

Master's thesis Spring Semester 2021



Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie

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Numerical modelling of sedimentation at Shimen Reservoir in Taiwan

Reservoir sedimentation have strongly increased both in the Alpine regions and worldwide under the impact of climate change. Reservoir sedimentation not only causes financial losses and environmental damages but also endangers electricity production, water supply and dam operation safety. Shihmen multi-purpose reservoir in the northern part of Taiwan is a striking example of reservoir sedimentation with frequent extreme hydrological events. From 1964 until now, 35% of the reservoir storage capacity was lost due to reservoir sedimentation. To countermeasure the sedimentation problem in this reservoir, an integrated desiltation strategy consisting of sediment dredging and mechanical removal, upstream sluicing and desilting tunnels and hydraulic discharge at the dam with two tunnels has been implemented (Fig. 1). The tunnels are either under construction or in planning stage. Within the scope of this thesis, the dynamic siltation process and desilting measures in the Shihmen reservoir will be simulated using the software BASEMENT. Data on hydrology (inflow and outflow), reservoir operation (water level), topography, bathymetry, and sediment characteristics in a sufficiently dense temporal and spatial distribution (1964-2018) will be provided by National Taiwan University (NTU). The data will be used to set-up, calibrate and validate the model. Using the model, future sedimentation processes and the effect of various mitigation measures over a period of decades will be simulated for different scenarios.



Fig. 1: Shihmen reservoir with sedimentation mitigation measures in Taiwan (Source: NTU)

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Particular information:

Prerequisite: Attending the lecture "River Morphodynamic Modeling" Language: English