.7m (SD: 4.7m) on no-deformation and deformation sites, respectively. It was found that there is the tendency that filling earth is thicker on deformation sites than on no-deformation sites. Furthermore, we tried sliding and no-sliding simulation for the main earth filling sites, considering seismic shaking and length of side and base of the cross section on the earth filling sites. We will also report the result of the simulation.

Here, the DEMs were given by courtesy of Prof.Miyagi, Tohoku Gakuin Univ.

Keywords: landslide, residential district, damage, earth filling, cut earth, earthquake