

Project Outlines 2017 for Research Plans

1. Directions for Research Plan Preparation

A Project group consists of two students. Select one of the rivers and write a max 2 page research plan based on the listed topic below. The research plan is your own group reflection on the problem and how you would go about solving it using BASEMENT. We are looking for your own ideas and opinions. Focus on four points: (a) define and describe the problem; (b) describe how you could use BASEMENT in this problem; (c) what are the expected outcomes you would like to achieve; and (d) list the data that you would need.

Indicate in the doodle <https://ethz.doodle.com/poll/7ktifdxxdh8tceyf> which river you are preparing your research plan for as soon as possible. Consider that we will most likely have one group per river site. Submit your research plan to Maria Magdali by **15 June 2017**. The PDF file of the research plan should include short CVs of both students. We will get back in touch with you by the end of June to make a selection and finalize your project.

2. River Sites and Project Topic Outlines

Maggia River

- model: 2d BASEMENT
- reach: Bignasco - Ponte Brolla
- main supervisor: Molnar

The Maggia River is a braided gravel-bed river with a riparian forest/floodplain and an actively changing bar morphology. The river has been regulated since 1950s when the OFIMA hydropower system was constructed in the headwaters and flow in the main valley was reduced to 25% of the natural mean flow. The regulation consists of maintaining constant minimum flow at the top of the study reach. A question in the Maggia is how has the sediment regime been affected by the drop in discharge. For instance what are the erosion/deposition rates in the river bed and what is the flood level at which significant geomorphic work/adjustment starts taking place? Another question concerns physical habitat. For instance how has the geomorphological habitat and its suitability for fish changed from before to after dam construction? Is the current minimum flow release sufficient to maintain habitat diversity and extent?

Ticino River

- model: 1d BASEMENT
- reach: Biasca – Bellinzona
- main supervisor: Siviglia

The Ticino River is a gravel-bed river with a channelized cross-section profile to sustain flood protection. The river has a hydropeaking regime with discharges from several hydropower systems. Channelization has led to vertical incision of up to 4-5 m since the 1920s. In the past gravel in the river bed was mined (extracted), this practice has been stopped in recent time. A question in the Ticino is what is reason for the past morphological adjustment of the long profile. For instance, why has the long profile not adjusted (aggraded) after gravel mining has stopped? What is the current balance between sediment input and sediment transport through the affected reach? Is the hydropeaking regime playing a role? Would aggradation in the river lead to an increase in flood risk? The relevant questions for the Ticino River concern the combined effect of channelization, flow regulation and disruption in sediment input on the sediment transport regime and erosion/deposition of the river bed.