



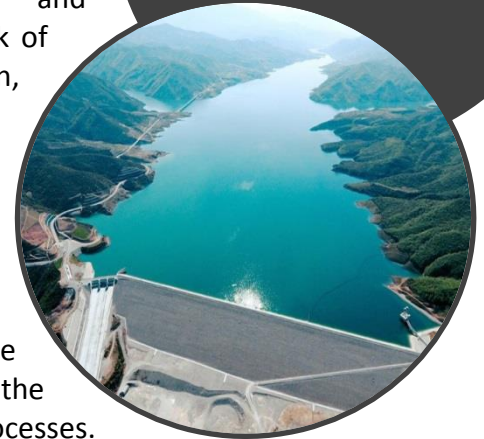
M.Sc. Topic

Numerical modeling of sediment transport processes in a large reservoir with Telemac3d

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 resulting in a supposedly elevated risk of reservoir sedimentation. To assess the risk of reservoir sedimentation, advanced two-dimensional (2d) and three-dimensional (3d) numerical models enable to simulate hydraulics and sediment dynamics. The model output maps the processes in the 2d or 3d and reveals spatio-temporal drivers of sedimentation processes in reservoirs. To this end, this study develops a numerical model of flow pattern, suspended sediment transport, and sedimentation processes in the Banja Reservoir in southern Albania. The student will learn and apply the open-source model Telemac3d coupled with the sediment transport module Gaia for the fully three-dimensional emulation of hydraulic and morphodynamic processes. In addition, the student will test the capacity of Telemac3d to simulate characteristic sediment transport processes such as turbidity currents in a large reservoir.

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Thesis Overview

1. Literature review on sediment transport processes in reservoirs and 3d numerical models
2. Familiarize with the software Telemac3d
3. Setup the 3d-numerical model of the Banja reservoir with Telemac3d
4. Implement purely hydrodynamic simulation and perform parameter study (steady flow conditions)
5. Implement sediment properties in the numerical model
6. Run hydro-morphodynamic numerical simulations for different scenarios (e.g., 1 week)
7. Interpret results and derive conclusions for modeling sediment transport processes in reservoirs



Apply now!

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The thesis can be written in German or English.

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