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# Humans as (dis)connecting agents in fluvial systems: a conceptualization with case studies from small to meso-scale catchments

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Knowledge about connectivity relationships in fluvial systems is of major importance, especially for assessing geomorphic system response to human interference. In the field of geomorphology, previous connectivity concepts have primarily focused on the (dis)connecting effects of different landscape forms rather than considering the role of humans. The authors will introduce a conceptual model highlighting the importance of humans as (dis)connecting agents in fluvial systems. It will be further demonstrated that different spatial dimensions of connectivity are interrelated, since alterations in one distinct spatial dimension cause changes in another. The reflections are underpinned by presenting case study examples from small (1 – 10 $km^2$) to meso-scale catchments (10 – 1,000 $km^2$) in different environmental settings.

Direct as well as indirect human impacts on fluvial systems lead to significant changes in different spatial dimensions of connectivity, consequently inducing geomorphic changes. The construction of dams, for example, leads to a significant reduction of connectivity in longitudinal direction which is followed by river bed erosion downstream of the dam. Lateral connectivity relationships are modified by major land use changes in the catchments, hence altering the river runoff and sediment dynamics. In this context, reforestation, for example, leads to channel narrowing as a result of lower peak flows and a decrease of lateral sediment input. Another case study example shows how gully development is influenced by the construction of dirt roads, since these features are altering flow routing and hence connectivity within the gully catchment. Moreover, an example will be presented demonstrating that connectivity relationships in fluvial systems also change with time due to self-organizing properties of the system.