



1 Experimental study on 3-D bedrock surface changes with abrasion

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Incision into bedrock channel is the primary control of landform evolution, but research into bedrock incision process stagnated for long time. Due to the scaling problem of the application of results from flume studies to bedrock channel, there is a strong need to simulate the bedrock incision process with more realistic mode. As a part of investigation into controls of bedrock channel incision, three-dimensional changes of rock surface with abrasion was investigated with physical modelling. 18 rock plates were abraded with various sediment particle size and sediment load and abraded surfaces of the plates were scanned with high resolution 3-D scanner.

To identify the spatial pattern of erosion of the rock plates, various methods were used. There was no one method that showed all features of the erosion, so each plate was analyzed using all methods. Contour maps, shaded relief maps and profiles show that abrasion concentrated on the centre of plate (cross profile) and upstream and downstream edges (longitudinal profile) and eroded area extended inwards. It also found that the cracks and boundaries of forming materials easily eroded than other parts.

Changing patterns of surface roughness were investigated with profiles, regression analysis and spectral analysis. Majority of plates showed decrease in small-scale roughness, but it depends on microstructures of the plates rather than general hard-

ness or other factors. SEM inspection results supported this idea.