Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Versuchsanstalt für Wasserbau,
Hydrologie und Glaziologie

Head: Dr. David Vetsch
Supervision: Dr. Davide Vanzo
Dr. Francesco Caponi

Master's Thesis or Project Work
HS 2022

Analysis and modelling of river thermal dynamics in the Maggia valley

The water temperature plays a key role in several ecological processes that occur within the 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. How river temperature responds to different discharge and atmospheric conditions is particularly relevant for river adaptation strategies in a changing climate.
In this context, the main goal of this project is to analyze and model the river water temperature dynamics in the Maggia catchment in Canton Ticino (see Fig. 1), where the impaired hydrological regime leads to high summer water temperature conditions.

Fig. 1: Maggia River, Canton Tessin

The student(s) will work on the (i) analysis of existing temperature time series in the Maggia valley, (ii) setup and calibration of a simplified process-based model to simulate river water temperature, and (iii) comparison between different flow and/or climate scenarios. Participation to field activities on the site is possible. This project requires an affinity for GIS and data analysis, and hydro-environmental modelling. General scripting skills are helpful.

Contact: Dr. Davide Vanzo
HIA C 51
vanzo@vaw.baug.ethz.ch

Remarks: Correspondence and report in English; 2 students for Project Work or 1 student for Master's thesis