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# Hillslope-channel coupling in a landslide dominated catchment (Nakatsu, Japan): simplicity or complexity?

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Sediment transport and deposition in tectonic active regions is a major threat to humans. However, downstream sediment transport and deposition in geomorphic systems is not exclusively controlled by sediment production at the hillslope but strongly depends on the coupling of hillslopes and the corresponding channel system. While investigations of sediment flux within certain geomorphic domains are common, little is known on the degree of coupling between hillslopes and fluvial systems. The main objective of this study is to investigate the degree of hillslope-channel coupling in terms of simple and complex feedbacks to external and internal system controls.

In this study, we analyse the degree of hillslope-channel coupling and its controlling factors in the landslide dominated Nakatsu catchment (61 $km^2$). The catchment is situated in the active tectonic zone of Central Japan. In the study site, a large number shallow landslides was triggered by heavy rainstorms in 1959, 1972, 1983, 1996 and 2000. To control the sediment yield of the catchment, 456 channel dams were built since 1947.

Based on aerial photographs taken in 1947 1972, 1985, 1996, 2000 and 2005, we estimated the aerial extend of landslides at the hillslopes and sediment deposition in the valleys. The degree of hillslope channel coupling was analysed based on the classification developed by Korup (2005) and by a simple hillslope-channel index based on the aerial extend of landslides and fluvial deposition.

The results are discussed in terms of simple characteristics of external impacts (rainfall

magnitude and number of channel dams) and of the geomorphic system (mean slope, catchment size etc.), and in terms of complex feedbacks and thresholds within the geomorphic system. We specially emphasis management strategies to control short-term sediment transport and on implications to extrapolate sediment fluxes to Holocene time scales.

Korup, O., 2005. Geomorphic imprint of landslides on alpine river systems, southwest New Zealand. Earth Surface Processes and Landforms, 30(7): 783-800.