

Sedimentation of Swiss reservoirs: extent and mitigation measures

The sedimentation of natural lakes and artificial reservoirs is a morphodynamical process that causes the sediment inflows to settle as a result of reduced turbulences and bed shear-stresses in the lake / reservoir or at the mouth of the watercourse into the lake. Therefore, lakes and reservoirs gradually fill up (Fig. 1). For dams, counter-measures can be implemented to transport the sediment downstream. Thus, loss of storage and the sediment deficit downstream of the dam can be reduced. These sediment management measures include the emptying and flushing of reservoirs, which is especially effective for smaller ones (Fig. 2).



Fig. 1: Reservoir Grimsel (BE), 2017 [Picture: VAW]



Fig. 2: Reservoir Raggal (Austria), 2007
[Picture: Robert Boes]

In this Bachelor's thesis, recent data from Swiss hydropower dams will be evaluated and presented in order to quantify the problem of reservoir sedimentation and estimate typical sedimentation rates in Swiss catchments. Further operational data will then be used to analyze and classify the effectiveness of reservoir flushing. The results are to be compared with literature data and checked for plausibility. The work serves to understand the sedimentation processes and to classify the effectiveness of possible mitigation measures. It thus makes a valuable contribution to maintain storage volumes and hence the energy storage capacities of Swiss hydropower reservoirs.

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Remarks: Practice oriented work; communication and report in English; 1-2 students possible