

Master's or Project Thesis HS 2021



Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie

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Modelling the dynamics of thermal refugia in Maggia River

The water temperature has a key role in several ecological processes that occur within river corridors. Among others, it influences the rate of biogeochemical processes, the behavior of macroinvertebrate as well as the fish community at different life stages, from egg development to reproduction. The river water temperature is the result of multiple heat exchanges that depend on the hydraulic regime, atmospheric conditions, riparian vegetation, groundwater exchanges, and river morphology. Understanding the water temperature variability at a local scale and identifying thermal refugia can improve the description of different physical template/habitat. In this light, the main goal of this project is to model the river water temperature dynamics of a reach of the Maggia River in Canton Ticino (see Fig. 1). The hydrological regime is strongly regulated, leading to high water temperature conditions, especially during warm season.



Fig. 1: Maggia River, Canton Ticino

The case study will be a 2 km long reach of the Maggia river (Figure 1), for which a large amount of data and a computational mesh are already available in the context of a monitoring program conducted by Canton Ticino. The student(s) will work on (i) the setup and run of the BASEMENT numerical model with an *ad-hoc* temperature module, (ii) the analysis of thermal variability in the investigated reach, (iii) the comparison between different flow and/or climate scenarios. Participation to field activities on the site is possible. This project requires an affinity for numerical simulations and data analysis. General scripting skills are helpful. The prior attendance of the course River Morphodynamic Modelling is a prerequisite.

for Project or 1 student for Master's thesis

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