Universität Stuttgart

IWS Department of Hydraulic Engineering
and Water Resources Management
Prof. Dr.-Ing. Silke Wieprecht

M.Sc. Topic

Two-dimensional (2D), hydro-morphodynamic, numerical modelling of a Californian cobble-gravel bed river

2D hydro-morphodynamic numerical modelling of a Californian river

Background

California's foothill rivers experienced substantial impacts from human acitivities in the past. The gold rush in the 19th century resulted in a massive sediment surplus. The mining sediment was transported by floods that led to devastating damages in the Sacramento Valley. Subsequently, large dams were built to retain the surplus sediment in the foothills. Today, the combined effects of sediment supply surplus followed by the cuttoff of sediment supply manifest in a degradation of the fluvial ecosystem. For instance, the spawning grounds of the largest Pacific salmonids (Chinook salmon) are considerably affected. For the restoration of the spawning grounds, hydro morphodynamic, 2D numerical models are necessary to estimate the effects of interventions on the complex sediment budget. The morphodynamic component of such numerical models represents one of the most challenging aspects of modern river engineering. This thesis takes up this challenge using the open source TELEMAC software, which is widely used worldwide. The successful student will set a landmark for her or his career in water resource engineering with this project.
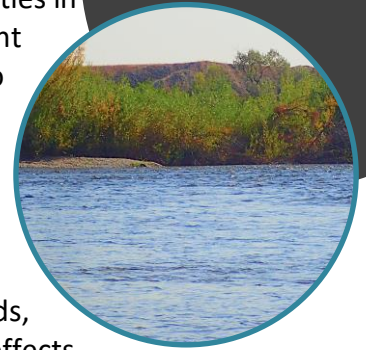
Thesis Overview

1. Familiarize with TELEMAC and the input dataset
2. Setup the numerical grid and boundary conditions
3. Calibrate and validate the numerical model
4. Simulate a representative flood event
5. Interpret the model observations

*The thesis can be written in **English or German**.*

Desirable Skills

- Basic understanding of numerical models (i.e., make to have attended a lecture that introduces numerical modelling of rivers)
- Basics in Python are an advantage, but not required

Apply now!
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Please write a few lines about yourself and why you want to work on this thesis proposal.

Examinar: Prof.-Dr. Ing. Silke Wieprecht (LWW) | Supervisors: M. Sc. Kilian Mouris (LWW)

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