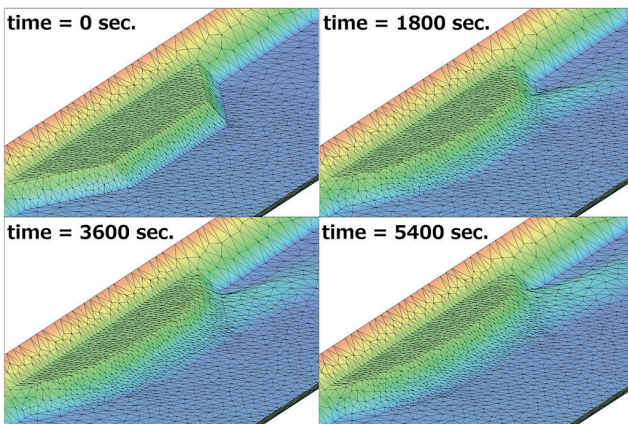


Sediment replenishment by gravel deposits and stream bank erosion in Swiss lowland rivers



Numerical model run of gravel deposit erosion in a laboratory channel. Flow direction is from left down to top right (Picture: L. Vonwiller, VAW)

Gravel-bed rivers in Switzerland are generally in a poor ecological condition. This is mainly due to increased river training measures and hydro power plant operations over the last centuries. The construction of dams, weirs, and sediment retention basins led to a disruption of sediment continuity. Hence, many rivers suffer from a sediment deficit and morphological degradation. In order to improve the situation sediment can be replenished by means of (i) artificial gravel deposits, (ii) bank erosion, or a combination of both. Pilot projects of artificial gravel deposits in Switzerland have shown some promising results. However, the behavior of such measures and their impact on the river morphology are still not fully understood. There is a knowledge gap concerning successful application of artificial gravel deposits. Lateral erosion is the relevant process to entrain sediment from gravel deposits and river banks. Therefore, the objective of this research project is to improve the numerical modelling of processes related to fluvial bank erosion. The current research project will be performed in close cooperation with the PhD project of Friedl at VAW conducting laboratory experiments. This hybrid model approach combines the advantages of experimental and numerical methods allowing for a comprehensive analysis and an improved prediction of bank erosion.



Gravel deposit at the River Aare. (Photo: Flussbau AG)

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Keywords: Numerical modelling, bank erosion, sediment transport, morphodynamics

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