



The role of humans as (dis)connectors in small fluvial systems: sedimentological effects and their implications

Ronald Pöppel, Thomas Glade, and Margreth Keiler

Vienna, Geography and Regional Research, Austria (ronald.poeppel@univie.ac.at)

In Europe, almost every river catchment is affected by humans, e.g. due to changing land-use conditions and the installation of river engineering structures. Thus, 'natural (fluvial) systems' are scarce and humans are almost always inseparably interwoven with them playing a major role in altering them coincidentally. A general differentiation of human impacts on fluvial systems between direct and indirect human interventions is mostly possible. Direct human interventions hinder or force water in river channels to flow deviant from its natural behaviour (i.e. river engineering structures), while indirect interventions take place on locations distant from the river channels (i.e. land use activities), but leading to alterations of sediment and water supply into the channel system (e.g. due to soil erosion). These modifications can cause various geomorphic system responses and sedimentological effects because of changing ratios between [sediment load * sediment size] and [stream slope * stream discharge], resulting in degradation and/or aggradation processes within the river system. In this sense, different types of human induced features have the ability to (dis)connect landscape compartments from/to each other hydrologically and hence sedimentologically.

The main objectives of the presented studies are to identify the role of humans as (dis)connectors in a small agricultural watershed of the Eastern Bohemian Massif by investigating human induced effects due to different land use conditions and river engineering structures on sediment delivery and sediment storage.

The applied methodology ranges from aerial photograph and airborne laserscan -interpretations, soil erosion modelling to field based and laboratory surveys of river bed sediment compositions. Finally, explorative statistics have been used to demarcate potential factors of influence and to delineate human-landscape system connectivity-relationships within the study area.

The results show that human interventions play an important role in altering the sediment connectivity relationships between landscape system compartments: i.e. due to (dis)connecting effects of different land use patterns which are much depending on topographical factors and features which can even result from their vegetation cover, as well as on the widths and their order of appearance along the flow routes; due to weirs and dams which are very effective features in trapping sediments leading to decoupling effects between different river reaches.