

Bank erosion inducement measures for dynamic river widening

The wide range of restoration measures in channelized, morphologically degraded rivers includes dynamic river widening. This method is based on the reactivation of bank erosion, sediment redistribution, and channel shifting processes within certain spatial limitations. The goal is to restore the morphodynamic processes characteristic for a natural riverscape and to increase the diversity of aquatic and terrestrial habitats. After the removal of the bank protection structures on one or both banks, bank erosion inducement measures are usually necessary to overcome the erosion resistance of the floodplain (Fig. 1).

The temporal and spatial development of a dynamic river widening is of substantial interest in the assessment of flood safety and ecological effectiveness. However, the initial widening phase is often a source of high uncertainty. During this thesis, several bank erosion inducement measures should be compared with respect to their effectiveness. This includes structural measures as well as changes to the sediment supply.

In this study, long-term hydromorphological experiments will be performed in a large-scale physical model at the Laboratory of Hydraulics, Hydrology and Glaciology (VAW). The objectives of the thesis are to investigate the suitability of different bank erosion inducement measures in terms of (i) the temporal evolution of bank erosion and (ii) the overall morphological processes in a dynamic river widening. Modern measurement techniques such as terrestrial laser scanning are used and the results will contribute to recommendations on the design of dynamic river widening with a focus on the initiation process.



Fig. 1: A secondary channel as bank erosion inducement measure directly after the construction of the river widening Felsberg, Alpine Rhine River, GR (www.alpenrheinschule.net)

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Notes:

Research oriented, experimental;
Single MSc-Thesis
Communication in German or English