



M.Sc. Topic

Building the future: A two-dimensional (2D) numerical model of morphodynamic processes in a large reservoir

Background

Thousands of large and small dams around the world are indispensable for hydropower generation, drinking water supply, irrigation, flood protection, and recreation. Global change alters hydro-climatic conditions and morphodynamics of watersheds. The changes in hydrological and sediment transport pattern accelerate reservoir sedimentation, and therefore, reduce the lifetime of dams. Advanced 2D and 3D numerical tools enable the coupled reproduction of hydraulics and sediment dynamics in the reservoirs. Such tools provide solid estimates of erosion and deposition rates. The model maps hydraulic parameters in the two- or three-dimensional space and reveals spatio-temporal drivers of sedimentation processes in reservoirs. This study tests the applicability of fast 2D models (compared to 3D models) for long-term simulations of reservoir sedimentation. This case study will produce a numerical model to simulate hydro-morphodynamic processes of the Banja Reservoir in southern Albania.



A two-dimensional
numerical model of
morphodynamic
processes in a large
reservoir

Thesis Overview

1. Literature study on reservoir modelling using 2D numerical models
2. Familiarize with the software
3. Synthesize input data for the numerical model of the Banja reservoir
4. Set up the 2D hydro-morphodynamic, numerical model of the Banja reservoir
5. Implement boundaries for purely hydraulic calculations and perform a parameter study (steady state)
6. Implement sediment properties
7. Run hydro-morphodynamic numerical simulations of a defined scenario (e.g., from 2017 - 2019)
8. Interpret results and extract conclusions for reservoir modelling



Apply now!

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The thesis can be written in German or English.

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