

Analysis of channel gradients and fluvial knickzones of mountain rivers in central Japan

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The fluvial knickzone is a zone of a riverbed having a relatively high gradient than its upstream and downstream segments, and it often corresponds to an erosional front in mountain regions. Quantitative extraction of fluvial knickzones was carried out for mountain bedrock rivers in central Japan using GIS and DEMs. Stream gradients for different measurement lengths, d (m), were calculated. The measured stream gradients of relatively steep segments tend to decrease as d increases. Knickzones were determined based on such attrition rates of stream gradients.

The identified knickzones occupy 4.1% of all the streams, and occur at a frequency of 0.18 /km. The knickzones are abundant at the lower to middle reaches of mountain rivers, while the effects of lithological boundaries on the knickzone distribution are unclear. This suggests that the distribution of knickzones is strongly influenced by the stages of landform development by fluvial and tectonic processes.