

Geomorphic setting on surface failure position by water line analysis

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As the spatial resolution of Digital Elevation Model (DEM) has become higher, we can investigate geomorphological properties of smaller scale surface failures using DEM. However, there are problems of how to distinguish failure cells from non-failure cells and how to analyze them. We traced water lines to identify target cells on hilly slopes.

The study area is the hilly area in Hiroshima city, where over a hundred surface failures occurred in 2014.

In analysis, 3 cells were determined on the water line; head cell located at the head of each surface failure, upper cell upward adjacent to the head cell, and lower cell downward adjacent to head cell.

We calculated slope angle, flow accumulation, and profile curvature for the head-, upper- and lower-cells.

Flow accumulation is defined as relative water quantity on each individual cell supplied from upstream areas (cells).

We compared vertical slope shape (concave, convex, straight) and its change along the water line between the failure slopes and un-failure ones, and had a tentative conclusion that combination of vertical slope shapes along the water line is one of the important geomorphological features for detecting the slope segment easy to failure.

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