

Numerical simulation of river widenings under variable sediment supply

Dynamic river widening is a restoration method applied to channelized, degraded rivers. The goal is to provide the river with more room for dynamic sediment erosion and deposition processes within a limited perimeter (Fig. 1). The episodic sediment relocation processes are vital for a healthy river system. To initiate the widening process, the bank protection of the initial channel is removed and the bank erosion advances during subsequent flood events. Comprehensive knowledge on the morphodynamic processes is necessary to avoid widenings that develop too quickly and lead to flood protection issues or too slowly and thus cannot provide any ecological advantages. Sediment supply from upstream is one relevant parameter related to the development of dynamic river widenings.

The goal of this thesis is to investigate the morphodynamic processes within river widenings in relation to different sediment supply scenarios. The 2D morphodynamic simulations will be performed with the software BASEMENT. The model will be calibrated and validated with experimental data that is provided from a large-scale laboratory experiment at VAW. The comparison to experimental data has the advantage of clearly defined boundary conditions and topographic measurements of high temporal resolution.

No specific programming skills are required. However, the lecture 'River Morphodynamic Modelling' is mandatory.



Fig. 1: Morphodynamic change in the dynamic river widening Heustrich at the Kander River. (2004-2013 © swisstopo, 2018 VAW)

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Notes:

Research oriented
Single MSc or Project thesis
Communication in German or English